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THE BRITISH
JOURNAL OF PHOTOGRAPHY,

PUBLISHED WEEKLY.

VOL. XXXVI.



285783
4
18

LONDON :

HENRY GREENWOOD & CO., 2, YORK STREET, COVENT GARDEN, W.C.

PARIS: M. LIEBERT, RUE DE LONDRES, No. 6.

NEW YORK: E. AND H. T. ANTHONY & CO., 591, BROADWAY; SCOVILL MANUF'G COMPANY, 427, BROOME STREET.

PHILADELPHIA: T. H. McCOLLIN, 635, ARCH STREET.

MELBOURNE: J. W. SMALL & CO. SYDNEY: BRAY & LICHTNER.

SAN FRANCISCO: SAM C. PARTRIDGE, 529, COMMERCIAL STREET.

MDCCCLXXXIX.

LONDON:
STRANGEWAYS & SONS, PRINTERS, TOWER STREET, CAMBRIDGE CIRCUS, W.C.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1496. VOL. XXXVI.—JANUARY 4, 1889.

THE USE OF THE SULPHITES.

In our article upon this subject three weeks ago we referred to some experiments we were making with regard to the proportions in which sulphite of soda was added to the developing solution, and we have now sufficient memoranda to be of interest. In using this salt, as its price is not great, we feel that it is desirable to recommend the employment on all occasions of the pure crystals for developing purposes. We have often used the commercial article, and been satisfied with its action, but uniformity is always advisable where possible; it will be ensured by using the recrystallised sulphite. We have used it also both with and without the addition of acid, and could perceive no difference, so that, as regards acid, it becomes merely a question of how long the solution of pyro is likely to be required to keep. A few weeks, and it will not need acid; but if it is intended to last for months, let acid be employed; but, above all, it is essential that for every-day work the "pyro" solution should be uniform both as to whether it is acidified or not, and as to the proportion of acid present. Many persons prefer to use acid sulphite of soda instead of free acid, but our preference is given to citric acid, both on account of our preferring an acid that does not at all set upon the image, and also of the tendency of solution of acid sulphite to absorb oxygen, and become changed into sulphate, when the preservative action as acid would be as nothing.

These preliminaries stated, we may discuss the results obtained which, as they are the outcome of a very large number of experiments, may be thoroughly relied upon. Our main object was to ascertain for ourselves the best working proportions for every-day development, and if we arrive at no new conclusions, alter no old formulæ, we, at least, can give added weight to their claims. We started with a developer containing sulphite to the extent of one grain for each grain of pyro, and this strength was gradually increased grain by grain till the last solution used contained twelve grains of sulphite to each grain of pyro, a proportion beyond which it is quite useless to go.

The grain-to-grain pyro gave results very much in favour of the use of sulphite, the yellow colour of the negative was greatly reduced, and the solution did not discolour so rapidly. Two grains to one of pyro was still better—yellowness greatly reduced, but still not giving "wet-plate" character. Three grains better still, but the whole benefit sulphite was capable of imparting not yet obtained. Four grains to one of pyro—and this, be it noted, is the original formula Mr Berkeley gave

to the world when he first made public the benefit obtainable from the use of sulphite—we found to give an excellent working solution, giving a good proportion, but not all, of the benefits obtainable, and one that was a vast improvement on all the rest. From five to six grains were still better, and that we looked upon as a practical limit for a working formula, as, although under some conditions—as, for example, greatly prolonged development and maximum amount of ammonia added—complete freedom from yellowness was not obtained, in by far the larger number of cases the fixed negative was all that could be desired for cleanness and "wet-plate" character. For the present we have fixed upon the proportion of six grains of sulphite of soda to each grain of pyro employed as the formula for our own general developing work. There is one good reason for adhering to a high proportion, and that is the increased power of using the solution with advantage for more plates than one. We have developed three plates in succession in the same solution without perceiving any but the slightest difference between the first and the last as regards yellowness, a condition that does not obtain with lower proportions of sulphite. When an open measure containing used solution was left exposed to the air for twenty-four hours it remained clear, and did not arrive at the depth of colour the one-to-one proportion attained in half an hour.

Another singular quality was perceptible when the highest strength was used—namely, a distinctly red hue imparted to the solution, more particularly discernible when the colour was observed in white vessels. So much was this changed hue discernible that a white jug containing a small quantity at the bottom that had been left for one day was brought to us with an inquiry as to what the red liquid was, our questioner being quite familiar with the ordinary aspect of oxidised "pyro" solution. We noticed in the *Chemical News' précis* of foreign chemical news a chemist having observed and published the fact that dilute solutions of copper gave a rose-coloured solution with saturated solution of sulphite of soda, to which a little pyrogallol had been added; two other chemists, while agreeing with these results, found also that the reaction is not characteristic of copper, being producible with dilute aqueous solutions of most metallic salts, and even with distilled water. As our own above-cited experiments show, the production of this pink colour follows oxidation, and is higher the greater the amount of sulphite present in comparison with pyro.

In conclusion, we may say that we have never found any objectionable action in the use of sulphite in the pyro ammonia developer, but we have made no exact comparative

trials. We purpose at some future time making tests in this direction, though we anticipate results of an entirely negative character.

A VENTILATING DARK-ROOM WINDOW.

Although the alkaline carbonates are gradually coming into use instead of ammonia for development, there is no doubt the latter still remains, and will continue to be, the favourite in spite of its volatility and the troubles it brings with it in consequence of that quality. We have in the present article nothing to do with the chemical side of the question—that is, the uncertainty that may arise from the rapidly varying strength of the unstable solution—but merely look at the sanitary considerations. Many operators, some far more than others, suffer greatly from the effects of the fumes of ammonia given off in the developing room; and where the process of development is a continuous one, lasting over several hours at a stretch, as is frequently the case in large establishments, it is by no means difficult to conceive that the permanent injury to health, as well as the temporary discomfort so caused, may be very considerable. Any means of alleviating the distress produced in this manner may therefore be welcomed.

Some time ago, when paying a visit of inspection to Messrs. Valentine & Son's extensive works at Dundee, we were greatly struck with a feature to which Mr. Valentine himself attached some importance in their developing room, namely, the provision made for carrying off immediately the fumes of ammonia rising from the developing dish, and this so effectually that the operator need never even smell the alkali. In an extensive establishment like the one we mention, where undeveloped plates are sent in daily by a large staff of outdoor operators, the process of development is naturally going on "from early morn to dewy eve," and without some adequate means of freeing the atmosphere of the work room of the noxious fumes given off from the numerous evaporating surfaces simultaneously exposed, the place would soon become unbearable.

The remedy in this case consisted in a current of air being induced to pass over the developing sink in the direction from the operator, carrying the ammonia fumes directly into communication with the open air, and thus not only freeing the atmosphere of the room of the injurious alkali, but also clearing it of all other noxious matter. We do not recollect the exact details of Messrs. Valentine's arrangement, or how the air current was induced, but we had ample evidence of its efficiency. A few days ago we saw, however, in an amateur laboratory, a similar arrangement of great simplicity, which may very well be utilised either on a small or large scale without any great expense.

In the arrangement referred to the air current is induced by a gas flame, which also serves the purpose of lighting the room—not necessarily, for daylight may be employed if preferred; but many experienced workers prefer to rely upon artificial light, as being more uniform, and consequently leading to more trustworthy results. When artificial light is employed, whether it be gas or oil, there need, therefore, be no additional expense; but even if daylight be used, the extra cost of gas or oil for the mere purpose of setting up a current will not be a serious matter.

A double casing to the lower portion of the window, forming a sort of "lantern" about ten inches or a foot deep, constitutes the main part of the system. The front of the lantern may be "glazed" with any medium suitable for artificial light,

while the back or window proper may have an additional thickness of non-actinic colour to render it safe for daylight, or may be left clear if daylight is not utilised. Along the lower front edge of the casing is an opening to admit air which supplies "food" for the lamp inside, and at the same time draws off the vitiated air from the room. The top of the lantern is provided with a tube, which should preferably communicate with the open air, or be run into the chimney if such be accessible; but if a ventilator of the ordinary character be fixed in the upper portion of the room, the exit tube may discharge its current into the room itself.

It is true this kind of arrangement does not act as a very powerful ventilator in the general sense, but at any rate it carries the ammonia fumes away from the operator, and delivers them at a distance, whence they cannot reach him without being considerably and sensibly diluted. We should, however, recommend the exit tube to be carried through the wall either into the "open" or into a chimney where possible, and to prevent any down draught a suitable cowl should be provided. It is needless to say that the nearer the air inlet is to the ordinary position of the developing dish when in use, the better will be the ventilating action.

SILVER PRINTS NOW CONTRASTED WITH THOSE OF THIRTY YEARS AGO.

At the commencement of the new year it may not be amiss to "take stock" of the conditions under which our finished pictures are now produced, and compare them with those which existed in times long past, and see what, if any, improvements have been effected. Let us bark back, say, thirty years. It is an even number, and will take us to the year 1859. The only method of printing then in use was that on albumenised paper, for at that period salted paper had practically become obsolete. The albumenised paper of those days was quite a different thing from what it is now. Its surface, in comparison with the present article, would be considered matt. For it was not until the *carte* picture became popular that the very highly glazed papers were adopted.

Fading or yellowed prints were known at that period, a cry was raised for a permanent process, and in course of time the carbon, the Woodburytype, the collotype, and the chromotype processes were introduced. As each of these processes were brought forward it was predicted by the sanguine that silver printing had received its death blow. However, it survived, and still survives. For a time the platinotype process made but little headway, as its tones were only partially admired. However, taste on this point has undergone a radical change, and platinotype has now become firmly established as a process of the future, and its results are permanent. And we have the gelatinobromide and the gelatino-chloride processes, which also yield excellent results, and at the same time are undoubtedly the most permanent of silver printing processes. In face of all these different methods of printing, there is no gainsaying the fact that out of the total number of photographs now produced only a very small percentage of them are other than albumenised paper prints. Silver printing on albumen paper still holds sway, for what reason it is not our present purpose to inquire; it is sufficient to know that it does, and in all probability it will continue to do so for some time to come.

Seeing that the same method of printing that was in use thirty years ago is still employed naturally leads one to inquire

of the prints now made are superior in quality or are more permanent than those which used to be produced at the date mentioned. With reference to the excellence of the work, taking into consideration the quality now conferred upon the negative by retouching, we say there is no improvement, and, what is more, many of the deep rich tones of old are now unattainable. As regards permanency we reply there has been a retrogression, and assert that the majority of the silver prints produced at the present time are far more evanescent than those which used to be made three decades back. It is an unpleasant admission to make, but it is nevertheless the fact, notwithstanding that, as a rule, more care is, or is supposed to be, bestowed upon the work.

It would be useless to deny that photographs faded in those days; but fading as it is now met with, often within a month or two, was a thing unknown. We have before us as we write a couple of portraits—different positions—of the same sitter, issued at the same time, only a few months ago, from one of the leading London houses whose prices are about the highest in the profession; one has faded badly, though the other is unchanged. Such a circumstance as this used not to occur; now, unfortunately, it is by no means uncommon. When we look at the altered conditions under which the prints are now produced and finished from those which formerly existed, it is not difficult to account for much of the fugitiveness.

At the period referred to the paper was but slightly albumenised, though it was heavily salted; it was sensitised on a bath of twice or thrice the strength now employed. The negatives then made were exceedingly vigorous, far more so than any now in use; consequently, by the time the image was printed it consisted of a much larger proportion of reduced silver—which, of course, took more gold to tone it—than those produced under existing conditions. The image was formed to a large extent in the body of the paper; whereas now it is confined almost, if not entirely, to the albumen surface. The difference may be readily seen if a modern print and one of the date referred to be examined side by side by a strong transmitted light. It goes without saying that an image composed of a large body of the reduced metals will better withstand deleterious influences than one in which it exists in the most attenuated form possible.

At the present time ready sensitised papers are extensively employed, the majority of which contain still less silver than that prepared at home. With many of these papers, owing to their preparation, the sizing matter is removed in the fixing and washing operations, so that in the end the print becomes as porous as ordinary blotting paper. Now the removal of the size, in one respect, is an advantage, as it facilitates the elimination of the hypo. Indeed, at one time it was recommended to treat the prints with hot water to get rid of the size, so that the washing should be the more perfect. It is, however, easy to see that the extraction of the sizing material, instead of proving beneficial, may be just the reverse. For example, if an injurious mountant be used, or the picture be put upon a mount containing deleterious matter, the frail image, by reason of the porosity of the paper, will be brought into more intimate contact with the disturbing influence than if the paper retained its original impervious character.

Thirty years ago photographers were content to use plain white cardboard for their mounts, and pay a higher price for them than they now do for those of a far more pretentious appearance. The inside of these boards was composed of a good quality of paper—wood or straw pulp “middles” had not then been intro-

duced—while the outer covering was a paper usually free from impurities in a photographic sense, for hyposulphite of soda as an anti-chlor had not then become general. Consequently the mounts were inert, which is more than can be said of a very large proportion of those now supplied.

When each of these matters is taken into consideration it is not difficult to account for the fact that the prints issued now prove less stable than those made in former times. For it must be admitted, unpleasant though it be to do so, that during the last thirty years photography, so far as the stability of silver prints is concerned, has retrograded instead of advanced.

THOUGH a practical photographer is in no need of a course of instruction in analytical chemistry to enable him to succeed in dark room work, occasions do arise when a little knowledge of ordinary reactions would be useful to him. The need, or supposed need, of a variety of apparatus, and a large number of bottles of reagents, generally operates to prevent anything being attempted by one unskilled in chemistry. There has, however, been published lately a singular kind of process of analysis which involves little or no special apparatus, the reagents for which will be found in most dark rooms. “Chemically pure white filtering paper, having a close grain, is dipped in a ten per cent. solution of ferrocyanide of potassium, laid on a pane of glass, and dried in the open air, or, preferably, in a drying oven, at 150° Fahr. Then prepare a ten per cent. solution of neutral chromate of potassium, also one of bromide of potassium, and one of hyposulphite of sodium, and proceed with each as before.” So much for reagents. The apparatus is merely a small pipette made of a piece of glass tube, three-sixteenths of an inch diameter inside, drawn in a flame to a narrow orifice, the end being perfectly round; a small quantity of the liquid to be tested is taken up to this pipette and a drop allowed to fall on each of the pieces of prepared paper (which may be ruled off into squares so as to answer for a number of different solutions), and according to the colours and variations of the rings and haloes produced by the decomposition may the nature of the substances under examination be detected. A full account of the method appears in the *Chemical News* for the 14th ultimo, to which we would refer all interested for details of the colours, &c., produced.

THE excessive lowness of the temperature during the whole of last year was matter of common observation and discussion, especially among photographers, who were influenced, and by no means favourably, by it. At the last meeting of the Royal Meteorological Society the subject was brought forward in a paper by the Rev. T. A. Preston, M.A., F.R.Met.Soc., who gave full details as to the comparative extent of the universal reduction of average temperature in the British Isles. During the fifty-nine weeks ending the third week in October there were but four warm weeks in the north-west, and only five in the south-west, of England, whilst in the latter district there was not a single warm week between March 12 and October 22. The mean temperature was colder than had been observed for ten years, with the single exception of the north of Scotland. At Greenwich the temperature during the fourteen months was below the average on 312 days out of 427, and in July there was not a single warm day. The means for July 11 and 12 were colder by several degrees than those for March 9 and 10. We may surely be permitted to hope that the new year we have just entered upon may be more favourable to photographic interests; but the auguries are unfavourable, as 1888 ended and 1889 began with a fog, which even to long-suffering Londoners was of unusual and distressing density.

ONE of the latest results of astronomical photography is arousing as lively an interest as did the famous epoch-marking photograph by Mr. Common of the nebula in Orient when first exhibited, and again it is the portrait of a nebula that has proved the value of photography. This picture, by Mr. Isaac Roberts, was exhibited at the last meeting

of the Royal Astronomical Society, and its value was at once recognised by all present, while its technical merits won great admiration. The especial interest attaching to this particular photograph lies in the fact that it appears to show the actual formation of a system out of the vague form of a nebula.

In a recent number of the *Harvard College Observatory*, an important and interesting account of the methods employed in their observatory in nebulae searching is given. Instead of using—as is ordinarily done, and as Mr. Common and Mr. Isaac Roberts have done with such conspicuous success for depicting large nebulae—a telescope for photographing these interesting objects, an ordinary photographic lens is used. This, as we need scarcely state, acts far more quickly than the telescope object glass, and, in addition, embraces a much wider field of view, hence a larger space in the heavens can be searched and in a shorter time, and objects too dim to be picked up by the telescope may easily impress themselves upon the plate through the medium of a good photographic lens. Already some very valuable results have been obtained by these means.

THE present week has been an important one in many respects for astronomical observers, the solar eclipse of last Tuesday possessing the usual fascination the phenomena always exercises upon all who have command of important instruments. We have not heard of any English parties having set out to make observations, but America was amply represented. The great Lick telescope did not lose its custodians, as they stayed at the Observatory to photograph the various phases and observe the time of contact, though there the eclipse was only seen as a partial one. Several strong parties were made up for photographing the corona and making photometric and spectroscopic observations, and Professor Pickering, from Harvard, had no less than eight instruments in the field on the line of central eclipse. When full details are to hand we may anticipate a valuable harvest of facts to be garnered, as each time the phenomenon has been observed fresh facts and fresh precautions have been indicated to pave the way of the observer in the next occurrence of an eclipse. The present occasion was less favourable than some of its more recent predecessors, in that the duration of totality was only two minutes.

ECHOES.

THE perennial questions of copyright and the ownership of the negative have once more cropped up in different forms in the law courts, and yet again have been exercising the minds of photographers as well as the lay press. As usual, very varying comments and suggestions have been made—some new, some old; and it is only speaking the truth to say that photographers themselves are little more agreed on these subjects than the county court judges and other legal authorities who “ring the changes” so absurdly in their decisions. Here I may note, that in the leading article in last week's issue a fear is expressed that the Ashford decision in *Barnes versus Marston* will form a precedent. Of what use, however, are “precedents” in this matter, since, as the same article points out, three previous cases of a similar nature had been ruled differently, and were overruled by the wisdom of Ashford. It is true the editorial pen wrote that the decision “stands as a precedent,” &c., “until it is overruled;” but that may occur on the next court day in the same place.

The proposed trade protection society, if founded, would, I fear, prove quite powerless in the matter, however willing and energetic, so long as the present legal uncertainty exists; for what is the use of pleading “custom of the trade” when the judge arrays against that argument what he considers of infinitely greater value—his own common sense, or what he honestly imagines to be such. It is the fashion in many quarters to decry the “great unpaid” magistracy because of their sometimes erratic decisions, but I think that a careful survey of county court decisions, especially where technical points are involved—aye, and the decisions of the superior courts too—would disclose in an even greater degree the same kind of “happy-go-lucky” interpretation of the law, not only on the part of paid officials, but of those presumably specially educated for the purpose.

Photography, unfortunately, at present occupies no definite position of its own in the eyes of the law; it comes under the general heading of fine arts in the matter of copyright, but occupies such a particularly “back seat” that the compliment of even including it at all is a very questionable one. This being so, it is almost a matter of necessity that most of the cases that come before the courts depend upon the individual decisions or opinions of the judge, and upon precedents so established; and in attempting to legislate from the point of view that a photograph is a “work of art” of precisely the same character as a painting or drawing, the non-technical mind encounters so many difficulties that it is little wonder it occasionally wanders.

As regards the copyright in works of art, such as paintings or drawings, and in literary productions, the law, if not perfect, is at least comparatively distinct and intelligible, but not so in regard to photographs. For instance, the law does not say distinctly whether the copyright exists in the negative, or in the print, or in both; it decides that the copyright in a portrait or other work executed to order belongs, under certain conditions, to the party giving the order, and not to the photographer. But in the case of a photographer in a considerable way of business, employing assistants, and executing work on his own account for publication, it leaves matters rather ambiguous, as the decision in *Nottage versus Jackson* proves. Here the plaintiff brings an action for infringement of the copyright of a picture taken for purposes of publication by his firm through one of their operators; but he is nonsuited on the ground that the operator, and not himself, being the executant, in the operator is vested the copyright. Here, surely, is “tidings of great joy” to “sculptors’ ghosts,” to Jan van Beer’s numerous pupils, and to the race of artists’ assistants generally, if at least the same law is good outside photography.

Now, if photography cannot be properly legislated for in a general copyright act, or, rather, if it cannot be fairly treated when classed with works of art generally, let it be classed by itself, and have a clause or clauses specially devoted to it, and drawn up by an expert, in order to remove the “glorious uncertainty” that now exists. I do not know that this is a particularly hopeless solution of the difficulty, if the matter is properly taken up by photographers themselves. The Camera Club numbers among its members more than one who writes M.P. after his name, as belonging to the National Club at St. Stephen's, and if the Club desires to do good work in the interests of photographers generally, it could not select a better channel in which to direct its exertions. And I am sure that when another Copyright Bill is under discussion, some of the Camera Club “M.P.’s” might gain *éclat* by championing the cause, from their places “in the House,” of the art to which they have been attracted for their own pleasure.

The two questions of which I commenced to speak are too frequently mixed up and confused. The ownership of the negative is completely and entirely distinct from the copyright which exists in the print or finished picture. In the case of a painting the picture and the copyright may go together, or the copyright may be sold independently of the picture, in which case the owner of the original painting has no right to reproduce it. If the copyright pass into the hands of an engraver, who after a time again sells his right, I presume by the custom of the trade alone, and not by any right, the engraved plates existing would be delivered to the purchaser, though they do not in any way represent the copyright. In like manner a photographic negative is distinct from the copyright, but it is not the custom of the trade to part with it to the owner of the copyright or party for whom the photograph is executed. The reason of this difference between an engraving and a photograph is easily explained in a common sense way. The purchaser of the copyright of an engraving buys for the purpose of publication, to which end the engraved plates are of value to him; the purchaser of a photograph to order, in the great majority of cases, buys merely for private use, and the negative is to him useless except with the assistance of a competent photographer, hence the negative forms no part of the contract, but is simply used by the photographer as one of the “tools of his trade,” as it has been described.

In any future legislation on the subject it would therefore be well if the distinction between copyright and right to the negative be clearly recognised and emphasised by special treatment, for clearly to

the photographer the latter question is of at least equal importance to the other. Until, however, the matter is authoritatively settled, it is to be feared that similar cases to that at Ashford will continue periodically to crop up.

In an article on *Intensification*, by Mr. Thomas Bedding, I find a reference to the desirability of avoiding exposure to direct daylight when intensification with "mercuric bichloride" is being effected. *Par parenthèse*, Why mercuric chloride, Mr. Bedding? Is there a mercuric sub-chloride, or have you ever met with mercurous bichloride? But, *n'importe!* With regard to the avoidance of exposure to light, it is the first time, I think, I have ever seen any reference to the necessity, so I ask, Why? Is it, as I presume it must be, on account of some supposed sensibility of the bleached image to the action of light? If so, I would like to ask if it is necessary to avoid direct daylight when examining the old "alabastine" pictures? I have seen many of these and made a few of them in years that are gone, and only a few months ago I was shown a number that had been made as far back as "early in the fifties," which were as pearly white as they possibly could have been when "young." Never, in fact, do I remember to have seen or heard mentioned any instance of the darkening of such pictures by light. In *Watts's Dictionary of Chemistry*, I think, it is stated that chloride of silver darkens under the action of light, except in the presence of bichloride or other salt of mercury. If this be so, why avoid exposure?

The particular method of intensification, or rather the formula given in the article referred to, is new to me, and may be an improvement upon using a plain solution of bichloride; but to add potassium hydrate to cause turbidity, and to afterwards "clear" the solution with hydrochloric acid, appears to me a needlessly round-about way of adding potassium chloride as frequently practised, unless special advantage accrue from that mode of operating.

JENKINS.

SOLARISATION AND POLARISATION.

MOSELEY'S experiments with a prism of calcareous spar placed in front of the camera lens seemed to him to show that there was little, if any, difference between polarised chromatic light and common achromatic light, as far as their action on a silver salt goes. His exposures on the various coloured designs produced by polarised light led him to the same conclusion.

It will scarcely be denied, however, that the efficiency of white, blue, or violet light is almost immeasurably stronger in promoting that condition in a film of a sensitive silver salt, which first allows it to attract metal from the developer, than are those rays which we find to be the less refrangible. In fact, if one is not in a hurry, it is instructive to attempt—as the author has done—to obtain reversals and re-reversals by contact under a piece of ruby glass. Employing a spectroscope, the results are much the same, and in some respects we may look upon the production of a spectrum as the determination of the extent to which the separate elements of white light are liable to undergo alteration in their direction of vibration, for it will scarcely be denied that this liability must depend—where the undulations are assumed to be purely mechanical—almost as much on the direction of the vibration as upon amplitude and wave length, two conditions of the undulatory, either of which can scarcely be credited with identity of property or aim. It may be urged, indeed I believe it has been urged, that while the amplitude for all colours is constant, the wave length is variable, and *vice versa*; and in this case it is evidently useless to argue that the number alone of the strokes beating upon an organic or inorganic patient is sufficient to account, on frictional grounds only, for the difference of the powers of orange and blue light.

Before touching briefly upon electrical polarisation—a theory, not merely a hypothesis—let us try to get as clear an idea as possible of the broad distinctions which are known to exist between the actions of the different coloured rays.

To begin with, our appreciation of the mass of ponderable bodies teaches us that all matter is composed of more or less cohering molecules, with interstitial spaces occupied by—something. We talk at times of a vacuum, but in discoursing of light according to the correct prescribed method we are forced to confess that, while the more attenuated matter the greater the velocity of light; where matter, as a vehicle, is absent there can be no light, and no effect of light.

We say that the material wave front is essential to any exhibition of the motive cause, and is ever in advance of it. So also says the electrician! So also might the chemist say if he acknowledged that chemical affinity was the power, the element or compound the vehicle; and, indeed, this is exactly his position at the present moment. It is the electric potential and the conductivity which determine chemical combination and decomposition.

The primary colours are either three (red, yellow, and blue, and we can decompose none of them), or from twenty-three to thirty-three or more, in proportion as there are elements in the sun. According to the undulatory theory of light, the difference between sound, heat, visible light, and actinic or electrical energy is simply a difference of wave length, amplitude, and period; yet, *primâ facie*, there is no evidence forbidding the conclusion that the material either acts as a dielectric or conductor.

Admitting that the violet or blue rays are, more than any others, of metallic origin, and possess a reducing power, it remains to be seen, first, by what virtue they reduce; second, by what circumstances their characteristic action is modified.

It is scarcely to the point to object that it is the same ray or series of rays which reduce silver haloid salts that promote the combination of the metalloid chlorine and the metal hydrogen. The true point raised here is, Does the blue ray enhance or reduce the electro-positive nature of the hydrogen or the electro-negative character of the chlorine? That light, under conditions with which we are tolerably familiar, increases and diminishes the electrical potential between these elements we acknowledge; that it does both when the elements are pure and the light itself elementary is quite another question.

Broadly speaking, no recent experiments have negatived the deduction that for chloride, bromide, and iodide of silver, prepared in the utmost darkness attainable, the reducing action commences at F, attains its maximum at or about H, and gradually decreases towards the limits of the ultra-violet rays, and is nil for the rays of dark heat, and for the luminous rays from A to F.

With potassium bichromate, again, the action commences at E, and terminates at N. With tetrachloride of gold the action extends from E to I, the extent of the action being slight, but continuing spontaneously in the dark. "Hence we conclude that the reducing action exercised upon metallic salts is exclusively determined by the more refrangible rays, which on this account have been named exciting rays, while the heat and light-producing radiations, up to F, are absolutely inactive" (Jamin).

"Upon guaiacum, bitumen of Judea, and various essences, the action of light is inverse. Its tendency is to oxidise instead of to reduce." (These compounds, it will be observed, are organic and comparatively complex.) "Nevertheless experience has shown that it is the same series of rays which act. Thus gum guaiacum only begins to turn blue at H, and the action continues as far as P.

"Notwithstanding this, it must not be inferred that the calorific and luminous rays exert no influence. Let us once more take the case of the sensitive chloride of silver, but, instead of keeping it in the dark, let us expose it for a short time to white light, so as to produce a feeble but uniform discolouration throughout. Next let us bring a pure, real spectrum to bear upon a portion of this partially darkened film. It will now darken in every region of the spectrum, even from the infra red, and the luminous rays from A to H will be found to have acted. This time it is the less refrangible rays which have played their part in continuing and developing the impression initiated by the more refrangible rays, although in themselves incapable of starting the action. They do not excite, they continue, and have hence been named by Becquerel 'continuing' rays. It is to be remarked that they hasten or reveal the chemical action as they do in the case of phosphorescence.

"These rays do not oxidise white guaiacum, but when they are caused to fall upon guaiacum which has absorbed oxygen and become blue they disengage this gas and bleach the guaiacum. Instead of being oxidising agents of organic matter they are reducing agents, and their action is the inverse of the more refrangible rays" (Jamin).

In addition to this continuing, accelerating, or developing action, the luminous rays have also a destroying action on the effects produced by the blue and violet rays. Sir John Herschel and Claudet have abundantly proved this in the case of Daguerreotype plates, and A. M. Wilson, of Trinity, has, I think, while experimenting with modern dry plates and an astatic galvanometer under variously coloured lights, done much to establish the connexion between the action of orange and blue light, and that of positive and negative electricity; but it is in acting on a silver salt necessary to distinguish very carefully between these two actions of orange or red light, as intensifying or annulling the initiative action of the blue. As Claudet

has shown, if a daguerrotype plate, exposed, but undeveloped by mercury, be exposed under a red or yellow glass "for from 50 to 100 times the original insolation, it loses the property of condensing mercurial vapours."

Solarisation, as exemplified in the refusal of the portions of a sensitive silver salt which have undergone the longest exposure to attract the most of the silver deposited by the developer, is not therefore a phenomenon observable only with films of Ag Br, but of Ag I and Ag Cl also. The most point to be determined in the immediate future is therefore: Is it by virtue of a mechanical interference and polarisation of the light by particles and interstices in a constantly varying proportion that a given developer, no matter what, acts now normally, now abnormally? or is it due to a light-imparted alternating electrical polarisation of the opposite particles of the adjacent molecules?

There are one or two experiments, simple enough in themselves, which, carefully performed, would tend to lead us very much nearer to a solution of some vexed and vexatious questions in photography. For instance, the determination whether prolonged exposure to monochromatic light is capable of inducing "solarisation;" and whether the metallic coin which when left on a film in the dark for a few seconds permits of the development of a dark "image" of the areas in contact, would, if left on the film for a much longer period, develop a "reversal."

This second experiment may seem to some to have as much bearing on "light drawing" as has the experiment of writing with a "style" on a sensitive film through an interposed tissue less sensitive to light. Nevertheless, it is either to "Moser's images" or to "Shearing-stress" that we must look; in the first instance, for a rational explanation of the subject in hand; and while it is comparatively easy to see the connexion between electric potential and chemical affinity, it is difficult to reconcile a belief in the efficacy of a purely mechanical strain to separate the elements of a silver salt with a conviction that chemistry plays an important part in the formation of the "latent" image.

HUGH BRENNER.

(To be concluded.)

INSTANTANEOUS WORK.

X.

In my last I referred to a few subjects that were to be found in the vicinity of a farmyard, and endeavoured to show that such a locality furnished no end of pictures suitable for shutter work.

When operating on such, one of the most important points to observe is the securing of a sharp focus of the animal, bird, or whatever else is being photographed. To attain this end I have seen some novices go about the work in the most awkward, impulsive, and unbusiness-like manner, and to judge of their style of proceeding one would imagine that they were photographing human beings instead of the lower animals.

Now, with many that I have met in with a common way of going about this sort of work has been something like the following. No sooner does the novice see some fine specimen than he exclaims, "By Jove! I should like a photograph of that fellow!" and straightway, acting on the impulse of the moment, he proceeds immediately to unlimber and rig up his outfit, which done, he stealthily approaches what he is going to photograph, and planting his tripod, &c., in what he considers a suitable position and distance from the object, forthwith proceeds to wait about the focussing cloth and make other fussy operations, at the same time expecting and hoping that the animal he is about to take will act like a human being, and stand or sit still, as the case may be, just to oblige and let him have what he wants.

Often have I smiled to myself when being an eye-witness of such an operation, and I wonder where the photographer, be he amateur or professional, is who has not seen some such attempts to obtain a photograph. Up to a certain point, with some animals, their curiosity keeps them tolerably quiet and still, and this gives a novice the impression that he is going to succeed; but no sooner does he arrive at the focussing stage of the operation, and proceed to throw the black cloth over his head, than the curiosity which has up to this time kept the animal tolerably quiet gives place to a certain amount of shyness, and rising up or turning round, it shows its heels to the enthusiastic operator, and walks off without saying good-bye, leaving the operator with no small amount of annoyance, and who very likely will exclaim, "If I had not taken so long to get the blessed thing focussed I should have had him all right."

But, then, it is just in this focussing where an experienced outside operator shows to advantage over the novice, who merely goes about the job in a sort of ram-stam manner.

In contrast to such a way of going to work, were the novice to bear in mind the golden rule—and which applies to nearly all instances of animals in motion—*instead of bringing the camera to them, bring them to the camera*, he would have more successes than failures, provided the work was gone about with coolness and deliberation. Now, in following out this rule, it will at once be obvious that the subject must, in some way or other, be focussed beforehand, or just at the time of exposure. There are more ways than one of going about this. Perhaps the simplest, and, all being considered, the best plan is to select some spot and carefully adjust the focus for it; then, either by stratagem or simply leading or driving the animal, as the exigencies of the case may require, over this exact spot, and then expose. To effect such often requires the exercise of much patience and caution, but when these are brought into play success nearly always follows.

I remember one summer, when living for a few months at a farm, being asked by the farmer to photograph a fine bull he had grazing in the field. Now, this bull was not the quietest of animals, and although the farmer and the shepherd had no fear of going into the field and approaching him, I must say, on my part, I did not like the job at all of being near him with the camera when he was quietly driven up to me, and so I thought it best to use some little stratagem. After pondering over the situation I decided at last upon a little plan that succeeded admirably. To carry this out, however, required a considerable amount of courage. So, summoning the shepherd to my aid, I asked him to accompany me with his collie. Entering the field boldly with the camera focussed as nearly as I could judge for a distance of about fifteen yards, we came to a halt about fifty yards from the fence, and set up the tripod and camera in quite a daring way, and then, spotting a clump of grass right in a line between the bull and myself, I carefully focussed for this distance and bade my time, keeping the shepherd, with his collie between his knees, close beside me. It was not long before the bull began to pay us a little attention. No doubt he could not understand the camera, never having seen one before, and so his curiosity soon brought him in our direction, and whether or not he meant mischief I cannot say, but he kept quite steadily on his way until the exciting moment arrived, when, simultaneously with the firing of the shutter, the shepherd let go his collie, who at once rushed to the bull. Then I made off as fast as my legs would carry me, leaving the collie to fight it out with the bull. It was a harmless engagement, however, for soon the shepherd called off his dog, and the bull was left to himself. But I got my negative all right.

Now, I wonder how it would have been had I waited for the approach of the animal before setting about the focussing? Some may think this rather rash and dangerous work, but a sojourn of a month or two at a farm tends to imbue one with confidence when coming in contact with animals which otherwise he could not possess.

I remember, on another occasion, when being out on a prow with my little boy in the Highlands, falling in with an amateur who was doing his utmost to obtain some animal studies, and after hunting about he had at last found his heart's desire in the shape of some splendid "Highland stirks," one especially of which was lying down on the field, basking in the sunshine, at a distance of about fifty yards from the fence. Now, Highland stirks are not the most peaceful-looking animals, but, on the contrary, with most people their appearance gives rise to, more or less, a certain amount of fear, for their magnificent horns could do a power of damage if put to it, and I at once saw that my casual acquaintance was in somewhat of a quandary what to do, the distance of the animal from the fence being too great to allow of a picture of any size being obtained without coming to closer quarters. I could easily see that at first this gentleman was not a little shy at going over the fence and so approaching nearer to the animal: but on consulting me, and on my remarking that I did not think there would be any danger, he eventually summoned up courage and got over the fence with his apparatus and quietly approached the monster. All seemed to go well, just as I anticipated, till the focussing stage was reached, when the stirk coolly gathered himself together and marched off. On looking round about me I perceived that there were some stirks also in the next field, and that a hedge separated them, in the middle of which was a large gap, which the stirk that he was trying to photograph made straight for. I at once saw the opportunity, and so, on the return of the stranger back over the fence, I suggested to him to let me have a try. "Oh! it's no use," he replied; "they are sure to walk off just when you think you are getting them all right." It was evident to me the stranger had not had much experience in photographing animals. I, however, prevailed upon him after all to try

my little plan, which, after I explained it to him, he condescendingly approved of. I firmly believe, however, he would never have done so had I not consented to do the dangerous part of the operation, which was going into the next field with my little boy and quietly driving the sticks through the gap back into the field.

We accordingly set up the camera on the sunny side of the hedge, and focussed sharply on a spot about fifteen yards distant, over which the animals were bound to walk. Taking my little boy with me, I made a *détour* to the furthest end of the next field, and without making any violent noise, or in any way raising the spirit of the sticks, we just quietly approached first one, then another. At our approach they coolly gathered themselves up and made right for the gap, where the stranger stood in ambush with his camera. The result was that my friend was quite overjoyed with the success of the little operation, and declared he would know better in future how to go about cattle work.

Now, even in this driving of the game to the camera there is a "knack," and I cannot do better than just suggest to those who want to know the right way of going about it to try and see how cattle buyers go about their business when viewing animals at pasture in the country. Sometimes I think that the cattle themselves know when any one approaches them on business.

So much for bringing the cattle to the camera instead of the camera to the cattle. I know that sometimes there will crop up exceptional circumstances where it is not just so easy to arrange matters as one would like, but much can be done with forethought and the exercise of some little stratagem.

Who is there, when being in the vicinity of some farmyard, but has been struck with the funny appearance of the ducks, and to a photographer what an opportunity they offer for making a picture! It is not always an easy matter, however, to get a shot at them at a casual time, or just when an amateur might chance to be passing or about the farm, for the simple reason that Mrs. Duck very likely will not happen to be at home when so wanted. Very likely they will be at some distance from the pond, and when hunted for will be found grubbing in some field not far off.

To attempt, however, to drive them to their pond would only end in failure, for most likely by the time you got a remnant of them there they would be so raised as to offer but a poor picture of what they would otherwise show when enjoying their swim of their own accord.

Now ducks are funny things, and have some peculiar characteristics, like all other birds and animals, and when their little customs are known it is not a very difficult matter to secure a good picture of them pecking and pluming themselves in their native element.

Ducks, as a rule, are very regular in their habits, and not only always come home to tea, but in the early morning, in one sense, they resemble human beings, for they always go straight for their bath as soon as they are let out of the barn, or wherever else they sleep overnight.

Early morning, therefore, is the time to be about to secure the ducks. A little arrangement with the farm servant or poultry maid whereby the ducks are kept shut up a little longer than usual some morning is all that is necessary. This arranged, and the camera being rigged up in the desired place beforehand, the operator will not have long to wait for his visitors, for no sooner are they let out and free than it will be found that they make straight tracks for their pond. A stranger, however, should take care to conceal himself, or they may be a little shy in their approach for their swim. I remember the first time I tried such that I had to submit to somewhat of a failure, through being so near the pond with my camera, but the next morning I got what I wanted, and this by a little stratagem which was easily arranged.

The setting up of the camera gave no trouble. This done, and the trigger of the shutter having a long black thread attached to it, I had merely to hide myself from the view of the ducks. Now, to some it might appear a difficult thing to hide oneself in the vicinity of a duck pond. But such need not be the case. I merely got the farmer to help me to wheel out of the yard one of his carts with a sack of hay in it; so, jumping into the cart, I squatted down out of view and enjoyed the fun immensely. I did not require to try the next day. On a fine bright summer's morning some good fun can be had by keeping the ducks in confinement till about eight o'clock, when there is plenty of light to take them with a shutter.

So much for a few subjects that are to be met with around a farmyard. To any one desirous of spending a few days' rest, and who at the same time may be wishful of using his camera, I hardly know any place to equal the same for downright enjoyment, the planning out of the various little stratagems being to my mind not the least part of the fun.

T. N. ARMSTRONG.

ON CERTAIN SURFACES FEEBLY SENSITIVE TO LIGHT.

[A Communication to the Society of Amateur Photographers of New York.]

THE specimens which accompany this statement are suggestive, inasmuch as they tend to illustrate the widely extended range of photo-chemical action, and the part it plays in every-day phenomena. In thinking and speaking of substances sensitive to light, photographers and others are apt to remember only the haloid salts of silver; chromic acid, under restraint, acting on organic matter; asphaltum, and a few salts of iron and platinum: which short catalogue does, in fact, include all the sensitive bodies used in practical photography.

But, as every one knows, this list may be indefinitely extended (if the degree of sensitiveness be disregarded), and the accompanying specimens serve to show such extensions in certain directions. Broadly, the results should not be regarded as new, though in the manner of their preparation and presentation some novelty may be claimed for them.

On sheets Nos. 1 and 2, three samples of coloured commercial paper will be found, which are bleached by light, and which give, therefore, a negative when exposed under a negative. On sheets 2 and 3, exposed papers, coloured for the purpose with eosine and methyl violet, are exhibited; which likewise establish the fact that these colours under the luminous influence give rise to colourless compounds. But, though a great number of colours used in the arts are bleached by light more or less rapidly, this is by no means a universal rule. On sheet No. 1, a small piece of commercial orange paper is shown, part of which has been darkened by exposure. Specimens of paper coloured with picric acid will also be found on sheet No. 4, in which the darkening to a brown is very marked.

The duration of the exposures required to produce these photographic effects is very considerable when the change is carried to its maximum, varying from twenty to thirty-five or forty hours in direct sunlight, which was the only kind of exposure employed in these experiments. Such substances are, perhaps, from four hundred to eight hundred times less sensitive than chloride of silver paper. Indications of photo-chemical action are, however, visible in much less time. On sheet No. 2, a piece of eosine paper, exposed under two strips of black lace, shows a faint positive after half an hour. Also, on sheet No. 3, a piece of methyl violet paper similarly exposed shows the gradually increasing strength of the positive (by contrast) after one, two, or three hours.

The fact that printing and writing papers become brown by age is familiar to most persons; but that this change is essentially photographic is not a common belief. On sheet No. 5 will be found pieces of newspaper taken from the *New York Tribune*, the *Baltimore Sun*, and the *Washington Evening Star*, on which photographic images have been impressed by simple exposure under a dense negative. These papers were subjected to no preparatory treatment, establishing the fact that the newspapers we read daily are, probably, all printed on papers sensitive to light and adapted for the production of positive pictures. On sheets Nos. 6, 7, 8, and 9, such pictures will be found on *Evening Star* paper, made by direct exposure to the sun's rays, under collodion negatives. A fact of some significance is, that some of the experiments on *Evening Star* paper were made on sheets which had been very carefully washed before exposure. The washing was done by causing a very rapid film of water to flow over and under the paper at the same time for two and a half hours. The paper was then dried and exposed. This treatment did not seem to effect the sensitiveness of the paper to light, and the presumption would seem to be justifiable that the sensitive compounds present are not soluble in water. The time required to produce the maximum effect is about fifty hours, but this must often be exceeded if any part of the negative is in the least obscured by cloudiness. The colour produced by exposure on such papers is peculiar. When the paper is clean and in good condition, as in Nos. 6, 7, 8, and 9, a very pure golden bronzy colour is produced, which can be appreciated only in strong white light. I will not now discuss the nature of the resulting brown-yellow compound, except to say generally that it is not easily acted on by chemical re-agents, and that it undergoes a very peculiar darkening by the application of heat alone, as by ironing the paper bearing such a photograph with a moderately hot flat-iron. On sheet No. 8, a piece of paper is mounted with two tints on it longitudinally, half of which (divided across the tints) was heated in the way described, and which is, in consequence, much darkened. The print above it on the same sheet was also so developed or intensified.

Sheets Nos. 10, 11, and 12, have mounted upon them pieces of white pine, of different qualities, upon which photographs have been produced by exposures under stencil negatives, made by cutting openings in tin-foil, and pressing it into close contact with the sur-

face of the wood by means of a plate of glass properly clamped thereto. The exposure required to produce these photographic images varies from thirty to fifty or sixty hours. On sheet No. 13, a piece of poplar is shown, the picture on which was produced in twenty hours, for it seems probable that of all the woods in common use poplar is the most sensitive and gives the darkest colour when fully exposed. In making these experiments it is important to obtain a fresh surface on the wood, to effect which, in the case of an old piece, a good deal of the outside has often to be removed by the plane, for the penetration of the light is often considerable.

It seems probable that this darkening of wood (which is very commonly, though rather vaguely, attributed to the action of the air) is related to the photographic effect obtainable on printing papers. There are now hardly to be had without an admixture of wood pulp, and the present inquiry (inasmuch as it proves the phenomena to be strictly photographic) may have a practical bearing if it points to means which will keep printing papers white indefinitely.

On sheet No. 1, the bleaching action of light upon a dried leaf is exhibited, and on No. 5, a piece of parchment is mounted, which has also, though substantially white, become a little whiter where the light has acted. As far as it goes, this would tend to show that the "yellowing of parchments by age" is not a photo-chemical process. This parchment had a very long exposure.

As connected with this general subject, I would call to mind the investigations of Mr. Thomas Gaffield, of Boston, who established conclusively, more than twenty years ago, the slow effect of light on colourless glass, in gradually giving it colour, sometimes pinkish and sometimes yellow, the former being apparently due to a reoxidation of the reduced manganese employed to counteract the iron. These changes often required years for their completion.

Experiments, only just completed, tend to show that pure cellulose, in the form of the finest filtering paper, is not sensitive to light; at least, a constant exposure in a horizontal position to diffused and direct sunlight failed in two weeks to produce any perceptible change in colour. On the other hand, the same filtering paper, covered with picric acid and similarly exposed for the same time (about 140 hours of diffused and direct sunlight), gave a colouration as before, when used and calendered paper of the best quality was the kind treated with the acid. On sheet No. 14, two pieces of the above filtering paper, prepared with picric acid, and exposed horizontally as stated, will be found, but one of them has been washed in hot water till all the soluble matter has been removed. This treatment of the exposed print tends to raise the contrast by letting the darkened parts appear as on white paper; it also shows the insolubility of the darkened portions in hot water, the production of which was effected by light alone.

Simultaneously with the above exposures, another was made of the same duration and in the same way. This was the presentation of a thin stratum of commercial picric acid on glass, to the same illumination as that already mentioned, under a stencil tin-foil negative and a plate of glass covering the same. The picric acid was darkened as before very decidedly, though it would be difficult to exhibit the results in a satisfactory way at a meeting of the Society.

In concluding this paper, and to account for its incompleteness in certain ways, I may be permitted to explain that the investigation, the results of which are here given, was not undertaken with a practical purpose in view, but simply to determine the limits within which bodies may be properly described as sensitive or non-sensitive.

J. W. OSBORNE.

PRINTING AND OTHER MATTERS.

PRINTING what a simple process it is! Just place your paper on the negative, set it in the light till done, tone, fix, wash, and there you are! What could be more easy? The essence of simplicity. Yet how many find it so? I am not now speaking of professionals (who, by-the-by, are not always exempt from failures, simple as printing seems), but of those scores of amateurs who, with commendable spirit, are above being under any obligation to others for work supposed to emanate from themselves. They prefer saying, "Alone I did it," and right too. A man in real love with his work has a pride in doing it himself. He sees an effect, and wishes to produce it in a finished photograph as nearly as may be, and the first step is taking the negative; but he does not straightway go into mistakes over it, unless it will print a picture that will come equally up to his idea of what it should be. In the old wet-plate days the resulting print could be fairly reckoned on, and a negative could be changed as good, bad, or indifferent, with tolerable accuracy. But those days have passed, and we have gained considerably in comfort

but lost in certainty, to a degree. Unpromising negatives will surprise us by good results, and promising ones with just the contrary. So very little increase of density beyond the proper amount will result in chalkiness, and too little in flatness. In saying this I believe I only echo the opinion of most workers with gelatine plates, if the conditions vary much under which they were exposed. This is, however, merely introductory to "printing," the only real use of a negative, but as the qualities of the negative exercise considerable influence on the print it is necessary to notice them.

The wail of the amateur generally takes the form of "beastly paper," and "toning bath gone wrong;" but I think "beastly paper" has the preference. It is all very easy to blame the paper, which, no doubt, is sometimes in fault, but not nearly so often as represented. In all probability the fault lies in the user, who finds this the handiest way of excusing his want of knowledge. Ready sensitised paper is the kind almost universally used, and varies considerably in quality. Let it be borne in mind that all ready sensitised papers gradually deteriorate until they become worthless, therefore the sooner it is used after preparation the better. This deterioration varies with different samples, some retaining their good qualities much longer than others. The first sign of decadence is difficulty in toning. A paper may retain its purity of colour, and yet have become very difficult to use with satisfaction; this difficulty increases until it refuses to tone at all, and the prints turn out a dirty brown, although its sensitiveness to light seems very little altered. The first visible change is a slight yellowing, which in some samples of paper clears away in toning and fixing, and the finished proofs are none the worse for it.

It is unfortunate there is no guide to the purchaser as to the length of time the paper has been prepared; he has to take this all on trust. The brighter the surface the richer the print and the slower the toning; at the same time there is greater danger of blistering and cracking of the albumen if the prints are allowed to get very dry and curl; in washing the surface is also more easily damaged. The gloss, whether produced by extra thickness of albumen, or by a less absorbent surface of the paper, more in some samples than others, determines the final colour of the proofs. A dull paper gives colder tones, and plain paper the coldest of all. The rapidity with which it tones is generally in proportion to its lack of lustre, the plain paper being quickest, as the gilding, so to say, of the silver print is rapid in proportion to the unprotectedness of the metallic particles, and the richness of the image depends a good deal on the amount of albumen in which the silver is encased. Organic compounds of silver determine the colour, and the reduced metal its permanency. This indicates that a print consisting in a great measure of reduced silver, as the image on plain paper, would probably be more permanent than one of a richer colour—more dependent on organic matter. When prints fade, the delicate half tones go long before there is any perceptible alteration in the shadows, and as many of the beautifully rich and delicate prints now obtained on highly albumenised paper have a much larger proportion of half tones, they in all probability will fade more rapidly than the coarser black-and-white productions of years ago, which, when carefully prepared, set time and rough treatment at defiance; but, without going to such extremes, a good silver print from a fairly strong negative will, with ordinary care, last as long as a water colour at any rate, and stand more ill-usage.

I have now in my mind some silver prints that have been hanging in a full glare of light on a damp wall for many years. The last addition to them was made thirteen years ago, most of them are considerably older, and they are occasionally washed to be rid of the green mould, by which they get nearly obliterated, then dried and hung up again. Up to the present date they are fairly bright—brighter than many new prints of the present day. True, some have lost their half tones, and some the paper has actually dropped to pieces, and all look yellowish in the lights; but what picture, unless it was in oil, could stand such a test without deterioration? As to the discolouration of the paper, it would probably have become discoloured if it had not been subjected to any photographic treatment whatever. When photographs are mounted the protection afforded by a lithographed tint seems considerable in case there is anything deleterious in the mount itself, but plain or toned cards, so far as I have been able to judge, are little likely to cause fading; but a stout toned paper often made up into scrap albums has, I know, in some cases entirely spoiled the photographs mounted upon it.

To return to the printing. Undoubtedly the best results from most negatives are obtained in strong diffused light; there is more harmony and quality about them than when printed in direct sunshine; the strong direct light penetrates the thinner and more delicate parts of the image and over-prints before the denser parts are sufficiently done. The consequence is we have a flatter result and

a worse colour; on the other hand, a *very* slow light gives increase of contrast, and the probability is the proofs will be wanting in half tones if a negative of the same density is used in both cases.

The process of toning is considerably affected by the quality of the light in which the impressions are made. There are exceptional cases, in which the most powerful sunlight is necessary to penetrate the image, and even then the printing is but a tedious process. I need scarcely say such negatives would not be made by choice; still they have occasionally to be printed. A very thin negative, on the contrary, requires an exceedingly weak light in order to increase the contrast as much as possible, but at best of times the result is but indifferent, and I believe such prints are, of all, the least permanent; and as to getting a rich, warm colour, it is out of the question. Very thin negatives may be made to give better impressions by covering them during exposure with a piece of clear yellow glass and print in a stronger light. This plan improves the brightness of the print but makes the colour much colder and less pleasant. For plans and such-like line subjects the particular tint is less important than its brightness, and the method may be used with advantage. In the case of no yellow glass being at hand, ordinary white glass, coated with spirit varnish in which iodine has been dissolved, answers every purpose. The objection to coating the back of the negative at once is the danger incurred of getting the iodine varnish on to the film, which, it is needless to say, would give rise to trouble. Yellow paper does not answer the same purpose, nor will any screen that diffuses the light. It seems imperative to success that the light should pass direct through the negative to get the additional brilliancy. A yellow screen diffusing the light merely increases the time required for printing without strengthening the image in anything like the same proportion. Weak white and yellow lights have different effects, although both lengthen the time of printing; so one cannot be satisfactorily substituted for the other. Very much of the beauty of the colour of the print depends on the kind of light that reaches the paper through the negative. The greater freedom from yellowness, the more pleasant the colour of the print, although with some the removal of the yellowness would too much reduce the printing density, and intensification would have to be resorted to to make up the deficiency. I do not mean to infer that good prints cannot be made from yellow negatives, but that, if the density was correct, better would be made from colourless ones, and the advantage would be in colour. A weak yellow negative, slightly fogged, is of all the most impracticable, and I never yet saw a decent silver print obtained from such direct worth the paper it was on. Unfortunately there are many such in existence, and are a continual source of dissatisfaction both to the taker and the printer.

Everything being in the best working order, the depth of the printing should only require to be a little deeper than the finished work. If there is much reduction in toning and fixing, something or other is not as it should be, provided, of course, that the negative is right; any part of the process may be in fault, so may the paper itself. Supposing it is the paper, the remedy is obvious: get another sample. The toning bath may be out of order, or the fixing bath too strong, or the hyposulphite bad, or the prints may be left too long in either. With the majority of printers the fault is in the toning: the bath may be too strong or too new, or improperly made. Most ready sensitised papers work best with a weak, warm toning bath, but before they are immersed in it they should all be passed (after removing the bulk of the free silver) through a bath containing two or three ounces of pure carbonate of soda to the gallon of water, and washed again to remove the soda. One frequent source of bad prints is owing to the introduction of acid from the paper into the toning solutions. A very little acid or an infinitesimal quantity of hypo will spoil the best toning solution ever made. The soda treatment is almost imperative, or patchy, irregular toning will be sure to be the case. If only a few prints are being treated, persistent washing and soaking may remove most of the acid, and the toning may proceed without much difficulty, but a great improvement is effected by the alkaline application, so much so that it is best never to omit it.

As to the composition of the toning bath, almost any published formula will give good results, but one formula may suit a special sample of paper better than another. For my own part, I give the preference to a toning bath that will produce black tones, if required. Much more depends on the preparation of the paper than on the toning bath. As to the eventual colour, perhaps for those who only print a few prints now and then the old acetate bath is as good as any, as it will keep for a long time, and rather improves by keeping than otherwise, and there is very little danger of over-toning with it, and the colours given are pleasant ones. Other toning baths, made with carbonate of soda or lime, will not keep indefinitely, and are at their best soon after preparation. With strong negatives the carbonate of

soda bath gives especially rich purple blacks, but colour is so very much a matter of personal liking that it must be left to the operator. There are doubtless ready sensitised papers in the market that will not tone well, or even passably, with any formula, but if this undesirable quality proceeds from an initial fault in the preparation, or from too long keeping afterwards, it is impossible for outsiders to say: the fact remains. In order to have some guide to any source of failure, a known good sample of paper should be tried with any new lot. If all goes right, one may be satisfied with the paper, and must look at home for any fault that may afterwards occur; but if the guide piece remains good, and the new paper works badly, there is no trouble in localising the failure, and the paper must be changed as unsuitable. A good paper should possess the following characteristics:—Print quickly; tone easily; give a rich, bright impression, clear in the light and velvety in the shadows; fix with slight reduction in strength; be free from streaks or metallic spots; and not blister or tear readily.

The hyposulphite fixing bath is best made of a strength of one to five or six. A much weaker bath will fail to dissolve out the hyposulphite of silver formed; prolonged time in a weak bath is not equivalent to a shorter one in one of the strength above mentioned. The use of a too weak or exhausted hyposulphite bath is, I believe, the principal reason of the want of permanency attributed to silver prints. No matter how carefully every operation is performed, unless the print is properly fixed no reliance can be placed upon it. This bath should never be used quite cold, say less than 70°. It may be noticed, if cold water is used to dissolve the hyposulphite of soda, the temperature will be considerably lowered, and the more rapidly the solution is effected the colder it will be. Prints at once placed in this cold bath will in all probability be only partially fixed, though they may remain in the usual time. The temperature is, therefore, an important consideration. Finally, after fixing, the prints should be rapidly washed for a short time in frequent changes of water to remove all the loosely adherent hypo. They may then be completed by soaking for some hours in tepid water, squeezing and draining occasionally; many give a finishing bath of boiling water, which plan has nothing to be said against it, providing the paper does not become too soft and tender by the removal of the size. The prints may then be dried either on frames covered with calico, or between sheets of blotting paper.

EDWARD DENMORE.

HOW I PHOTOGRAPHED THE WORLD'S HIGHEST MOUNTAIN.

THE nearest point from Darjeeling which affords a peep of Mount Everest is Senechal, which is about 8000 feet high. Away to the north-west will be seen Everest, appearing in the distance of the size and shape of the point of an egg. This view is anything but imposing, as Everest is too far off, about eighty miles as the crow flies, and hidden from view by the Ghoompahar range. The best view of Everest is obtainable from Santakphu or Phalut, distance from Darjeeling about fifty-six miles, and 12,000 feet high. Mr. Cowell and myself started on this arduous expedition with a view of obtaining, if possible, a negative of Everest, the highest peak in the world, on the 10th November, 1886.

The weather was very unfavourable; we were enveloped in thick fog, and had occasionally a wetting. The first day we got as far as Tonglo, 10,074 feet high, and continued our journey the next morning. Five miles before reaching Santakphu, at a height of 11,000 feet, the drizzling rain changed into a snowstorm, and we were glad to reach the rest-house at Santakphu, 12,000 feet high, as the road got very slippery for the ponies. We had to stop here for the rest of the day, as the snow came down in earnest and continued all night. It was bitterly cold at this elevation; everything froze except the whisky, of which we had a good supply.

The weather very fortunately changed early next morning, and we had a glorious view of Kinchinjunga and Everest; the atmosphere was very clear, and made the peaks appear quite near. All trees were covered with snow, which glistened in the rising sun, making the landscape look like a fairy scene.

The camera was soon on the stand, and we took a few negatives of Kinchinjunga, and, after refreshing the inner man, we started for Phalut, from whence we expected to get a still better view of Everest. The road from here runs through that beautiful pine and rhododendron forest, which, in the beginning of April, is in one blaze of various colours.

The height of Phalut is 11,811 feet. We observed that the best time to photograph Everest was soon after sunrise, as a little later the broad shadow on the higher peak disappears and all is one mass of white. This fact proves that the centre and smaller peak, which is Everest, stands by itself many miles beyond the front range. It is said by some unknown big man that the distance between the front range and Everest is fifty miles.

Next morning we were ready long before sunrise, and after selecting a suitable place with regard to foreground, we waited till the sun gradually rose and lighted up the snowy peaks. Sunrise and sunset from any of these points is probably the finest sight in the world.

We exposed about eight plates of different makers.

The exposure we gave was between one and two seconds.

The lens used was one of the single combination of a 12 x 10 triple achromatic, which gave about thirty five inches focus. I found this lens very suitable for distant views, as it gives a large image with great depth of focus.

After returning to Darjeeling we developed our exposed plates, and the best results were obtained with Tailler & Clayton's isochromatic plates. The next best (but not to be compared with the former) were Wratten & Wainwright's make. The Britannia plates which we exposed proved a complete failure. Everest was not even visible, and the foreground dim and flat.

In conclusion, isochromatic plates are the best for distant objects such as Kanchenjunga or Everest, and give a very brilliant negative with true intensity in tint and colour, and are quite as rapid as the best plates in the market. The negative of Everest we have taken is the only one in existence.

—Journal of the Photographic Society of India.

THEODORE HOFFMANN.

A NEW CAMERA.

We have just examined a new camera containing several new features. It is made by Watson & Sons, and is intended for the Richmond Exhibition. It folds into a smaller compass, and is lighter and more portable than any other pattern we have yet seen. The back has reversing frame for vertical or horizontal pictures, and also swings in both directions, while by a novel arrangement it may, when required for use with a wide-angle lens, be pushed forward close to the front, so that there is no protruding baseboard to interfere with the angle of the lens. When the camera is open, the back automatically sets itself at right angles to the baseboard, from whence it may be swung as required. The front is of perfectly novel construction, giving a very great range of rise and fall, and fastened at the side by a ratchet instead of a loose front screw, which ratchet is automatically released when the camera is closed, and allows the front to go to the centre of the camera, when, as then happens, it is naturally drawn by the bellows, so obviating any difficulty in folding the camera.

The baseboard is fitted with a combined turntable and tripod head, of light, yet strong, construction, the design of which has been registered. The tripod stand is also quite new, there being three sliding joints, fixed by rack and ratchet, and entirely dispensing with screws or projections of any sort. The portability of the camera is remarkable in sizes as small as $\frac{1}{2}$ and $\frac{1}{4}$ plate, but when it comes to such sizes as 12 x 10 and 15 x 12, the saving in size is most apparent, the thickness of a 15 x 12 being scarcely more than an 8 $\frac{1}{2}$ x 6 $\frac{1}{2}$, and only about one-half the bulk of the lightest pattern cameras one usually sees.

THE SOLAR ECLIPSE.

The eclipse of the sun, which took place on Tuesday, was well observed from several parts of the line of totality in America. Many photographs have been secured.

At Anaheim no photographs were secured, but it is claimed that an intra-Mercurial planet was seen during the period of greatest obscuration.

At Lick Observatory the eclipse was successfully observed, and a number of photographs were taken.

At Letcham ten photographic views were secured during the period of totality, which lasted 1 min. 44 secs.

The party of observation at Bartlett Springs report that the corona was beautifully distinct, and that they saw remarkable changes in the length of the coronal lines. They obtained nine photographs of all contacts, studied the structure of the inner corona, and made even measures of light during totality.

Twenty five negatives were taken at Willows, California, to measure the brightness of the corona and its surroundings. Five of these were obtained to search for intra-Mercurial planets, and twenty to study the spectrum of the corona in order to determine its composition. These negatives will reach from the yellow rays to the extreme ultra violet.

The general illumination during the period of totality was found to be lighter than during the eclipses of 1878 and 1886. The corona was similar to those of 1868 and 1878, but showed much more detail than the latter, and was exceptionally fine, extending usually on one side to two solar diameters. A striking characteristic was two forked wings of light. The polar rays were well defined and considerably shorter.

At Clarendale the eclipse was observed with great accuracy, but shortly before totality some cirrus clouds passed over, all tinged with the most brilliant colours of the rainbow.

Venus appeared during the early stages of the eclipse, while Mercury and the other planets were plainly in view during every phase that was photographed.

To the observers at Healdsburg nineteen-twentieths of the sun's surface were obscured. The period of totality was eighty seconds. Venus, Mars, Jupiter, Mercury, and the principal fixed stars were visible. The corona appeared with long rays of light parallel to the sun's equator.

Professor Todd secured a number of fine photographs of the corona, showing rays extending ten or twelve degrees from the sun. Only rose-coloured protuberances were visible.

At Orland the period of totality was 110 secs. Venus and other stars were visible. Three successful photographs were taken.

At Winnemucca, Nevada, the observers were entirely successful. Accurate observations were made of the times of contact. One observer discovered a comet near the sun. No appreciable change of temperature was noticed at this station. Accurate observations were also made of the shadow bands. The corona was similar in general appearance to that of 1878. The streamers extended to a distance of from three to four diameters, and the red protuberances were strongly marked.

Our Editorial Table.

SELL'S DICTIONARY OF THE WORLD'S PRESS.

THIS wonderful two shillingworth, which has been brought up to date, contains, *inter alia*, practical hints as to the law relating to libels in newspapers, together with many other articles relating to journalism in every part of the world. It also contains sixty portraits of well-known journalists connected with the London and provincial press. Most truly is it a useful book of reference to all who are, or aspire to be, acquainted with matters associated with "the fourth estate"—the Press. Pp. 1452. Sell's Advertising Agency, 167-8, Fleet-street.

THE AMERICAN ANNUAL OF PHOTOGRAPHY AND PHOTOGRAPHIC TIMES ALMANAC FOR 1889.

Edited by C. W. CANFIELD.

THIS annual, though young in years, is growing rapidly in repute. The admirable style in which it is got up appeals at once to the lovers of fine bibliography, and this in book-making is of great worth at the present time. But it contains much that, apart from its fine typography and illustrations, is also of genuine merit and worthy of attention.

We shall take early occasion, as we have formerly done, to give our readers extracts from this admirable annual.

PHOTOGRAPHIC MOSAICS, 1889.

New York: E. L. WILSON.

THIS well-known American annual is now in its twenty-fifth year. It contains, in addition to a summary by the editor, a variety of articles by various American writers, one of whom (D. Bachrach, jun.) we are rather surprised to find is "down" on bromide prints.

PLAQUES FOR BROMIDE PRINTS AND NEGATIVES.

FROM Mr. W. Tylar, of Birmingham, we have received a specimen of his new *papier maché* plaques, on which to squeegee prints or negatives. It makes a good substitute for the more brittle ebonite, being strong, light, and well finished.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 7	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 8	Great Britain	5A, Pall Mall East.
" 8	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
" 8	Derby	Sykes's Restaurant, Victoria-street.
" 8	Manchester Amateur	Manchester Athenæum.
" 8	Bolton Club	The Studio, Chancery-lane, Bolton.
" 8	Bradford	55, North Parade.
" 9	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 10	Birkenhead	Free Public Library, Hamilton-st.
" 10	Cheltenham	
" 10	Manchester Photo. Society	36, George-street.
" 10	London and Provincial	Masons Hall, Basinghall-street.
" 11	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

ON Thursday night, December 27, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. J. J. Briginshaw presided.

Mr. A. HADDON exhibited a negative of the interior of a laboratory in which a large portion of the plate was fogged, and he stated that this was due to the influence of the leather part of the dark slide upon the sensitive surface; the most brilliant objects represented in the fogged part of the plate exhibited reversed images. The plate had previously been in the slide a very long time; the exposure in the camera had been about one hour in dull weather. He did not think the effect to be due to atmospheric influences passing through the leather because there was no iridescence.

Mr. EDGAR CLIXTON thought that the plate had been fogged by a portion of it having been accidentally exposed momentarily to light.

Mr. HADDON said that about three months ago it had been stated that some one recommended a few drops of a solution of phosphorus in bisulphide of carbon dropped upon powdered chlorate of potash to give a flash light for photographic purposes; he would show the meeting how the plan worked. He first poured a little solution of phosphorus in bisulphide of carbon on blotting paper; in about a minute the liquid evaporated, leaving the phosphorus in such a finely divided state upon the paper that, as usual, it spontaneously caught fire from rapidity of oxidation; nevertheless it did not set fire to the blotting paper, but only charred it beneath the flame, the phosphoric acid produced by the combustion preventing the paper from catching fire. Next Mr. Haddon poured a few drops of the same highly dangerous liquid upon a few grains of finely powdered chlorate of potash; after the lapse of about a minute the mixture exploded with a loud report like that of a gun. Mr. Haddon expressed the opinion that the man who recommended using a flash light in that way for portraiture must be an idiot.

Mr. W. H. HARRISON said that if the flash gave light enough to photograph the sitter before he had time even to blink his eyes it ought to give better pictures than obtainable by any of the magnesium blow-through lamps in the market.

Mr. T. E. FRESHWATER said:—

I thought I would refer to the latest book on the optical lantern, just compiled by Mr. Hepworth, to see what information I could get from it on oil lamps for the lantern—the subject for this evening. Looking through the index, I find “Lamps, Newton, page 6;” on referring to page 6 I find the following: “The management of oil lanterns is so simple, really resolving itself into the necessity for keeping the burning wicks at a correct height and putting the pictures on the stage provided for them, that no more space need be given to the subject.” Well, that is dismissing the oil lanterns summarily, and I feel, with Mr. Hepworth, that there is not much more to say. One of the great secrets is cleanliness; care should be taken to light the lamp at least five minutes before use, so that the whole lamp may get thoroughly warm before being fully turned up; for when the oil gets hot it flows more readily, consequently its vapour is more rapidly thrown off. Care should be taken that the cottons are properly trimmed, not cut, as the raw edge of the cotton does not throw off that full volume of light which you get from the burnt edge of a cotton that has not been recently trimmed; all that is necessary is to take a piece of paper and rub off any charred part, taking care that none of it falls into the space between the cottons and, perhaps, stopping up the perforations. It is very important these perforations should be kept quite clean and open, so that the current of air passing through to the flame may in no way meet with interference. Much depends on extreme care in keeping the lamp clean both as to obtaining a good light and securing freedom from smell. The question of condensers and front lenses has been gone over so many times that it calls for no remarks now. There is nothing in this lantern which is new; I have only brought it at your request, so the best thing I can do is to light the lamp and show you how it works.

Mr. Freshwater then worked the lantern for about half an hour, projecting various pictures upon the screen, without the lamp giving either smoke or smell. He said that a good four-inch condenser would illuminate an ordinary slide better to the edges and corners than a half four and a half inch condenser.

Mr. HADDON remarked that one way of avoiding smell in subsequent operations was to carefully empty all paraffin from the lamp at the close of each exhibition, otherwise by capillary attraction it would continue to rise in the wick and afterwards run down on the outside of the lamp.

Mr. BRITISHMAN had found three-wick to work better than four-wick lamps, and to give as much light.

Mr. F. A. BRIDGE had had the same experience.

Mr. HARRISON remarked that in buying an optical lantern it was well to obtain a guarantee from the vendor that the back lens of the projection combination was large enough to take in the whole of the cone of rays coming through the picture, otherwise there would be loss of light from a too common defect in lanterns.

Mr. HADDON asked why the parallel wick could not be placed slightly diagonally to the axis of the optical system, so as to throw no dark vertical line or lines across the luminous disc on the screen.

Mr. FRESHWATER replied that the plan had been tried and there was a loss of light.

Mr. CLIXTON had tried it with a two-wick lamp, and found that there was a loss of light.

Mr. HADDON could not see why such should be the case, flame being transparent to light.

Mr. FRESHWATER said that a stone found near Nottingham was found to burn into the best lime for lanterns, but the lime cylinders made of it are at present badly turned and badly drilled.

Mr. BRIDGE had found that the aforesaid lime from a Nottingham stone was the best in the market.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of this Society was held Friday, December 28, at 12, Old Bond-street.—The Right Hon. The Lord de Bosc in the chair.

The minutes of the last meeting having been read and confirmed the following members were elected:—Messrs E. A. Tower, S. A. Garnett, and Albert Norman.

The SECRETARY then laid before the meeting the prizes which had been awarded at the annual meeting, which were as follows:—Mr. B. O. Milne (the first prize), a large silver goblet; Mr. F. S. Senwale, a silver goblet; Mrs. Hobson, a silver goblet; Mr. W. Galdum, a silver goblet; Mr. R. Leventhorpe, a handsome landscape album; Mr. W. S. Hobson, a silver goblet; M. Maurice de Delys, a handsome portrait album; Dr. Drew, a small silver goblet; Mr.

R. Murray, a handsome landscape album; and Mr. F. Gowan, a handsome portrait album.

These prizes were approved by the Council, and the Secretary was directed to forward them to the members to whom they had been awarded.

The SECRETARY was directed to inform the members of the following resolutions which were proposed by the Earl of Rosse and passed at the previous meeting:—1. That the last day for receiving negatives, so that they shall be guaranteed an entrance into the annual competition, shall be May 1. 2. That negatives received after that date, and until the meeting of the Referees, shall as far as possible be entered, but they shall not be guaranteed entrance unless they be accompanied by a print from each. 3. That the unpunctuality of members in sending in negatives shall not be considered a reason for the postponement of the meeting for the award of the prizes.

CAMERA CLUB.

On Thursday, December 27, the slides sent in by members for the exchange with the New York and other American Photographic Societies were exhibited. In all about two hundred were shown, and from these one hundred will be selected to send to the United States. Among those contributing were Messrs. Gale, Conway, Wainwright, Beasley, Greene, Howlett, Davison, Ferrero, Carnell, Sturme, Shipton, Stroth, Elder, Robertson. After the exhibition, a short discussion took place on the marking of lantern slides.

On Thursday, January 10, another lantern show will take place at the Club.

WEST LONDON PHOTOGRAPHIC SOCIETY.

The inaugural meeting of this Society was held at Addison Hall on Friday, December 28, when a large number of ladies and gentlemen attended to hear the inaugural address from the President.

After the disposal of the formal business, the PRESIDENT (Mr. William England), in the course of his address, said a photographic society for West London was now actually in existence, but its success in the future would depend to a great extent on the hearty co-operation of every member. It was not to be forgotten that many societies were already in existence, and some of them had had a long start of the new society, still he trusted it would never, after all the energy and trouble which had been expended, be said that the West London infant would not grow into manhood. It had been said in some quarters that another London society was not required, but that was an opinion which he certainly could not endorse. Central and other parts of London were, undoubtedly, already provided for, but surely the western district, which probably contained more photographers, amateur and professional, and persons interested in art culture than any other portion of the metropolis, should be represented by a photographic society of its own. He reminded those present that ladies were eligible for membership, and probably in West London there were many lady amateurs who would fully appreciate the advantages to be derived from becoming members of such a society; he, therefore, trusted that a large number of ladies would join and honour the Society by their presence at its meetings. It was a fact not to be overlooked that photographers of the present time possessed great advantages over those who practised the art in its earlier days. At the time to which he referred there were no photographic periodicals to appeal to for help and guidance out of a difficulty, and photographic societies, of which there were now upwards of eighty established in Great Britain, were things unknown. The President, in concluding his address, gave an interesting résumé of the Daguerreotype process, and, to illustrate his remarks, handed round for the inspection of the audience some valuable early specimens of the process, including a portrait of Daguerre, a portrait of himself, a copy of a picture, and a fine instantaneous study.

After a vote of thanks had been accorded to the Chairman for his address, Mr. HARRISON LOW said that the President, in the course of his remarks, mentioned that the real work of the Society had only just begun; but, with all respect, he ventured to disagree with him upon the point. They should not lose sight of the fact that they owed a debt of gratitude to four gentlemen—Messrs. Blackmore, March, Bennett, and Hodges, who were really the originators of the idea of forming a photographic society for West London, and that it was they who had undertaken all the trouble incident to and inseparable from the work of promoting such a society as the present. Bearing this fact in mind, he thought it only fair to the gentlemen he had named that the meeting should mark its sense of its appreciation of their services by according them a hearty vote of thanks for the expense and trouble to which they had been put.

The motion having been seconded by Mr. Whiting and carried unanimously, Mr. HODGES returned thanks on behalf of himself and those who had been associated with him in forming the Society, and said that the future success of the Society would rest in a great measure with each individual member and not alone with the executive; they might have the most capable President and the most zealous officers, but such a desirable condition of things would not make the Society a success without the hearty co-operation of all the members. There was also another matter which he wished to impress upon them, and that was the necessity of regular attendance at meetings on the part of members. They must bear in mind that they were now an existing society, and as such were open to public criticism, and it was unnecessary to remind them that photographic criticism was very keen.

The optical lantern was then called into requisition, and a number of slides, the work of members, were exhibited, including a fine series of Continental and instantaneous views by the President. Mr. Whiting contributed a series of views in Ely and Canterbury produced by the wet collodion process. Messrs. Varlen, March, Bennett, and Hodges, also contributed views.

The CHAIRMAN announced that Mr. G. F. Blackmore would read a paper entitled *Notes on Ferron Oxalate Development* on January 11, and that Mr. Hodges would give an account of a tour in North Wales, with lantern illustrations, on January 28.

A vote of thanks to the President for presiding terminated the proceedings.

The next meeting of the Society will be held at the Addison Hall on Friday, January 11, at eight o'clock.

HALIFAX PHOTOGRAPHIC CLUB.

The monthly meeting of the above Club was held in the Mechanics' Hall on Thursday evening last.

Mr. R. Kemtani read a paper, *To the Alps with a camera*.

Mr. Alston Palmer exhibited a large number of views by the aid of the limelight, being the joint production of himself and the lecturer. The pictures were very interesting, being chiefly drop-shutter views taken in the various cities visited and from the steamboats as our travellers passed up the Rhine.

EDINBURGH PHOTOGRAPHIC SOCIETY.

At the meeting held on December 5, 1888, the President in the chair, nine new members were elected, namely, Messrs. A. J. Rannerman, James Burns, Robert Grieco, James Macadam, Andrew L. Smith, J. Steel, Alex. Walker, Fred. Wank, and J. H. Young. Eighteen gentlemen were nominated for election at the January meeting.

Mr. Robert T. Salmon then read a paper entitled *The Photographic Harvest of 1888*, in which he pointed out the rapidity with which applied photography has recently advanced. A vote of thanks was accorded to Mr. Salmon.

Mr. A. A. Inglis presented the Society with the Parker's sky shade which Mr. Macbeth, R.N.A., had brought before the notice of the Society some years previously. Mr. G. G. Mitchell, in the absence of Mr. Inglis, exhibited the method in which the sky shade worked, and handed it over to the Curator.

The members then proceeded to inspect the specimens of members' work hung around the room. The quantity of exhibits showed a slight falling off as compared with that of last year, this decrease being generally attributed to the general unamiable weather characteristic of the past summer. One noticeable feature to the exhibition was the growing popularity of developed bromide prints, as evidenced by their comparatively large number.

The first "popular evening" will be held in Queen-street Hall on Thursday, January 17, 1889, when Mr. David McGibbon, F.S.A.Scot., will lecture upon *The Cathedral Structures of Scotland*, comparing period with period, and especially pointing out the characteristic features of each.

It is intended that the second popular evening—devoted to the exhibition of members' work only—shall take place on Thursday, February 21, when a musical programme will form a special feature in the proceedings. Members are particularly requested to send in their slides to Mr. William Forgan, 13A, Friar's-place, or to Mr. J. M. Turnbull, 6, Rose-street, on or before Monday, February 12, and to see that each picture is legibly titled. The observance of these precautions will enable the Council to do their work more efficiently, and will tend to the prevention of mistakes.

ALLAHABAD CAMERA CLUB.

The first general meeting of the above Club was held at 9, Albert-road, at six p.m., on December 11. President, the Hon. Mr. Justice Straight. The meeting opened at a quarter past six p.m.

After the ordinary business of the Club had been disposed of, it was decided to form a class of instruction, commencing with the A B C of photography, under the able supervision of the Secretary. Classes to be held weekly, open to all members. Camera, chemicals, and dark room, free of charge, being supplied at the cost of the Club.

Colonel Brown Constable then exhibited a short series of lantern transparencies prepared in various manners, and showing practically the various results caused by the various developers used.

Afterwards a discussion was held on the Brown-Constable changing bag, and a practical proof of its excellence was given by its inventor and patentee (whose name it bears) changing and recharging with plates three double dark slides for 3½ x 6½ plates. This work was done, though under difficulties, in ten minutes.

After a little general discussion the meeting closed.

The next regular meeting of the Club will be held on Tuesday, January 8, 1889.

All communications to be addressed, Mr. A. Wingrave, Secretary, Allahabad Camera Club, 9, Albert-road, Allahabad.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A STATED meeting of the Society was held Wednesday evening, December 5, 1888.—The President, Mr. Frederic Graff, in the chair.

Nominations for officers and standing committees for 1889 were made.

A paper was read by Mr. HENRY HARRISON SPYLER on *The Largest Camera in the World*, being a description, particularly in its application to astronomical photography, of the Lick telescope.

Mr. Spyler also presented to the Society, on behalf of Messrs. Warner & Swasey, of Cincinnati, the builders of the telescope, three fine photographs showing the instrument as mounted in the observatory.

Dr. CHARLES M. MITCHELL gave an interesting account of a photographic trip taken during the last summer in the White Mountain region of New Hampshire. A large number of excellent slides were shown as the result of the trip.

Mr. CARBUTT showed some transparencies made on his new flexible negative films, which were of great beauty. They were mounted between two sheets of plain glass, no ground glass being required. An excellent portrait negative made on a film by Mr. Gutekunst was also shown. As a convenient method of using the films in ordinary holders, Mr. Carbitt showed some carriers made from sheets of ferrotype plate, the edges being bent over in such a manner that the films could be readily inserted and firmly held, so that the carriers could be placed in position in the holder. He called attention to the absence of halation when films were used, the smallest twigs and branches of trees being perfectly sharp. Negatives taken in the building of the American Institute Fair, in New York, a portion of the skylight being included in the view, were

entirely free from halation when taken on the films, the decided reverse being the case when glass was used.

In reply to a question by Mr. Burroughs, it was stated that the tendency to curl in drying could be obviated by first placing the film for three or five minutes in a mixture of water, thirty ounces, and glycerine, one ounce.

RECENTLY ELECTED OFFICERS OF SOCIETIES.

AUCKLAND CAMERA CLUB.—Meetings are held on the second Thursday in each month. Annual Meeting, second Thursday in November. *President*: S. C. Brown.—*Hon. Secretary and Treasurer*: A. G. Tibbitt.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—*President*: Richard Hill Norris, M.D.—*Vice-Presidents*: W. J. Harrison, F.G.S., E. H. Jaques, B. Karleese.—*Council*: F. Barnett, J. J. Button, J. C. Fowler, F. Hoskins, S. G. Mason, E. C. Middleton, A. Pumphrey, G. A. Thomason.—*Librarian*: S. T. Holliday.—*Treasurer*: T. Taylor.—*Hon. Secretaries*: J. H. Piekard, 361, Moseley-road, and William Rooke, Ascot-road, Moseley.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.—*President*: T. Mansel Franken.—*Vice-Presidents*: J. W. Insole, Jonas Watson, J.P., S. W. Allen, M.I.M.E., Alexander Kellar.—*Hon. Treasurer*: W. Foster.—*Hon. Secretaries*: G. H. Bedford and G. H. Wills, jun.—C. F. Gooch, George Shepton, H. L. Bridger, Rev. W. Whiteside, W. Windsor, T. H. Faulks, and E. H. Bruton, were added to the Council.

CINCINNATI CAMERA CLUB.—*President*: George Bullock.—*Vice-President*: George McLaughlin.—*Librarian*: Archibald I. Carson.—*Treasurer*: T. H. Kelley.—*Secretary*: Emery H. Barton, 171, Race-street, Cincinnati, Ohio, U.S.A.

HEREFORD CITY AND COUNTY AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1888. Meetings, first Thursday in each month at half-past Seven. *President*: James Rankin, M.P.—*Vice-Presidents*: Thomas Blake and Rev. W. Bowell, M.A.—*Council*: C. B. Beddoe, Edgar Morris, M.R.C.S., Alfred Watkins, Will Parker, James Godwin, A. H. Smith, J. Runkin, jun., E. G. Davies, Robert Clarke, W. Wilson.—*Hon. Treasurer*: B. Culwick.—*Hon. Secretary*: John Parker, A.M.I.C.E., Mansion House, Hereford.

HUDDERSFIELD PHOTOGRAPHIC SOCIETY.—Meetings are held on the first and third Wednesdays in every month at the Society's Rooms, Byram-buildings, Station-street, Huddersfield, at Eight o'clock. The dark rooms, enlarging, and reading rooms, are open for the accommodation of members daily. *President*: Surgeon-Major Foster.—*Vice-Presidents*: John Ed. Shaw and T. K. Mellor.—*Committee*: H. G. Brierly, A. Clark, B. Crook, T. Fitton, H. Haigh, F. W. Mills, G. B. Nahder, H. Young.—*Curator*: W. H. Charlesworth.—*Hon. Secretary and Treasurer*: H. M. Smith, 15, St. John's-road, Huddersfield.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—*President*: A. W. Beer.—*Vice-Presidents*: H. N. Atkins and H. Lupton.—*Council*: R. R. Gibbs, G. A. Kenyon, M.D., P. H. Phillips, E. Twigge, P. Lange, D. Lewis, W. P. Riley, G. H. Rutter, R. Crowe, E. Roberts, B. J. Sayee, W. Tomkinson.—*Librarian*: W. Hughes.—*Auditor*: W. H. Kirkby.—*Hon. Treasurer*: Joseph Farr.—*Hon. Secretary*: Walter A. Watts, M.A., Highfield-road, Appleton, Widnes.

PACIFIC COAST AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established February 19, 1883. Regular Meetings, once a month, held upon the first Thursday after the first Monday in each month, at Eight o'clock p.m., at 605, Merchant-street. Annual Meeting to celebrate anniversary. Exhibitions annually. *President*: A. J. Treat.—*Vice-President*: George W. Reed.—*Executive Committee*: W. H. Lowden, Dr. E. W. Ruyon, Dr. S. C. Passavant.—*Treasurer and Secretary*: James H. Johnson, 414, Buchanan-street, San Francisco, California, U.S.A.

Correspondence.

Correspondents should never write on both sides of the paper.

PROPOSED PHOTOGRAPHERS' DEFENCE UNION.

To the Editor.

SIR,—At no previous period in the history of photography has there been such need for a co-operation of professional photographers as at the present time.

The decision of Mr. Justice North, *in re Pollard versus Photographic Company*, threatens to still further seriously interfere with the already much handicapped profession; unless a decisive step is unhesitatingly taken, and generously supported by professional photographers, any one of our brethren may be proceeded against at any moment by some spitefully inclined person for simply exposing a specimen in his show-case, or supplying a re-order to the wrong member of the family. The case cited above will furnish a dangerous precedent if it is suffered to become law, therefore no stone should be left unturned to prevent this.

If the facts of the case, as revealed by the proceedings, formed the only basis, there would, of course, be an end of the matter, as no respectable photographer would part with any copies otherwise than to the sitter or relatives, or with the former's permission, nor do I believe that he would hesitate one moment to remove any specimen from his window (or would never exhibit at all) after a request to that effect, but the case presents a slightly different aspect.

The defendant, with whom I am acquainted, belongs to the first rank of the photographic profession, and is an artist of no mean order, and it must be a matter of regret that he allowed the case to be conducted by affidavits instead of witnesses being heard orally, for or against, and, further—

more, I must say that in my opinion it was a mistake on the part of the defendant's counsel to contend that the photographer could make what use he pleased of a negative. However, as that cannot now be remedied, I trust that an appeal may reverse the decision when the case may be clearly stated as follows:—

The plaintiff, a solicitor, having paid an account he owed to the defendant, ten days afterwards brought this action. (In case of my readers misconstruing my words, I wish it to be distinctly understood that I do not mean to say that this action was brought out of spite; on the contrary, I firmly believe that a gentleman of such high standing as a solicitor could not possibly be capable of such meanness. Even if [some might think it a remarkable coincidence, I am quite sure that such coincidences do occur in every-day life having no particular meaning attached to them). An exceedingly good and pleasing photograph of the plaintiff's wife was inserted into one of the usual Christmas designs (as is the custom of trade from its infancy) and exposed in the shop window for a considerable time, during which the plaintiff's wife frequented the defendant's shop several times, and although knowing it to be there never objected to it.

Then the plaintiff's clerk purchased one on the detective system, having previously and repeatedly been asked whether he had the lady's permission. The action was tried, with the result known. It is easy to imagine the consequences if the decision is permitted to stand. First of all every photographer, apart from being liable to be prosecuted from an unknown enemy, will probably have to part with a valuable negative to the amateur friend of the family who will furnish all after copies. Secondly, if he insists in retaining the negative, the material of which clearly belongs to the photographer, the necessary permission to supply after copies will lead to no end of complication, as, for an instance, a group of twenty having been photographed, any one member's consent in writing will be required to supply the other with a copy, and it is truly appalling to contemplate what formalities will be requisite in the case of an after order, supposing some of the company to have emigrated to the Cape of Good Hope or elsewhere; or it may happen that an application for permission to sell photographs to members of the family cannot be entertained until a list of those relatives, who may or may not be supplied, has been prepared. A gentleman, engaged to be married, accompanies his intended bride, and actually pays for her photograph. At an impending breach of promise action the gentleman orders some more copies, and so may drag the unsuspecting photographer into his meshes. Examples like these might be drawn *ad infinitum*, and it would require an extra clerk to guard against the law; therefore it is clear something must be done.

The leader in your last issue should alone suffice to bring about a protection society. If we do not band together now, such gross omission will surely become a standing reproach to us. The defendant in the case of Pollard versus Photographic Company is inclined to pay the costs in the action, being afraid of incurring the risk of an unsuccessful appeal.

The chances are very much on the defendant's side if the case were carried into that Court. All previous decisions have been in favour of the profession, and it has always been understood by photographers that the copyright is vested in the operator, and not in the sitter as pronounced by the judge.

In view of the great and acknowledged interest you, Mr. Editor, take in photographers, I ask you to lend your esteemed and valuable assistance to this cause, so that a society may at once be formed, or an appeal fund be started, to which I am happy to contribute 2l. 2s.

No time must be lost, as the term within which an appeal may be lodged expires in less than a fortnight, therefore permit me, through your widely-circulated journal, to invite the brethren of the craft to forward their names for membership immediately, whereupon an early meeting can be arranged, and the subscription paid, and other necessary formalities can be settled. Let it be remembered that this important matter concerns every individual member of our noble profession, and though it only affects a provincial colleague to-day it is not at all unlikely that it may be our turn to-morrow.

As experience teaches that for the want of an organised beginning many good schemes fall through, I venture (even at the risk of appearing over officious) to take it upon myself, if necessary, to act as secretary *pro tem.*, until the ship is successfully launched within smooth waters, when I shall conceive it my duty to deliver it up to the guidance of abler hands, who I sincerely trust may steer it in grand style through the strongest currents.

That it may be quickly and powerfully manned and accomplish its grand object, is the earnest wish of—Yours, &c., J. HUKAR.

OWNERSHIP OF THE NEGATIVE.

To the Editor.

SIR,—I see two judges have decided that the copyright of the negative belongs to the sitter. How would it be if a picture was taken of a person with a hand camera, the person photographed being quite unconscious that he was being done? In this case, also, it is clear, if the judges are right, that the negative belongs to the sitter. A landscape photographer must, therefore, be cautious, as if he puts a figure in the foreground the negative will belong to the figure, and what would happen if he had

several figures—say a street scene—I am at a loss to imagine. The whole of those included would have a "joint estate" in the result. They would be "co-owners." This would lead to an exceedingly perplexing state of affairs. Any one in the crowd could prevent the publication.—I am, yours, &c., F. J. Q.

Camera Club, 21, Bedford-street, W.C., December 29, 1888.

PSYCHIC PHOTOGRAPHY.

To the Editor.

SIR,—I am pleased to be able to send you the result of your criticism in THE BRITISH JOURNAL OF PHOTOGRAPHY, September 14, 1888, in reference to the apparent double exposure in the spirit photographs you saw. It appears to have been due to a phosphorescent halo which surrounds the spirit, and which is capable of penetrating to the plate in the camera when the room is full of light-coloured magnetism; consequently, when the magnesium is lighted, it stamps the sitters in the body on the plate as well, but whether this is necessary to impress the spirit also was the point in question.

The plate, a print of which I send you, was taken under the following circumstances, the focussed sitters being myself and a lady friend, very incredulous, but sufficiently anxious for knowledge to keep her mind calm and in a receptive condition. She is a frequent visitor here, and had frequently expressed a wish to go upstairs when we were sitting; she has now been sitting regularly several weeks, and every suspicion she had has vanished.

Among the correspondents my letters in your JOURNAL have brought me is a lady from Belfast. She was most anxious to come to see me and bring her son, who was an amateur photographer, to try to get some spirit photographs with me, for he could not believe that they were genuine because he can imitate them. As is my custom, and has been all my life, in all matters outside my own knowledge, "I inquired of the Lord," and received this audible reply: "Yes; you may invite the lady, and make her up a bed in the room you operate in. We have consulted with the spirits in her surroundings, and we will try to bring one forward; but as we wish you to make these experiments known to the world without coming in rude personal contact with sceptics who won't believe even the evidence of their own eyes, and who we know argue to have their own way, not to gain information, we would like you to suggest, when you write, that her son should try himself once per week for spirit photography until he succeeds, and in the meantime read what the leading minds have written on this subject." Thus encouraged, I invited her. She came, but a telegram summoning her immediate return home reached here before her arrival late on Monday evening; being tired out she went to bed, and proceeded on her homeward tour early the next morning, without the desired experiment in psychic photography. Now for the sequel.

On Tuesday evening (as is usual when convenient) I exposed three plates, one of which was developed without lighting any taper, or, in plain words, exposed in total darkness, quite black, the fire being screened and draped heavily. . . . When the plate was developed there were on it six distinct faces, and many indistinct ones. I printed it, and as none of the spirits were known to me in life, nor to my two friends who were present, I forwarded a print to the Irish lady's address, asking if she recognised them, feeling certain that my spirit friends would keep their promise, and complete their part of the agreement, though circumstances prevented me fully keeping mine. Instead of answering my question she wrote asking me to forward the negative, and if I would pay carriage she would return it. . . . But I considered my question merited an answer. I therefore wrote reminding her that she had not answered my question, that I was pleased to show the plates to any one, that I had three or four callers for this purpose most days (many of whom refused to give names, even after they have seen them and are satisfied), but that I did not feel disposed to part with them, even for a day, unless to relatives of the spirit shown, then I would willingly give up the plate altogether, provided they were willing to give a substantial donation to the Spiritual Evidence Conference, of which I am a member. The answer to this contained these cautious words: "I thought I recognised the spirit; I showed it to my daughter, too. My niece said it looked like me." Of course, if it were the lady herself, I must have had a portrait of her, which I had not, nor any like her, or she must have been dressed up and sat for it, which was not the case. But, supposing this was so, how about the other four forms, one of which is unmistakably an Irish face. Two heads are close together as mother and son, and the fifth an old lady smiling down upon the centre figure. Is it possible for these to be produced in miniature without separate focusing? In the meantime I send you the three negatives taken that evening, two with light and one without light, which kindly return in a few days. I feel that you are honestly interested in the subject, and are willing to investigate it if you can satisfy yourself of the genuineness of the phenomena. The chief plate has accidentally been damaged in the corner; it is the one developed without light. The lady's name is —. The details are intended for the consideration of those who every week confess, "I believe in the communion of saints," and yet superciliously resent and scoff at every attempt the saints make to establish such a communion as so much time lost in their chase after money. Angels are men continuing the life they commenced on earth;

and just in the same proportion as our relations and neighbours will not intrude their company upon us when they see they are not welcome, will this sensitive delicacy be increased, as all their other faculties are intensified by life in the spirit world. "He that hath friends must show himself friendly" applies as much to man's communion with angels as with men. A closer and more frequent communion between the spirit and the material world would have more power to check sin than all the sermons ever preached. I do not believe it possible for any person to take the photographs of spirits unless there be a sympathetic confidence existing between the operator and the spirit world. If the communion be an audible and a conscious one so much the better for results, but this is not so necessary as sympathy, contentment, and patience with, and confidence in, their efforts to fall in harmony with and impress the friends in the body who are operating for spirit photographs how to improve conditions.

Your criticism on the negative will oblige. I am, yours, &c.,
S. A. POWER.

Ladlow's College, 93, Ashford row, Birmingham, December 28, 1888.

P.S.—Of the two friends who were present when the three plates were exposed, one is the sister of the spirit pupil you were shown in Birmingham—a constant visitor here, though opposed to my views on the subject, and, though she has every confidence in me, thought I was the subject of a joke. During the last dozen sittings she has sat in the room, witnessing and examining every movement. She finds all her theories have to give way, because they will not dovetail with the facts as she witnesses them. (I enclose her name and address, but not for publication.) The third person present taught me photography indeed, still teaches me, for as you see there is much room for improvement.

[In the first place we must confess to having deleted portions of our correspondent's letter, which we thought did not bear directly on the subject of spirit or psychic photography. Hence, if there be any jerkiness in the style, we, not Miss Power, must be held responsible. One, at least, of the names she gives us is not unknown to us, and we quite admit honestly and truthful endeavour as regards research.

Concerning the negatives which accompany the foregoing letter, we shall not hazard any opinion, but shall very soon arrange to send Miss Power a binocular camera with which to institute a few more experiments. If with it she obtains any spiritualistic or psychic (call it what you will) phenomena and send us the negatives, then we shall feel we stand on stronger ground than when mere monocular impressions are concerned.—Etc.]

To the Editor.

SIR,—At the time that I am writing there are reaching me numbers of *The Harmonic Journal of Photography* in which there is much correspondence on the subject of *Psychic Photography*—a subject that, under one name or another, is continually cropping up. I imagine that the subject will have been pretty well threshed out before this reaches London, and I certainly hope that the discussion will have stopped, for the result of it is sure to be only one. No conclusion will be come to whilst those on both sides of the argument will display the most lamentable credulity, those on the one side allowing themselves to be taken in with what is, at times at any rate, palpable trickery, or allowing their preconceived notions to blind them to evident explanations of the phenomena that are observed, whilst those on the other exhibit the far worse credulity involved in the assumption that there are no forces possible but those that have been scientifically investigated, no senses possible but the five or so that have already been fully developed, and that, therefore, all that is commonly called "preternatural" or "supernatural" is impossible. A denial of the possibility of the so-called "supernatural" is always the result of the very shallowest scientific knowledge, and commonly gives way before a broader knowledge, at the same time that it comes to be recognised that "supernatural" is not the proper term to use. Looked at from one point of view all phenomena whatever are supernatural. We can explain no one of them even in the smallest degree. All our so-called "explanations" are merely statements of one phenomenon in terms of others. On the other hand, if we are ever able fully to investigate and to classify the phenomena now termed "supernatural," we will certainly find that order in their sequence which we usually, but wrongly, express by saying that the phenomena are "subject to natural laws." Nothing in the world is "subject to natural laws;" and "natural laws" being nothing but an expression of certain sequences which have been observed to take place with such unfailing regularity that we conclude, reasoning by analogy, that they hold in regions where we have not investigated, and that they will continue indefinitely.

It is not, however, to write an essay on the possible existence of the supernatural that I sat down, but to tell of a little event in photography that came within my own knowledge a short time ago, and that, at first, seemed so extraordinary that it appeared as if it might be classed amongst the things generally spoken of as "supernatural." Here is an exact account of the event.

A friend of mine, a very enthusiastic photographer in these parts, came to me the other day with a tale of the most startling kind. He had opened a new box of a brand of dry plates made in this country, and had exposed some of them. On going to develop them he was rather surprised that no image appeared for a long time—"rather" surprised I say

advisedly. He was working on a not very familiar subject, and admitted that possibly he had very much under exposed. He was, however, far more than "rather" surprised when at last an image appeared on the plate, but one of a view entirely different from that on which the exposure had been made. In three cases such images were got, and in one case the image was of remarkable clearness. The last-mentioned plate was brought to me, and then I saw that it was distinctly and unmistakably a transparent positive of the interior of a foreign house. Not only that, but the house and room were before long recognised. This was, naturally, not a very difficult thing in a place where there are but few European houses, and in the case of a photograph that showed some very uncommon "curios" on one of the tables. And now the mystery reaches its height. So far as it is possible to prove negatives (I do not use the word in its photographic sense here) it was proved, not only that none of the plates that gave a picture of a certain room in a certain house had ever been in that house, but, further, that no photographic apparatus of any kind had been brought within the doors of the house since a time considerably before that at which the plates that gave the mysterious images had been manufactured.

And here comes the "moral," if there is one. All the statements that I have given above were considered by all concerned to be fully proved. Suppose now that some one had wished to establish what may, perhaps, be given the name of "telepathic photography," and it would be pure Philistinism to deny the possibility of such, here would have been a most undoubted and undeniable case.

It is generally mere foolishness to deny the possibility of anything, but when we get beyond the beaten track it is necessary to exert ten times the usual care, lest we come too quickly to conclusions. The case in point is a good example. Our "supernatural" photograph was to be most completely explained, or, to be consistent with what I said at the beginning, was to be stated in terms of phenomena quite common and almost well known. The photograph was, after a time, recognised as a transparent positive of a part of a negative made months ago by a certain professional photographer. This discovery led to further investigation, and it was found that the supply of imported glass had run short in Tokio some month or two before the plates that gave the strange images had been made, and that the plate makers had bought up all the old glass they could get hold of, the particular negative just mentioned being amongst the lot. This brings our explanation down to a very simple matter. It is, indeed, merely a repetition of the old, old manner of producing spirit photographs, only that it was done quite accidentally.

There is, however, much that is interesting in this matter from a purely photographic point of view. In the first place, this is, I believe, the first record of the appearance, in the case of dry plates, of a phenomenon which was well-enough known in the case of wet plates. Then there is the further curious fact that the image was a *positive*, not a *negative*, as one would have expected had the glass retained any form of latent image. Further, there is the curious fact that the image appeared in the case of only three out of several thousand plates that were made from old glass. One theory is that the glass absorbed a certain amount of light, in the way in which sulphide of calcium absorbs light, and that it gave off this light to the plates. It will be observed that, if it be assumed that the plates were placed in a pile, in a brilliant light, with the film side of the particular negative that gave the image upwards—an assumption by no means extreme—the plate might absorb light in such a form as to give a positive image, if it were coated with emulsion and gave off some of its light after it was coated. On the other hand, the manner in which the plates were treated—as reported to me—makes it somewhat difficult to entertain this explanation. They were steeped for ten days in acid—one part hydrochloric acid to twenty parts water, were then washed in hot water, were further scrubbed with the vegetable sponges that prove so useful in this country under a stream of cold water, were placed for half an hour in a weak solution of chrome alum to prevent frilling (A. L. Henderson), and finally were rinsed in cold water and were dried. It is almost impossible to suppose that the absorbed light remained to such an extent in the plate through all these operations as to be able to produce an image on a gelatine emulsion. On the other hand, the fact must be borne in mind that a luminous surface—luminous from having absorbed light—will, upon the application of heat, after it has apparently given off all the heat that it has absorbed, sometimes give off a residuum under the influence of heat. It is just conceivable that such a residuum was given off from the glass when the hot emulsion was poured over it.

The theory that I give may be right or wrong—probably it is wrong; but I consider that I have established, or rather that the facts that I have described have established, one most practical point, namely, that it is not safe, even in the case of gelatine emulsion, to use glass a second time. I do not think that glass is at all extensively used a second time in coating with emulsion, for the reason that it barely pays to clean it, otherwise I should expect a vote of thanks from the glass makers.

Imperial University, Tokio, Japan.

W. K. BURTON.

DEFECTIVE SLIDES—DEVELOPERS.

To the Editor.

SIR,—With reference to the query put by "M. H. A." in your issue of November 9, I write to say that I have had great trouble since coming

to the sea coast with double backs, the hinges of which are made of leather. My experience, however, is the converse of "M. H. A.," for whereas he complains of a band of fog, I always had, not fog, but a band paler than the rest of the negative. This bleaching I attribute to the action of the sea air on the silver bromide. As a remedy I tried wax, then shellac varnish, but they proved ineffectual. I then tried Bates' black varnish, which so far has proved satisfactory.

As I am writing to you I may mention that I have found anhydrous sulphite of soda in the alkaline part of Beach's developer (when used in the proportion of half the quantity, by weight, of the equivalent amount of ordinary sulphite of soda) most unsatisfactory. It produces severe frilling on plates which develop without a trace of frilling when ordinary sulphite of soda is used; and I believe, also, that it leads to fog.—I am, yours, &c.,

T. M. HORSFALL.

Madras, December 2, 1888.

HYDROQUINONE AS A DEVELOPER FOR COLLODION EMULSION.

To the Editor.

SIR,—I trust you will not think I am wasting your valuable space by giving a short experience of the above as a developer for collodion emulsion dry plates. I determined to try the Beechey plates for making lantern slides. I accordingly made up the developer given with each packet of plates, which consists of pyro in alcohol and carbonate of ammonia as alkali. I exposed a plate for about one minute and a quarter, at a distance of two feet six inches, under what is rather vaguely described as a negative of "average density." I then flowed the developer over it continually for over three minutes, but no signs of an image up to that time. Getting somewhat impatient and thinking I must have hopelessly under exposed the plate, I thought, as an experiment, I would throw the plate into a developing dish which stood by, and contained hydroquinone, that I had just developed a number of lantern slides of the ordinary bromide kind. I was rather surprised to see the picture come up in less than ten seconds, the only fault that I could find was that it came up rather too quickly. The formula I was using was a slight modification of the one given by Messrs. Thomas & Co., and also Messrs. Fry & Co., both of which act well. The items I was using are as follows:—

Hydroquinone.....	165 grains.
Bromide of potassium	23 "
Citric acid	40 "
Sulphite of soda.....	1½ ounce.

ALKALINE SOLUTION.

Carbonate of soda.....	2 ounces.
Carbonate of potash	2 "

Make each of the foregoing up to twenty ounces of distilled water. Doubtless Messrs. Hough & Co. will issue a better developer than the above, as I have called their attention to the fact of this universal developer acting so well on their excellent Beechey plates. I forgot to mention that equal parts of each solution are to be used for a correct exposure.—I am, yours, &c.,

FRED. W. MUNCY.

"Oakleigh," 41, St. Julian's-road, Kilburn, December 31, 1888.

CAMERA CLUB EXHIBITIONS.

To the Editor.

SIR,—Will you allow us to draw attention to the second of the series of "one man" exhibitions of photographic pictures at the Camera Club? The exhibition now announced will be devoted to the work of Mr. Harry Tolley, of Nottingham. By the kind co-operation of Mr. Tolley we shall be able to present a fully representative show of his work, and believe that the exhibition will prove of great interest to photographers and artists.

The exhibition will commence on Monday, January 7, and will continue open for about six weeks. Visitors will be admitted on presentation of card.—We are, yours, &c.,

G. DAVISON, } Hon. Secs.
E. G. SPIER, }

Camera Club, 21, Bedford-street, December 31, 1888.

EARLY HISTORY OF THE LANTERN.

To the Editor.

SIR,—On receiving the JOURNAL this morning I read with great interest your extract from the *Manchester Guardian*, giving some early chapters in the history of the optical lantern. After describing fairly accurately the exhibitions which Messrs. Dancer, Manchester, Heywood, and Hutchings organised in the Manchester Mechanics' Institution, and the like of which had never previously been seen, the writer quotes at some length from an article published in *Chambers' Journal* (No. 284, July 9, 1859), entitled "Shadows in a New Light," which, he goes on to say, was "written by one of the brothers Chambers." This is an error which I desire to correct. The article in question was written by my uncle, Colonel Mellor, F.R.A.S., of Whitefield, near Manchester. I have a copy of the article by me as I write, and the contribution was suitably acknowledged by the Messrs. Chambers. I did not see the article in the *Manchester Guardian*, or I would have corrected the mistake.

Colonel Mellor was working in lantern matters with Mr. Dancer thirty years ago, when, I believe, about 5s. 6d. each was the price then paid to Negretti & Zambra for the splendid series of Frith's Egyptian slides, which he describes in the article in *Chambers*, and to which description the writer you quote alludes.

I very well remember being at my uncle's house one evening, some twenty years ago, when Mr. Dancer brought a novelty in the form of his (then) new diagonal lantern. After dinner we adjourned to a neighbouring school to try the new innovation, which, in this form of lantern, will be ever associated with Mr. Dancer's name.

Twenty years ago my uncle constructed a pair of metal cylinders, and fitted up a pump for compressed gasses, he also devised a regulator, which worked by the rise and fall of a column of water; his ideas have to-day been popularised in the modern bottles and patent regulators. I think therefore that Colonel Mellor's name might justly have been included among those of the early lantern pioneers.—I am, yours, &c.,

Lytham, December 29, 1888.

EDWARD W. MELLOR.

COPYING PAINTINGS.

To the Editor.

SIR,—Mr. Dunmore preaches up the value of common sense. On that point all sensible people will agree with him; it is an essential auxiliary, but it is not a substitute for technical knowledge; it will not enable a man to paint a picture or produce a photograph. He writes, "We are all aware that *damp long continued* is a very destructive agency, and will actually decay canvas itself," yet he still adheres to, "as a preliminary to photographing, the plan of sponging over the surface of the picture with glycerine and water or beer, leaving it moist while copying, either plan tends to equalise the surface."

The difficulty of copying old oil paintings is very great, and many negatives might have to be taken in the attempt to get a good copy; wet collodion is often used for copying, which would prolong the time; orthochromatic plates are still in the experimental stage, which would also involve a long time; the picture—if cracked—would be ruined. If glycerine were applied, I believe it never dries, and it would certainly ensure "that damp, long continued . . . will actually decay canvas itself." I still fail to see how these instructions can be consistent with common sense.

"Free Lance," in his letter on this subject, says of me. "He states that stout would be much safer than water, and that his modified egg-nog would not be injurious, which water might be; he is self-convicted of incompetence or want of veracity." The words in my article were in regard to stout, "I certainly would not recommend it, but it would be much safer on a cracked picture than his distilled water, and much less fluid and searching." Then, as to "his modified egg-nog." Now, although stout and egg-nog in moderation may be very good things by themselves, when mixed together as "Free Lance" mixes them up the mixer's notions on art are apt to become mixed also. Still, with all his egg-nog, he is not happy. He continues, "I never recommended, as he again suggests, after my disclaimer, that water should be used as a temporary glaze to facilitate copying." As he next suggests that I did not quote sufficient from Mogford, I shall now quote the entire paragraph from "Free Lance" which I quoted in my first article, omitting the first and last sentences, because I did not think them necessary at the time. I italicise some words to make the matter more clear.

"In the same number of the JOURNAL wherein this article is printed I notice a reference to pictures of another class that often seem to give trouble to the inexperienced—oil paintings brought to be copied, I mean. Now it is all very well for the expert to paint the surface with beer, or stout, or glycerine, or linseed oil, or poppy oil, or anything that suits his purpose; but I have to say that if a picture of mine were so treated without permission by one who was not to my knowledge thoroughly conversant with, and with the handling of, paintings, and I happened to be allowed into the studio while it was being done, there would be an instant opportunity for studying early English, and a great chance of a policeman being needed to prevent bodily injury to that photographer."

He talks of literary propriety and self-respect; where were they when he suggested that his style of language and conduct would be such that it might be necessary to send for the police? He concluded the next paragraph with, "No; let the inexperienced beware of anything but a clean sponge and distilled water upon the face of an oil painting." Now this discussion was solely founded on that portion of Mr. Dunmore's article on copying oil paintings. "Free Lance" says, "Oil paintings brought to be copied, I mean," and to these he mentioned the application of a sponge and water to facilitate copying. That in many cases would lead to saturation; he gave no caution or limit as to its use, and it was not till after I pointed out the danger, that in his next article he said he only meant a damp sponge for removing surface dirt.

My quotation from Mogford was too long, and I left out a distinct previous sentence, because, although it added strength to my case, it was not necessary, as it touched on "lining"—a distinct branch.

My reference to stout was, of course, confined to what had been written during the present controversy. I was not aware that any photographer, prior to "Free Lance," had suggested the application of such a dark, non-actinic liquor to a painting for the purpose of copying it.

In regard to "advice" to artists, I merely expressed my own individual

opinion when I said "I think" so-and-so, taken in connexion with my previous sentence (which "Free Lance" again ignores). "Of course, he will use his own discretion." It could not fairly be considered as giving "advice." I am, yours, &c.,
PICTOR.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

I will exchange 15 x 12 mahogany-backed folding camera and two slides; want posing chair, two or more backs, and good interior background.—Address, GEO. SHERMAN, Photographer, Great Yarmouth.

Wanted, rustic arm chair in exchange for *Fragments of Science* and *Faraday as a Discoverer*, by Tyndall, and *Faraday's Lectures on the Chemistry of a Candle*.—Address, NESTLE, 4, Carlton-terrace, Harrow-road, W.

A number of baths and dishes, a pine studio stand, C.D.V. rolling press, and rustic stile; want background or accessories. Also retouching desks and printing frames up to 15 x 12, want wide-angle lens or camera.—Address, W. C. CHIFFER, 39, Highgate hill, London, N.

Will exchange a Ross' plano-convex lens, seventeen inches focus, for a pair of portrait lenses, about four and a half inches focus, for use with lanterns; also a large die press by Marion for a clockwork magnesium ribbon lamp.—Address, ALEX. AVERHOES, Photographer, Elgin.

Answers to Correspondents

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

M. R. C.—Try either hydrochloric acid (diluted) or a solution of oxalic acid.

F. R. (Boslington Quay).—There is a recently issued work by J. Hubert, price 6d.

POTASSIUM.—The potassium meant is what is popularly termed caustic potash. The other solution will keep and can be used several times.

THOS. J. O'CONNOR.—The toning and fixing proceed concomitantly. Follow the directions given and if anything is found to be wrong let us know.

A. J. GRIVITT.—The process is now open to the world, the patent having long since expired. A full account of it is given in the last edition of *Hartwich's Manual of Photography*.

A. R.—Add a little nitrate of silver to the distilled water, and if it does not show turbidity or does not become discoloured when exposed to light it is pure enough for ordinary photographic purposes.

GEO. A. JACKSON.—When the "steeling" of engraved copper plates is spoken of it is not implied that it is a real steel deposit, but only that it is coated with iron under such electrical conditions as to render it as hard as steel.

T. J. R. says: "There is a church in my neighbourhood that has been altered considerably lately, and as a large sale of views of it is anticipated I have been asked by the rector a certain sum for the sole right of photographing the exterior. In case I agree could he legally restrain other photographers being taken or sold, supposing mine to be registered?"—Registration will not prevent any other photographer from taking views of the church and selling them. It will only operate in preventing your own prints being copied.

LESTER COE, R. writes: "I have a lantern containing condensers of much larger diameter than the photographic transparencies I intend showing. A friend informs me that there will be a serious loss of light, and that I ought to obtain smaller condensers. Is he right?"—In reply: If the small transparency is placed near to the condenser, then will there be a loss of light equal to the area of unused condenser; but if the transparency be removed from that position and brought into a narrower portion of the cone, then will the illumination be all that can be desired.

J. R. asks the following questions: "1. Is it practicable, commercially speaking, to use the electric arc light instead of daylight for copying, enlarging, or reducing, by the wet collodion process?—2. Are the negatives as good as can be got by daylight?—3. What candle power is required to give good results?—4. What type of dynamo and lamp is best suited to the purpose?"—1. Yes; a very large proportion of the commercial work in copying and enlarging is done by the arc light.—2. Yes, if the light be evenly diffused over the picture to be copied.—3. This will much depend upon the size of the work to be copied. From 3000 to 6000 c.p. will suffice for almost every purpose.—4. A continuous-current dynamo. Messrs. Siemens Brothers will supply a suitable machine for the purpose.

LIVERPOOL inquires: "Can you oblige us with the address of a firm who can make for us micro-photographs mounted in miniature ivory mounts?"—We are uncertain. Some one possessing the information will perhaps reply.

M. writes: "1. In Piquet's book on enamelling, page 15, it says, 'Preparation of the collodion:—Alcohol, 400 parts; sulphuric ether, 600 parts; gun cotton, 8 parts; castor oil, 8 or 10 drops.' Will you please say if methylated alcohol and methylated ether will do for it, and if anything more is necessary than just putting the gun cotton in and allowing it to dissolve?—2. Also on page 575 of new ALMANAC, at the bottom of the page on intensifying, it says, 'Add 240 grains of sulphocyanide of ammonium: a precipitate is formed which is again redissolved.' Will it redissolve itself on shaking, or what do I add to redissolve it?"—In answer: 1. The methylated liquids will answer. In making the collodion, immerse the cotton in the alcohol, then add the ether and shake up well, when the cotton will dissolve; after adding the oil shake up again.—2. It redissolves upon agitating the solution.

ERRATUM.—In the first column of page 832 of our last issue, in the letter signed "John Hargreaves," the signature should be "John Hargreave."

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting, Tuesday next, January 8, at eight p.m., at the Gallery, 5A, Pall Mall East.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of the Club, January 9, 1889, will be on *Hydroquinone as a Developer*.

We have received from the P. A. Co-operative Supply Association, Charterhouse-square, a sample of mounts made entirely in London, from the primary pasting to the last rolling, which serves to show that England can hold her own against Germany in this department of manufacture.

The premises of Mr. Holoway, Photographer, of Chester, were completely burnt out on New Year's Eve. Everything but one camera was destroyed, and as the studio, reception, and other rooms, were entirely of wood, and two stories high, it is a marvel that anything is left standing. We understood Mr. Holoway was fully insured.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—The Exhibition of this Society will be held in the Lecture Hall, Manchester Athenaeum. It is open on Tuesday, January 8, 1889, from six to ten p.m.; Wednesday, January 9, from ten a.m. to ten p.m.; and Thursday, January 10, from ten a.m. to ten p.m. There will be a lantern exhibition each evening.

SAMUEL FRY & Co. write: "Herewith we send you a sample of our compound sulphoquinone developer, and we send you at the same time a bromide print developed by its agency. This developer is universal in its application, and may be used for transparency and negative work with much success."—We have tried this "sulphoquinone" developer and have nothing but good to report as to its action. It brought out the prints very cleanly, the tone at first being a warm brown, which soon afterwards proceeded to a fine engraving-black. More than one print was developed by the same solutions, which we received in two bottles with instructions to mix them in equal proportions.

RICHMOND PHOTOGRAPHIC EXHIBITION.—We learn with pleasure that this is likely to be a very large Exhibition, and that exhibits have been sent from all parts of the country, including Scotland, Ireland, and elsewhere. We understand H.R.H. the Princess Mary, Duchess of Teck, is to open the Exhibition on Tuesday next, the 8th, at three p.m., and afterwards to attend the exhibition of lantern slides on the screen, when the "Optimus" prize, comprising a five-inch enlarging apparatus, offered by Messrs. Perken, Son, and Rayment, of Hatton-garden, for the best lantern transparency, will be awarded. A feature in the Exhibition will be the projection of lantern slides on the large screen, which visitors will have the opportunity of seeing, without extra charge, each day, at half-past four and half-past eight.

CAMERA CLUB FIXTURES FOR JANUARY 1889.—Monday, January 7, Opening of the Exhibition of Mr. Tolley's photographs (second of the series of One-man Exhibitions at the Club); press and private view, half-past seven to nine p.m.; nine p.m., Smoking concert. Thursday, January 10, eight p.m., Lantern evening; members are requested to bring new slides. Thursday, January 17, eight p.m., Mr. Andrew Pringle on *Photo-micrography*; apparatus and illustrations on show. Thursday, January 24, eight p.m., Mr. W. Marriott, of the Royal Meteorological Society, on *The Application of Photography to Meteorology*; illustrations on exhibition. Thursday, January 31, eight p.m., Mr. Graham Balfour: *Figure in Landscape and Genre*. Monday, February 4, eight p.m., Smoking concert. Thursday, February 7, eight p.m., Mr. J. E. Austin on *Enlarging*; illustrated by enlargements on Alpha paper.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1497. VOL. XXXVI.—JANUARY 11, 1889.

DEFECTS IN SENSITISED PAPER.

Our readers will understand by this title that we refer, not to "ready sensitised paper," the well-known form of expression for sensitised albumenised paper with keeping properties, but to the ordinary kind prepared the day it is wanted, or, at least, shortly before it is to be used. That there is an increasing demand for the former is beyond doubt, and also that pictures of the highest class may be obtained upon it the walls of the various exhibitions have shown; but when tones more approaching the "blue" stage are wished for, the preponderance of opinion is undoubtedly on the side of the ordinary paper. Lately there have been brought under our notice several examples of defects of a kind which had not before come within the range of our experience, and it may be useful, therefore, to call attention to them here. The presence of black spots has always been a source of trouble to the photographer, and of anxiety to the albumeniser, whose shoulders, like those of the dry plate maker, are too frequently made to bear the burden of want of skill in their customers and of the faults of the manufacturers through really the existing imperfections in the raw material, the paper itself. A little close and careful examination of a sheet of paper before placing it on the silver bath will in most instances, if they exist at all, reveal the presence of minute black specks either imprisoned within the texture of the paper itself or outside that surface and within the albumen. Some batches of paper seem to be more spotted than others, and at the same time some albumenisers are great sinners in this respect, the paper they send out being largely sprinkled with little dots of black, which, when the print is toned and fixed, cease to be little and spread into ugly marks.

Such spots as we describe, however, fall within the experience of most photographers at one time or another, and are traced without difficulty to their true cause. But when that happens to be external, and the markings resemble the familiar ones, there is room for conjecture, experiment, and often for dismay. The particular kind of defect which last came under our notice consisted of small, irregular black marks occurring only occasionally, and in a very erratic manner. An investigation brought to light the fact that, though in a week's work a decidedly large number of prints were spoiled, the damage of this particular kind was confined to two negatives, and a further examination revealed the fact that on each print from a particular negative the markings occurred in exactly the same place, showing almost conclusively that there was some abnormal action taking place through the negative itself. A close scrutiny showed that there was some—the very slightest

—irregularity of the surface, but nothing that would, under ordinary circumstances, have drawn attention to the spot. Revarnishing the negative proved a complete cure and covered the evil, whatever it was.

The next instance was a complete crop of these metallic marks, which make their appearance with such regularity and persistence as to become a most harassing trouble in the printing department of the photographer whose studio they invaded. Great difficulty was found in tracing them, although eventually the cause was discovered. A complete change in the pads brought temporary relief, but after a while the evil reappeared again, to be exercised by another change. It was found after a time that all the spots emanated from certain new frames recently taken into use; and ultimately the cause was proved to be the presence of minute, invisible, metallic particles, which found their way into the frame-back and the pads, or both, after the brass springs had been filed to shorten them, an operation rendered necessary through their being too long to fit in their places, except when the frame was empty of negative and packing.

The next instance we would record was, without exception, of any ever brought before us, the most mysterious, the most annoying, and productive of the greatest loss of material through so long a time elapsing before tracing the mischief to its source. The form of the spots was irregular, and the size most uneven, varying from markings no larger than a small pin's head to others from half to three-quarters of an inch long, and about an eighth wide; but all these proportions were irregular and uneven. Frames, pads, and negatives were subjected to the closest examination, till at last the conclusion was reluctantly come to that the paper must be in fault, and preparations were made for obtaining a fresh supply when our advice was asked. We knew the photographer in command to be an experienced hand, and one who was never tired of inculcating the necessity of cleanliness of manipulation in all matters connected with dark room or printing room; and we also know that he practised what he preached. It is needless to detail all that was done or left undone; suffice it to say that, after every possible source of evil was eliminated, the conclusion was arrived at that the mischief was introduced after drying and before printing, the irregularity and uncertainty of its appearance adding greatly to the perplexing nature of the problem. The cause of the spots was eventually made clear. After taking from the bath and drying, and before storing away, the paper was laid upon a table upon which clean paper was always placed; but at the time these markings arose the paper

employed for the purpose was old but apparently clean newspaper, and it was this paper that caused the marks. Apparently there was, either in the paper or the printing ink, some material which exercised a reducing action upon the free nitrate of silver. We could not discover what this was, but when the use of the printed sheets was discontinued the markings instantly disappeared and have not reappeared since, a space of time covering nearly six months. We find that we have not quite exhausted our subject, and leaving it for the present we therefore hope to take it up again shortly with a description of the cause of further abnormalities of marking.

CYCLING AND PHOTOGRAPHY.

Though the present is emphatically not the season to tempt the cycling photographer to venture forth with camera and steel—unless, indeed, it be a bright frosty day with the trees and hedges clothed in rime—it is decidedly the period when preparations may be made for another campaign, and we have, therefore, no hesitation in alluding to a subject which many totally shelve at this period. We have all the less compunction in the matter since the paper which forms our text is the comparatively recent one read by Mr. E. R. Shipton before the London and Provincial Photographic Association.

With regard to the purely cycling side of the question, we are scarcely so well qualified to speak as an old and practised cyclist like Mr. Shipton, who has also more than “served his time” in the photographic department. But as he has left two points in a somewhat unsatisfactory state, in connexion with which we can make one or two suggestions that we think will be found of value, we shall proceed to do so. The points referred to are the prevention of shaking and vibration, and of the access of dust to the films.

So far as the first is concerned, it would be, perhaps, as reasonable to expect to entirely annihilate the trouble as to carry an unlimited weight over any sort of road without any exertion. The very construction of the tricycle courts vibration, or perhaps we should say that the very features in its construction that commend it for ordinary travelling purposes favour that defect. In order to produce a machine that can be propelled with a moderate amount of exertion over ordinary roads it is obvious that the construction must be as light as is consistent with strength; if the framework be strengthened until vibration disappears, we should have a vehicle entirely unfit to be worked by a man, at least with ordinary comfort or any approach to it, so that what we can do is only in mitigation of the trouble at best. But if a good sound machine of the “roadster” build, and good type, be selected, much may be done in connexion with the “carrier” to make matters run with tolerable smoothness.

The method of carrying we adopted some years ago with an old form of rear-steering machine was to fix the photographic travelling case by means of stout straps to the framework of the machine, not binding it to the machine itself, but suspending it from different points and tightening the straps as much as possible, until it occupied much the same position with regard to the framework that the hub of one of the wheels does to the rim. In this manner, while the rudest of the jolting caused by uneven roads, and much, if not all, of the vibration were expended upon the framework of the machine and the connecting straps, the camera was not subjected to any undue amount of swing, as would be the case with too light

springs, and which would be as bad as the original disease. It is not every form of machine that will permit of this arrangement we are aware, though some which *per se* are not so utilisable may be easily made so. Thus, with another machine of the “Premier” type which we rode for some time, though we were unable to strap the apparatus to the cycle itself in the manner described, we managed with the assistance of a single luggage carrier of the L form to establish fresh points of suspension from which to hang the straps, and thus, between machine and luggage attachment, we were enabled to attain the desired end. Similar expedients will, no doubt, prove equally effective with other types, and a good opportunity will be afforded at the end of the present month in the Stanley Show at the Crystal Palace to examine some thousands of cycles of the most modern forms, and to make a selection of those which appear most convenient in themselves, or offer any suggestions which may be applied to others.

It is alleged that the constant jarring and vibration of cycling will in a comparatively short time so loosen the lens in its cell as to necessitate its being remounted. This is a somewhat serious matter if it be true under circumstances where proper precautions are taken; but we have never experienced any symptom of such a result, nor have we heard of an actual case—possibly because our own cycling practice with the camera and that of our friends has not been of a sufficiently constant character. But where such a trouble should make its appearance we would suggest that the lenses be carried separately in a bag or satchel fastened securely to the body of the rider, not merely slung to a strap—in which case a good deal of shaking from swinging would ensue—but attached firmly by means of a belt. If, under such conditions, sufficient jar or vibration were transmitted to the lens to loosen it in its cell in any reasonable time, we imagine that it would require a miraculous constitution to enable the rider to survive the destruction of his lens. We have carried a “sitting” of eggs for hatching a distance of over five miles in that manner over indifferent roads, and nine out of the dozen subsequently hatched all right, which, from a poultry-breeder’s point of view, may be taken as a tolerably severe test.

For the rest, if the things be slung in the manner described—and, in addition, the precaution mentioned by Mr. Shipton be adopted of securely and firmly wedging each article into position in the case, so as to prevent its jumping about—we do not think much trouble on the score of shaking will be experienced by even those who do much more cycling than the majority of photo-riders. The great danger arises from careless packing and unsuitable means of attaching the apparatus to the machine, and under similar conditions equal injury would accrue in almost any vehicle travelling over rough roads.

The second point, the avoidance of dust, is one which, though it may cause a great deal of annoyance in a general way, is not so difficult to battle with if attacked in a methodical manner. Dust, we are all aware, is a great bugbear in photography, but in connexion with cycling the conditions are in every way more favourable to the development of the trouble than in almost any other department. Given fine weather and more or less dusty roads—conditions almost sure to prevail on the best “photographic” days—and add to these that the apparatus is trailed along at little more than a foot or so from the ground upon a lightly built fabric which, by its vibration and jolting, adds to the penetrating power of the dust particles, what wonder is there that every nook and crevice, and every fold of raiment, becomes thoroughly imbued with the objection-

able matter! The finest workmanship of the camera maker, the closest-fitting slides and shutters, are alike powerless to keep out the enemy by themselves, and it becomes absolutely necessary to adopt some special means to combat the ever-present foe. Still, we repeat, this difficulty is not so formidable as one to meet as that already dealt with; and we can say, with Mr. Wollaston, that though we have developed many negatives taken on cycling trips, we have never experienced any serious trouble from dust.

Such remedies as that tried and rejected by Mr. Shipton—smearing the rabbit of the dark slide with glycerine—are likely not only to fail in the object aimed at, but actually to increase the difficulty, whilst the beneficial (!) action upon the dark slide alone forms a powerful item in the calculation of the advisability of adopting such means. We venture to think that no wooden slide so treated, with sufficient hygroscopic matter to be of any use as a "dust trap," would, after an hour or two of a hot July day, permit its shutters to be withdrawn; and even if they were so loosely fitting when dry that they could be forced when swollen, the constant change in the condition of the woodwork from repeated applications of the glycerine would speedily ruin the best apparatus.

It was perhaps more the result of a happy accident than through any previous calculation that we secured a comparative immunity from dust in our cycling experience. Our first excursion with the camera, a day trip of only some twenty or thirty miles, was made on a particularly hot and dusty day in the middle of summer. Having had some experience of the effects of dust upon external appearance when cycling, before starting we slipped into the camera case a small hat brush with which to remove the thick of the dust from our clothes previous to passing through any civilised or populous regions. That formed part of the accident, while, to complete it, it happened that we carried each of our double slides in a closely fitting bag or envelope formed of two thicknesses of black twilled calico, made nearly twice the length of the slides, so as to fold over and thoroughly exclude all light until inserted in the camera underneath the focussing cloth. The camera case being unfitted with partitions, the camera was, as a rule, wrapped in the focussing cloth to protect it from rubbing against the other contents, as well as to fix it firmly in position, so that as far as possible every obstacle existed to the ready penetration of dust into either camera or slides.

Upon first opening the case after a run of eight or ten miles we found the contents "white" with dust, and naturally, having the means at hand, removed it by means of the hat brush already mentioned before removing each wrap, and this formality was gone through at each stoppage. Without attaching any particular importance to the matter, we subsequently continued the practice, carrying the brush for the special purpose on all our photo-cycling excursions, and to this we attribute the fact that dust has never been any more of a trouble to us on such occasions than when travelling on foot. In fact, if the plates and apparatus are properly dusted before starting, these simple precautions will remove all further need for anxiety.

Another plan which we adopted on one occasion many years ago, before the cycling era, may prove even more effective. The time was July, the weather hot and dry, and the *locale* the English Lake District. We had had a whole day's work, the result of a tramp of some twenty miles, entirely and hopelessly spoilt by dust, so we resolved to stop the evil if possible. Procuring some sheets of stout brown paper and some paste, we

made half a dozen "envelopes" to fit the slides, and also one for the camera, pasting over the joints with the exception of one side, which was closed with a broad flap. This flap and the adjacent portion of the envelope against which it would lie when closed were smeared with—nothing better being obtainable on the spot—common treacle, which caused the flap to adhere tenaciously to the body of the envelope when closed, and yet to be easily opened and reclosed when necessary for exposure. After very carefully dusting and ventilating the camera and slides, these roughly formed "protectors" stood the test of a walk from Ambleside to Keswick and Borrowdale and back again on two of the hottest days we ever remember, and dusty in proportion, and we had not the slightest cause to complain of dust spots.

For regular use, while adhering to this principle, we intend to modify the details of construction, making the envelopes of stout Willesden paper, preferably covered with twilled calico for the sake of durability. Instead of treacle, which is inexpressibly "messy" in use, we propose to apply to the flaps a mixture of gelatine and glycerine similar to that used for the different "graph" copying processes; this, while very adhesive, may be so nearly dry as to cause no trouble or mess, and if it get too dry only needs moistening with a sponge or rag and a little water or glycerine and water. The camera as well as the slides should be so "cased," for it is little use keeping the plates themselves free from dust before exposure if during that operation the interior of the camera is full of floating particles. It is, of course, impossible to entirely exclude dust from the camera when inserting the slide, but at least there is less chance of the film being contaminated if we start with the internal atmosphere comparatively free than if it be already overloaded with dust.

Dust is omnipresent and omnipotent for evil, but with envelopes so constructed, and the joints, both fixed and temporary, made thoroughly sound, we scarcely think the most "rickety" of tricycles would produce any very serious effect if the surfaces of the plates, as well as interior of camera and slides, are free to start with. Now is the time to construct the protectors, and put them to any tests that may suggest themselves, in order to ensure efficiency when the time comes for their use.

ALREADY has the Council of the Photographic Convention of the United Kingdom taken steps to ensure the most ample accommodation for the various meetings and exhibitions which will be held on the occasion of the next gathering. Having been *en rapport* with all the large halls in London, they considered that the balance of advantages lay in St. James's Hall, Regent-street, and the Great Hall of that edifice has accordingly been secured. The position is central and of easy access from all parts, while the accommodation is most ample. The time for the meeting has been fixed for the week commencing August 19. Further details will be duly announced.

THE year just ended was a remarkable one in a meteorological sense, as every photographer is fully aware. Last week we alluded to a paper read before the Meteorological Society by the Rev. T. A. Preston, M.A., showing the abnormally low temperature which had prevailed up to the latter part of October. However, after the short spell of severe weather at the commencement of that month, a much milder and almost spring-like temperature set in and continued till the end of the year. The Annual Report just issued from the Meteorological Office will no doubt take many photographers by surprise, inasmuch as it shows that the mean temperature for the entire year was but one degree below the average. This may be accounted for by the fact that, although the summer was much colder than

usual, the temperature at the latter portion of October and during the months of November and December was far above the average.

ON the commercial aspects of photography during the past year we find, on inquiry, that opinions somewhat differ, but, on the whole, it is said to have been satisfactory. Many portraitists say that the last was the best year they have had for several past. The high-priced and the very low-priced professionals appear to be the best satisfied with the year's results. It is the medium-class houses which complain the most of depressed business. It would almost appear, from observations during the past few years, that commercially successful photography, as regards portraiture, is becoming divided into two distinct classes, namely, the very high class and the mediocre. It is the intermediate grade that, in a business point of view, seems to be in the least satisfactory condition. It is those who follow the latter class of business that complain the loudest of the influence of amateur photography on their trade, and many are not slow in attributing their diminished returns to that source.

TELEGRAMS received since the different eclipse expeditions in America have had time to more closely examine, and, to some extent, compare results, fully confirm those sent earlier, that the observations made were eminently successful; also that the majority of the large number of negatives secured have turned out satisfactorily. There is no question that the results obtained on this occasion ought to prove of immense value to astronomers.

ALTHOUGH, up to the time of writing, photographers have had no opportunity of obtaining pictures of snow-clad landscapes, the recent fogs have been productive of some exceedingly heavy hoar frosts which have given the country a very picturesque appearance. Frost-covered trees and shrubs make glorious pictures. Unfortunately, however, hoar frosts are usually accompanied by such foggy weather as to make the photographing of them somewhat difficult at times. With near objects, however, little difficulty will ever be experienced. If orthochromatised plates be employed the intervening fog will, to a modified extent, be ignored.

IN pictures of frost or snow-clad landscapes it is quite a mistake to imagine that a certain amount of fog in the distance is a disadvantage, as, on the contrary, it greatly enhances the wintry effect, while, at the same time, by contrast, it gives greater brilliancy to the nearer objects. Hoar-frost effects make charming lantern slides; so they do stereoscopic pictures. A group of ferns, or similar objects, covered with the sparkling crystals, form excellent subjects for stereoscopic photography. There is scarcely a suburban garden that just now would not yield some excellent frost pictures. Photographs of hoar frost are always more effective when printed as transparencies than when they are on paper. By backing the transparencies with different tinted glasses a great variety of effects, such as moonlight, glowing sunlight, &c., can be obtained, particularly in the lantern.

RECENTLY a considerable number of letters have appeared in some of the daily papers commenting on the large proportion of the Christmas and New Year's cards sold this season, which bear the imprint, "Designed in England, printed in Germany." This intimation is, of course, necessitated by the exigencies of the Merchandise Marks Act, which, as regards this class of goods, appears to be rigidly enforced. Why should it not be so in the case of photographs? There are numbers of collotype prints, from negatives taken here, being supplied which are really printed abroad, although they bear no intimation of the fact; consequently they are passed upon the uninitiated as being of home production. If the Act were enforced with regard to these pictures they would bear the words, "Photographed in England, and printed in Germany." In future we anticipate this will be the case, as we learn that some short time back a large consignment of foreign collotypes were arrested by the Customs authorities because they did not bear an imprint indicating the place of origin.

ON THINGS IN GENERAL.

WHEN the value of the work done in 1888 comes to be reckoned up in the future, the mode of printing in platinum by the so-called "cold process," and the great attention given to hydroquinone and its properties, will occupy a foremost position. There cannot be a doubt that platinum printing has received a distinct impetus, and been brought to a degree of excellence beyond all its previous achievements. It has so many points of sterling value, that all lovers of the beautiful must welcome every variation, however small, tending to increase the excellence of its results. To my mind its greatest claim to attention is the fact that for negatives of inferior quality it is not suitable. When results of the highest class are aimed at, none but negatives capable of producing good prints should be kept; then platinum will make "a thing of beauty" and "a joy for ever" of them.

Hydroquinone also will have a place in the future of photography. Whatever opinions may be held as to its quickness or slowness, there can be no doubt as to the pleasing colour that can be obtained from its use, provided only that it be combined with plenty of sulphite. For lantern slides there is a strong probability that it will become very popular.

Apropos of lanterns, it is amusing to note the latest thing in penny help-yourself-stands. We have had proposed a machine to photograph the penny-dropper "while you wait;" but so far it exists on paper only, and is likely to. In Paris, however, they have produced an electric magic lantern. The coin, dropped through the slit in the usual manner, immediately actuates an electric battery for a few seconds, and at one time produces the necessary illumination and sets a series of views revolving. The eye is placed at the peephole, and the show is for a brief period visible, when the light extinguishes itself till another coin once more sets it going.

I should like to draw the attention of those of my readers who have not seen it to a letter from the veteran, Mr. Alexander Forrest, in the correspondence columns of the last number of this JOURNAL, for the year just ended. It recommends, and describes how, for one extended locality, there has been carried out a photographing of the whole of a "hundred" county, or other division, by dividing it into sections, the photographing of each section being undertaken by one or more members of the Society. A survey of a complete district is thus obtained, and for future reference, and present amusement and instruction, will be invaluable. The photographing of a section is, of course, a very wide term, and may be taken in a different sense, according to the views of the photographer undertaking it. An improvement in the plan would be the separation of the undertaking into subdivisions: one to embrace objects of archaeological and antiquarian interest, another to include geological features, a third natural history, a fourth purely pictorial, and so on. The results would be more systematic, and likely to prove of greater value.

The discussion on artificial modes of illumination for enlarging purposes at the North London Society, as reported on page 830, was both interesting and instructive, the President's method of producing an even sheet of lighting surface by placing before the negative a sheet of obscured glass, illuminated by three gas jets, being both simple and efficient. It might be improved by an opal reflector, curved, if possible, to render the illumination more even. Most people have seen a clock in some public place or other illuminated by the same means. When unaided by a reflector it is a very miserable affair, especially after the "ground glass" has been in use a little time; the illumination is not even, and the outline of every individual light is seen through the semi-transparent screen of glass. But when the lights are backed by a reflector that may be likened to a white bowl, the inside turned to the flames, the contrast is very great, from grossly uneven to wholly even. Of course, in the lighting of the photographic arrangement alluded to this great disparity would not exist, as the flame areas would be quite out of focus, and so dispersed and amalgamated with one another.

It is somewhat singular that so little has been heard of the deterioration of lenses by the continued action of air and moisture, and photographers would do well to note the remarks by "L. P." as seen on page 821 in the number of the JOURNAL already quoted. That glass is acted on by moisture is well known, although in many cases it is so slow as to be a negligible factor; but, especially in the early days of the symmetrical and rectilinear type of lens, glass was used

whose qualities were not fully known, and which was given to "sweating": it is obvious the surface would rapidly be injured when this occurred. But all lenses should, indeed, be well protected from the atmosphere if their pristine qualities are expected to be retained, whatever the kind of glass used—crown or flint, sweating or permanent.

Those who are in the habit of using magic lanterns with paraffin oil as the illuminant, especially when their use is only occasional, will do well to follow Mr. Haddon's advice as given at a recent meeting of the London and Provincial Photographic Association. He says: "One way of avoiding smell in subsequent operations is to carefully empty all paraffin from the lamp at the close of each exhibition, or otherwise, by capillary attraction, it would continue to rise in the wick, and afterwards run down the side of the lamp." This is quite true, and not only does it so run, but by some special action it appears to travel over the whole surface of the lamp; and if the latter be put away for a time and then used, the evaporation from the surface of the heated metal of the lamp becomes terribly offensive. A lamp so tainted should be lighted in an outhouse, and allowed to burn for some time before being brought into an inhabited room. This smell is sometimes put down to faulty construction of the lamp, when, indeed, it is nothing but the burning and the volatilisation of the film of oil.

I have been interested in reading Mr. T. N. Armstrong's articles upon instantaneous work, but I can scarcely coincide with his views as to the quality of quick plates now in the market. I have tried nearly all the best brands in a thoroughly systematic way, and I may say that I believe I am now using the quickest plate sold yet; but so far from their giving thin negatives, I have had to reduce the strength of my pyro (as used with some other makes) to bring them under sufficient control when I develop about half a score at a time. The finished negatives, too, are all I desire, as regards gradation and density combined.

I suppose the correspondence with "Pictor" may now be considered at an end, as in his last letter he makes no attempt to disprove the charge of want of veracity or of competence, and does not explain away the ignorance he displays on the subject of drying oils.

FREE LANCE.

ECHOES.

I WROTE, last week, of copyright and the ownership of the negative, and I find in the same number a couple of letters on those subjects. In the first, J. Hubert, taking the "Pollard Case" as his text, pleads in favour of the proposed co-operation of professional photographers in the formation of a Trade Protection Society, against which I, personally, have nothing to say, but his suggestion of the starting an "appeal fund" in this particular case will scarcely commend itself so strongly. As a friend or acquaintance of the defendant, Mr. Hubert actually takes a strong view of his side of the case, and the version of the facts as given by him may be perfectly accurate; but even so, it is not very clear to me that an appeal is by any means certain to bring about a reversal of the decision, for, leaving the question of copyright altogether on one side, I venture to think that no judge would rule that a photographer has the right to publish any lady's portrait without her permission. The application was, it must be borne in mind, for an injunction to restrain further sale; if the defendant chooses to plead copyright, or, in other words, that he has a perfect right to do what he likes with any portrait he is paid for taking, without the sitter's permission, I think he will find very few even, amongst respectable photographers, to side with him.

But the point in Mr. Hubert's letter to which I would especially call attention is where he says, "It has always been understood by photographers that the copyright is vested in the operator and not in the sitter." Is this so? I think not. So far as the very ambiguous law on the subject can be interpreted in any definite manner, I was under the impression that it says pretty distinctly that where a photograph is taken "for a consideration" the copyright belongs to the party paying; in other words, that the copyright in a portrait taken in the ordinary way of business belongs to the sitter. So much is this the case, that I know at least one photographer of eminence who takes many portraits of celebrities purely for publication and without the usual "consideration" who never proceeds to registration

and publication until he has a written assignment of the copyright in the portrait. This of course is in addition to the permission to publish, which, however, might be assumed if the sitter consents to be photographed; but the assignment renders matters sure and prevents the subsequent withdrawal of the right of publication—a right which never exists under the circumstances of "consideration."

As for the imaginary difficulties which might arise on the suppositions cases mentioned by Mr. Hubert, they could only be possible where a malicious intention of annoying or imposing upon the photographer existed, and even then would be easily disposed of. For instance, in the hypothetical case of a group of twenty, some one individual must almost of necessity have ordered and paid for it, and consequently be the owner of the copyright as having parted with the "consideration." Or if each member of the group paid for his own copy or copies, he has an equal right with every other member of the group to order fresh copies without harrowing the soul of the nervous photographer.

In the letter signed "F. J. Q.," which is, I suppose, intended to be facetious, the writer overlooks the absence of "consideration," consequently the idea that an *unconscious* sitter has any claim either to the copyright or to the negative itself (which "F. J. Q." mixes up) falls to the ground. If the picture so "poached" be in any way objectionable, the "sitter" would have the legal means, I presume, of preventing its publication, but under no stretch of ingenuity could he claim more. It would perhaps be better if he could, as the indiscriminate users of secret cameras might then perhaps have an inducement to be careful as to the manner in which they apply them.

I am not sufficiently versed in the mysteries of psychic photography or spirit science generally to feel myself qualified to criticise Miss Power's letter on the subject, nor justified in making any suggestions regarding the negatives forwarded to the editor, especially as I have not seen them. I am, in fact, a sceptic in such matters, though I am far from being an unbeliever in "spirit photographs" provided they are of the kind referred to and described by Mr. W. K. Burton. I have, in fact, such faith in "psychic" photographs of that class, having met with more than one such mysterious visitation in my own experience, that I scarcely care to search deeper for the influence that produces them than dirty plates and similar dodges; and while I do not wish to impute dishonest motives in all cases of spirit photographs, I am bound to say I think imagination has much to do with their genuineness in most cases.

But Mr. Burton's story is one of the best I have heard, and it is fortunate in the interests of truth that so great an authority was able to trace such a mystery to its source, otherwise we might have had Burton at some future date ranked among the firm believers in the capabilities of the "spirits," not only in portraiture, but in landscape and interior. Spiritualism has ranked amongst its believers more than one high scientific authority, who having witnessed manifestations that were unexplainable, elected to set them down to spirit force rather than doubt the *bona fides* of the manipulator or medium. Had our friend Burton's mysterious photographs been obtained on the plates prepared in this country, it is to be feared they would have gone to swell the evidence in favour of the spirits, but as it was the local circumstances were such that the truth prevailed.

One thing, however, strikes me as curious in Mr. Burton's letter, namely, that he appears never previously to have met with a duplicate image so produced upon a dry plate—that is, upon a gelatine plate. He speaks at least of its being the first *recorded* instance, and I judge the phenomenon therefore to be new to him, which surprises me the more since I know him to be one who has certainly not made all his pictures upon commercial plates, and who has presumably sometimes recoated glass that has been used before. The reason why such occurrences are so rare nowadays is no doubt due to the fact that it is cheaper for the plate maker to use new glass than to clean off old, and consequently there are very few old images to reappear as ghosts or spirits. But that they will do so I had reason to discover some few years ago when I invariably made my own plates, experimental and otherwise, and of course used my glass over and over again. I then found it a great trouble to prevent the recurrence of previous images on some plates, though not by any means on all, and this partiality in the matter I attributed to the

kind of glass; that is to say, its character as regards porosity or otherwise of surface.

I can quite conceive even the reappearance of an image after all the lapses of time and all the cleaning process mentioned in Mr. Barton's letter, without going to phosphorescence as an explanation, for I recollect one particular plate that was constantly turning up at awkward times with one particular old image and not intermediate ones. It resisted all my ordinary methods of cleaning, until I made a special bath of bichromate of potash and sulphuric acid chiefly for its benefit, and thought I had at last "laid" the ghost. Not so, however, for it turned up once more in combination with one of three pictures I had travelled many miles into the country to secure; so to save further trouble that plate was destroyed.

It may seem curious that one image should so impress itself and other subsequent ones not so, but in reality I do not consider it so, especially in this instance. At that period I was deeply engaged in investigating different methods of intensification with silver, mercury, copper, platinum, and what not, and though I had no record by which I could tell the history of my phantom image, it is almost certain that its persistence arose from its having been treated—perhaps forced—with some more than ordinarily strong metallic solution, and had so obtained a correspondingly firm hold of the glass. The frequent, I may say regular, recurrence of such images at that time may also no doubt be ascribed to the same general cause—the systematic use of metallic intensifying solutions—because though even at the present day I still make a practice of preparing some of the plates I use, it is a very long time since I remember a case of redevelopment of a previous image, and nowadays I very rarely resort to intensification of any kind, finding the alkaline developer performs all I require.

A very interesting communication by Mr. J. W. Osborne to the Society of Amateur Photographers of New York, on the subject of *Surfaces Freely Sensitive to Light*, contains a reference to "a few salts of iron and platinum" as being amongst the sensitive materials ordinarily used in practical photography. Now I have racked my brain, and though I can call to mind innumerable processes old and new, practical and obsolete, in which ferric salts figure as the sensitive agent, I cannot think of any application in a similar manner of a platinum salt. I may, of course, be wrong, I may have overlooked some familiar process, or, what is very possible, some such process or application may exist of which I am altogether ignorant, but at present it seems to me that in including platinum salts Mr. Osborne is erroneously referring to the platinotype process. In the original or hot bath process it is true that the platinum salt formed a part of the sensitising solution, but it in no sense takes any part in the formation of the image until the developer is applied. In other words, it is not sensitive to light, while at the same time it is not a developer, but merely suffers reduction by the developer formed by the action of light upon the sensitive ferric salt with which it is combined, which action is not set free until the insoluble ferrous salt so formed, and which constitutes the real developing agent, is rendered active by the hot solution of potassium oxalate which is ordinarily called "developer." In the "cold bath" process the platinum salt is not present at all in the sensitive paper, but forms part of the developing solution.

Mr. Osborne's remarks on the darkening of white papers under the action of light are interesting, and the results not so generally known as the bleaching of aniline coloured papers. With regard to the length of time required for the bleaching or the sensitiveness of the dye, the author's experience differs considerably from my own, at least so far as regards eosine, for I have met with a sample of that dye a solution of which, of the strength of one per cent., when washed over ordinary writing paper, had its colour completely discharged in little over an hour's exposure to sunshine, and showed an appreciable change in three or four minutes. The sample I refer to was one possessing special "orthochromatic" powers, more so in fact than any similar dye I have since been able to secure. Erythrosine I have not found so sensitive to the bleaching influence, nor does it exhibit so great efficiency for orthochromatic purposes.

Mr. Osborne also alludes to the darkening of wood by light, and states that the effect is often attributed to exposure to the atmosphere. All photographers are familiar with the darkening action

that occurs in cameras, the rich light yellow of the new instrument changing in time to red of greater or less depth. I formerly attributed the change, and no doubt many others do, to atmospheric influence upon either the wood or the polish, or both, but that it is a photochemical change is, I think, proved by a careful examination of a camera that has been exposed for any length of time in a show-case, especially if in a strong light. While the general colour will be comparatively dark, underneath the sliding plates and other movable brasswork the original light tint will prevail, and it can scarcely be supposed that these offer any or much protection from the atmosphere, though they do undoubtedly from light. Again, a mahogany studio camera which is constantly exposed on its stand in the glass room will be found generally darker and to darken more rapidly than a landscape instrument which spends most of its time shut up in its leather case. JUNIUS.

VIGNETTING.

THERE is, perhaps, no more delicate or artistic manner of printing a photograph than vignetting it, if it is properly done. A badly vignettied picture is an abortion, and of all eye-sores one of the most irritating. The comparative ease with which a good vignette can be made ought to prevent any but good work being sent out. That it is not so we are most of us painfully conscious. The difficulties to be encountered are few, and to be overcome more by careful working than manipulative legerdemain, providing the negative itself is suitable. One of the chief causes of bad vignettes may, I think, be attributed to the use of negatives utterly unsuitable for the purpose. Unfortunately, the exigencies of portraiture necessitates the occasional use of negatives that were taken without any reference to being vignettied for this mode of finishing, and much of this unsatisfactory work may fairly be attributed to this cause. Given a suitable *cliché*, vignetting is tolerably plain sailing. A screen, with a suitably shaped opening, with serrated edges laid outside the printing frame, will generally answer every purpose, the graduation of the vignette and its size being dependent on the distance of the screen from the negative, and the fineness and length of serration. For the best results the printing should be through ground glass or tracing paper, and the operation conducted in a good strong diffused light; under certain conditions sunshine may be used, but of course the sharp shadow of the screen must be diffused by extra thicknesses of tracing paper; but, take it altogether, nothing is so good as strong diffused light, as in direct sunshine the additional tracing paper used counteracts the extra strength of the light. Perhaps the very softest gradations are obtained by the use of two serrated masks, each covered with tracing paper and adjusted with a space of about half an inch between them, but for ordinary practice one screen is sufficient.

We will suppose a suitable negative is to be treated. The first thing to be done is to decide on the *shape* of the vignette—whether it shall be pear-shaped, oval, circular, or irregular—in general contour; this being fixed upon, a pencil mark should be made on a suitable piece of cardboard or thin sheet zinc, defining the shape, but much smaller, say half the size of the intended vignette, and at, say, an inch outside this draw another, then cut out an opening with the smallest line for the boundary, and from the edges of this to the outside line make a regular series of sloping cuts about three-sixteenths of an inch apart, and the strips thus left may by another cut in the opposite slope be made into pointed teeth—the fineness of the teeth and their length will determine the gradation of the vignette. It will be necessary to also make some of these serrated screens with short teeth in order to work with negatives that have very narrow margins or rather space between the figures and edge of plate. The greater the space in moderation of background at disposal the more easy vignetting becomes, and *vice versa*. This, I believe, is accepted as the best method in vogue of vignetting ordinary portraits by all those who aspire to the production of artistic work. There are many other ways and means of softening the edges, but all give more trouble and produce no better results.

The well-known vignetting glass, which is a piece of flashed ruby or orange glass with the colour ground off the central portion in an oval or pear-shaped form, or a lithographed tint, or series of tints, on tracing paper, leaving the centre clear, or a negative of a large black and white shaded screen of suitable design, or a screen made of different thicknesses of tracing paper overlapping at their edges; but with all these plans the *shape* is *definite*, and cannot be modified to suit the negative under treatment, and a little alteration in this respect is often all the difference between a satisfactory and unsatisfactory form. At one time vignetting by the aid of cotton wool tucked under a paper mask and graduated by being pulled out in

a greater or less degree was the chief method adopted. Even now with some pictures this plan is not to be despised, but for ordinary work it is too troublesome and uncertain, and the results are not satisfactory in proportion to the care and adjustment required. A simple hole in a card laid over the print and placed on a revolving table has its advocates, but scarcely commends itself if any number of frames have to be attended to.

When the vignetting by any plan is required to reach nearly the edge of the negative, a roughly shaped mask of thin opaque paper should be laid on the face of the negative in addition to the vignetting arrangement paper on the back, in order to prevent lines showing from the lateral penetration of the light through the edges of the negative, which would quite spoil the vignette effect; it is also a good plan to paint the edges of the negative with black varnish. A plan sometimes adopted is to stipple the back of the negative with opaque colour applied with the fingers, but this is more useful in fancy than in plain vignetting, where the idea is to get the most delicate possible graduation of the image into the plain background.

So far suitable negatives have been treated upon, but there remains a large contingent of most unsuitable ones that as a matter of business have to be made the best of. We will give our attention to a few of the most usual ones. First, then, is the portrait with a dark background or surroundings. Now it is evident if we were to proceed as in the case of a suitable negative the result would be unsatisfactory, so to make the best of it a certain amount of work dependent on circumstances must be bestowed on the negative in order to make the background print lighter; stippling the back of the negative with opaque colour, graduating it close up to the face, is productive of a better effect than actually painting out the background or the face of it, for unless there is a little tint printing through the result looks hard and patchy; in fact, in the case of a painted out ground a tint should be introduced by covering the figure with a mask and letting the light act through it until the desired gradations are attained. If the original background is abruptly dark and light, the first thing to do is to stipple the transparent parts up to the average printing density of the opaque ones for a little space round the figure, and then vignette in the usual way. This may occur when one portrait is required from a group, or if the background represent an interior, &c.; in any case it facilitates matters to equalise the grounding. The most difficult part is to graduate off an unsuitable ground when the figure is profile, and the hair is loose and tumbled, without either interfering with the likeness or producing a blotchy effect. It can be done by the methods already described, but great care and work both on the back and front of the negative is required.

In vignetting a landscape there is very little trouble. The form being decided upon, it sometimes happens that the branch of a tree or something or other prints too strongly into the vignettied portion; in that case paint over the too dark parts on the back of the negative with a wash of gamboge yellow, which will remedy the fault. Of late years it has been a favourite way of illustrating books by adopting a semi-vignette form of illustration; that is, one part of the subject bounded by a sharp line, and the other graduated. This mode is somewhat difficult to manage nicely, principally for the reason so few negatives, unless taken expressly for the purpose, lend themselves kindly to the treatment.

To begin with, the negative should be twice the size of the print required to get a good result. To produce a dark line round the portion selected the face of the negative should be covered with a clear piece of *papier minérale*, a line drawn of the required form in reverse, the outside of it being rendered opaque with colour; this is necessary to obtain a sharp line, as if it was drawn on the back of the glass it would be more or less blurred. The stopping out, which can be done with indian ink, will have to be continued amongst the foliage on the upper side of the negative so that a judicious portion of it is left, then the lower part of the negative is vignettied in the usual way. As this kind of vignetting depends for its beauty entirely on the skill of the operator, it is impossible to do more than indicate the method of procedure, as each different view might be best with some little variety of treatment in either stopping out or graduating, a suitable negative being available. Of all kinds of landscape vignettes these seem to me to be the most charming.

EDWARD DENMORE.

INSTANTANEOUS WORK.

XI.

It frequently happens that when working in the vicinity of a farmyard some nice pictures may be got of cattle lying down in full contentment, chewing the cud. Should the locality be a quiet one,

and the animal of a restful disposition, there will be little difficulty in getting sufficiently near with the camera to ensure a tolerably fair size of figure on the plate, but even here it is better to arrange the focus beforehand, and judge of the distance when approaching them. When taking, say, cows of a dark brown colour, it must be borne in mind that such will stand a considerable amount of exposure, and one very important point to observe is the taking of them from the sunny side. In my opinion, when photographing a dark brown cow with a shutter exposure, a lens of large angular aperture is needed, and I know of a very clever operator who uses, with marked success, a portrait combination for such. I have also got good results working with a rapid symmetrical at something under $\frac{1}{4}$. Such is just a case in point where the operator must bear in mind that the colour of the object being photographed has a considerable influence on the results, and such should only be attempted under the most favourable conditions of light. I know that many people have an inward feeling of distrust when meeting, or approaching cattle in any way, and would rather dispense with such subjects in their travels with the camera. It is wonderful, however, what a little intercourse in farm circles will do in the way of dispelling any inward fear that may arise when going in and out among the cattle. As a rule, when a herd of cows are seen to be lying down in a contented manner, chewing the cud, no fear need be entertained of their doing any mischief. I have seen my little boy approach some of such, and coolly clap them with his hands, and my little daughter, of three years old, used to make a point regularly of feeding some very wild-looking highland storks with cabbage leaves out of her own little baby hands across the fence, until, after a time, the storks came to look for their little girl, and always came to her when she called, "Coopie, coopie!" Then was my opportunity to get cattle subjects. Any one who is desirous of getting along well with cattle must, at the outset, banish all thoughts of danger, and have no fear to approach and go in and out among them.

An enthusiastic photographer need never be short of subjects at a farmyard, even in winter as well as in summer.

There are, however, many other places—when considering inland work—besides a farmyard, and which offer excellent opportunities for some pictures to be got with the camera. Near most large towns is to be found a canal, and on the banks or water of such there is always to be found something worthy of a plate. I don't know if all canals offer such specially fine subjects as I have met in with on the Forth and Clyde, but on this, at certain times of the year, are to be found some delightful pictures of fishing boats sailing merrily along. In the spring of the year large numbers of east coast fishing boats proceed to the West Highlands to the herring fishing, and as they study economy and dispense with tracking, they are to be met in with in large numbers, sailing from east to west; and a very delightful picture such makes, with their dark brown sails extended as they skim along the smooth surface of the water. But whatever canal it be, there are always plenty of subjects for the camera, and a day spent on the banks at some nice picturesque spot makes a very pleasant outing. I have seen a very pretty picture knocked out of a couple of gray horses dragging a timber log. White or gray horses come out best, and they are easily secured by fixing on a spot beforehand for the focus, and when they arrive at the exact place chosen let off the shutter.

One of the best bathing pictures I ever met in with was got on the banks of a canal, for in summer time urchins will have a duck, and are not over-particular about the water they swim in.

There is plenty of good things to be picked up on the banks of a busy canal by the exercise of a little patient waiting.

But some may say they don't want to tramp so far for inland pictures. Then, in such a case, let him turn to and see what he can get almost at his own door. Many a day, when not in a photographic mood, have I been struck with what I have noticed at my own doors, as it were, and wished I had my camera ready.

What town is there in the suburbs of which some enterprising Punch-and-Judy man does not turn up at now and again? Very likely at first such may be of an evening, for the artist knows well the best time to visit, so as to catch a full audience of youngsters; but a quiet shilling, judiciously administered, will bring the proprietor round next Saturday at three o'clock, if fine; and what a charming picture such makes! Nor need the youngsters know anything about the photographic part of the entertainment, for the little undertaking is very easily performed from one of your windows without in any way attracting the attention of the delighted audience, with their gaping mouths and merry eyes. A little previous arrangement with the proprietor will enable the show to be set up just on the most desirable spot for the light at the time chosen for the entertainment.

Then, again, in many poor neighbourhoods there is always to be found a candy man, and even such with his wheelbarrow makes a

good picture, if you can just catch some ragged little urchin busy at his little game of barter. I was once a spectator, at a country inn, of a delightful picture of this kind, and I mean to have it out yet, even should I have to get up the show; but such are best taken without any pre-arrangement, for then you get everything more natural.

I wonder where, also, is the locality that some little youngsters are not to be found playing at shop; or little lassies amusing themselves with a skipping rope? I have had my turn at the latter, and failed over and over again; but at last I succeeded. It is one of the most difficult subjects I know of in photography, and requires a very fast exposure and rapid plate to secure a sharp picture. I tried several times before I succeeded, at last, however, by choosing a spot which gave me a dark background, and by giving the skipping rope a good rubbings with whiting, I got a good result. There is just a knack in catching the rope at a certain height, and it should be taken full on—not sideways, and if the exact moment can be seized when the little jumper is off the ground, it makes the effect more real. I was once told that my picture was dodged up, and that it was not a rope at all, but a white wand which the little girl was using and posing over her head. Such, however, was not the case, and so I brought my unbelieving friend out, and let him see how it was done; only this time I got a number of little lassies, and two of them to "caw." Such a picture can only be done in the very best light and with the shutter going it on a lens working about f .

Another very common picture to be met with in nearly every locality, but which, when a little pains be taken, makes a nice photograph, is that of a few little urchins playing at "moshey." Over and over again I have stood and watched them at this game. Unlike the skipping rope, a full exposure can easily be given on such a picture.

But, after all, I think the prettiest subject I ever saw for an instantaneous picture was a group of three little children sitting on a doorstep, with a broken bowl and clay pipes, delighting themselves to their hearts' content in blowing bubbles. So much was I struck with this sight that it was not long before I got some little models rigged up with pipes and soapy supplies. At first, however, I could not get the little ones to give me the same delightful expression on their faces which came so naturally to the first group I met. They knew they were being photographed, and hence got into a stiff and somewhat forced pose. I, therefore, just let them alone to their own sweet will for about ten minutes; they very soon entered into the spirit of the amusement, and I saw gradually appearing the same childish delight in their little faces as I had witnessed in the first group. I then quietly began to hum to myself a little tune and set my camera up all right. Sitting down not far from them, with the ball in my hand, they did not know they were just about being taken, and so waiting till a "fine one" was nicely poised, and a pair of wicked, large, dark eyes were just beaming with excitement at the glorious colours, I seized my opportunity and exposed.

In taking such a scene as this, the little ones are best left to themselves; the moment any one attempts to pose them in some particular place or way, so surely will they lose that grace and naturalness, which, to my mind, makes the little group so charming. Of course they have an idea, in fact know they are being photographed; but after a minute or two they lose the stiffness and drop into their own little graceful ways.

Such are among a few of the many little opportunities that are offered to an enthusiastic worker even in the vicinity of his own doorstep. There are many others, "which, when found, make a note on."

Not very long ago I met a friend who had gone almost mad to get a picture of sea gulls. He had seen the photograph of these birds which was so kindly distributed to the members of the Convention at the Glasgow meeting, and was so struck with the different shapes and appearances which the birds assume when in a flock, that nothing would do but he must have a shy at them himself. When I first met him he had been inquiring in all directions as to where was the best place to get a chance at the gulls, until at last, acting on the advice which some one had given him, he had made up his mind to proceed to "Ailsa Craig," and then get among the innumerable flocks which make this island their abode. On my telling him he "needna gang see far," he seemed quite astonished. His idea was to charter a small yacht and go for a week's sail, and so visit this secluded spot; but on my telling him to go on board the *Columbia* some fine day, and fire away from the promenade deck there, he seemed quite crestfallen, for he had, by some means or other, come to consider the photographing of gulls as one of the most difficult of operations, and which was only possible on some secluded island, under circumstances of great difficulty. But what photographer has not been on the *Columbia*? Still there are many, I have no doubt, who have never had a shot at sea gulls.

From time to time I have fallen in with some people who have the

most strange ideas regarding instantaneous photography. I remember once, when staying at one of our hydropathic establishments, meeting in with a masher and his sweetheart who were big on photographing a running fountain, which looked so charming in the grounds, backed up as it was by the dark green foliage which surrounded it, and so one day they told me they had been having a try, but that somehow the plates were bad, for they could get hardly a picture at all. I asked the lady what exposure she had given. "Oh, I made my Newman's shutter go pretty fast, don't you know, just to catch those delightful sprays; but I fancy I shall try it a little quicker next time," she said. I made no reply, but at once said to myself, "It's not much this pair know about photography;" so I persuaded the young gentleman just to lend me his camera while he went to town next day. So the morning being very fine, I quietly went out to the fountain and at once saw it was not a subject for instantaneous work at all. Getting a few friends just to stand still while I took off the cap, I gave forty seconds' exposure, with a stop of about $\frac{1}{32}$, and quietly huddled up and walked off to develop. It turned out a beauty; every jet of water showing up just properly. So after dinner time I showed the negative to both the lady and her friend, and they said, "By jove! just see how the spray and jets come out! That must have been taken far faster than we did it, Arthur!" and so they there and then determined to have another try. When, after repeated trials, they gave it up, I told them they ought to have given forty-five seconds, with $\frac{1}{32}$, they stood amazed. "But how can you get the water sharp?" they said. "Never mind the water," I replied; "you expose for the dark green shrubbery, and you will be just about right for the fountain."

Now this is a very common error with a great number of beginners. They have an idea that a small waterfall in some charming secluded glen must be taken with a shutter "*because the water is moving.*" Now, this is a fatal mistake. If you want a picture, you must expose for the darkest part of the glen—never mind the moving or flowing water, it will take care of itself; and when you come to develop, if proper precautions be taken, it will be found that the water is quite natural, and as it should be.

T. N. ARMSTRONG.

PHOTO-MECHANICAL JOTTINGS.

WHEN working photo-litho or photo-zinco on a commercial scale the wet collodion process is the most suitable, both on the ground of economy and efficiency; and when the wet plate bath is kept in constant use and at its proper strength the process is simple and certain, and, except in very dull weather, is quite rapid enough. But when the process is only occasionally in use, and at rather long intervals, then the silver bath is very uncertain in working. The temperature of the dark room also has a good deal to do with certain results, so, taken altogether, the wet collodion process is too erratic for those who require only an occasional negative for a photo-litho transfer, or a print on zinc for etching. It is this class of worker who is the most benefited by the recent introduction of photo-mechanical dry plates, and by substituting them for the old wet process are enabled to do their work with certainty and comfort, more especially if hydroquinone be the developer used.

Pyrogallol can be used, and yields good results, with a little more trouble entailed by the necessity of using a clearing bath of alum and acid. The great secret of making good negatives on these plates lies in giving full exposure in the camera, using a full dose of bromide in the developer, and by taking plenty of time over the operation.

Ammonia, or the carbonates of soda and potash, may be used with the pyrogallol, the best preservative being the meta-bisulphite of potash. One of the fallacies with regard to these negatives is that extreme density is absolutely necessary. This is wrong, the golden rule being—get clear lines; density—i.e., extreme density—is not required. A finished negative to be good must, when laid upon a piece of white paper, show each and every line clear, and quite free from even the slightest veil.

Negatives for collotypes, or for half tone photo-lithos, are of a totally distinct class, the collotype requiring a good soft negative, suitable for silver printing; half tone photo-litho, on the other hand, a negative well exposed, but too flat for silver work, as unless the light can get through the negative there will be no reticulation of the gelatine, whether from paper or a collotype plate. Negatives for collotype printing must be what is usually called reversed, and if they are to be made specially for the process should be made with a plane mirror, in which case they will be right for the process. Stripping and flexible films also give negatives suitable for collotype if developed without stain, as stained negatives are peculiarly unsuitable for collotype exposures. Negatives taken in the ordinary

way may be made available for collotype, either by stripping or by reproduction.

To strip a gelatine negative, first clean the back thoroughly, then carefully level upon a levelling stand. Now coat with as much plain collodion as can be put upon it without running off; do not run any of it off, as the object is to get a thick film of collodion when set so that the stripped gelatine film may be easily handled and be without risk of stretching. The negative coated with collodion is allowed to remain upon the levelling stand until the film of collodion is perfectly set, when the plate is immersed in a dish of clean cold water, where it must remain until the whole of the alcohol is washed out, this being indicated by the absence of any apparent greasiness of the film. Now immerse in a dish containing a mixture of water eighty parts, hydrofluoric acid one part, rock the dish gently until the edges and corners of film show signs of leaving the glass, then remove the plate from the dish and wash well under the tap, washing both back and front. Then, having placed a plate previously cleaned and coated with gelatine one hundred and fifty grains, chrome alum five grains, water twenty ounces, dissolve and filter. Plates coated with the above should be prepared beforehand, as they improve by keeping. The negative, ready for stripping, is now held film down upon top of water, when the film will leave the glass and float upon the surface. Now carefully adjust in position upon the gelatinized glass and lift out of the water, and with a soft, short squeegee drive all water from between film and glass. Now soak in clean methylated spirits of wine for five minutes, then place on a rack to dry. This method of stripping is perfectly safe and certain, if there is a thick enough film of collodion which has been allowed to properly set before washing. Negatives that it is not desirable to strip must be reproduced, and the best way to do this will be to first make a transparency in carbon, and from this make the reversed negative either the same size, or larger or smaller as may be desired. If the negative is to be the same size as the original, the best way to make a reversed negative—after well cleaning the back of transparency—is to place it in the carrier of dark slide film up, then dust the film and place a dry plate in contact with the transparency, the slide is now closed and removed to the studio. Now place in front of the camera a large sheet of white paper in such a position that it reflects quite evenly into the camera. Adjust the camera as far away from the sheet as possible, so that the whole of focussing screen is illuminated. Now adjust the lens so that the reflector is perfectly out of focus. Then insert the dark slide containing the transparency and sensitive dry plate, draw up the shutter, uncup the lens, and make the exposure, which will range from five seconds to one minute. The after operations are those usual to the development of a negative. This plan of exposing in the camera will be found to yield far the best results for making contact negatives from carbon transparencies. There are two advantages in using carbon transparencies for the reproduction of negatives: one being their acknowledged superiority over any other transparency for the purpose; the other, they are the only kind that will allow reversed negatives to be made by contact.

If the negative for collotype is required either larger or smaller than the original, the transparency is placed in the enlarging camera, film inwards, and the negative made therefrom the desired size.

W. T. WILKINSON.

[The next "Jottings" will be the various methods of making photolitho transfers in line and half tone, and the preparation of collotype plates.]

COLLODIO-BROMIDE EMULSIONS.

[A Communication to the Society of Amateur Photographers of New York.]

In bringing this subject to your attention, I am reminded of the fact that it is nearly ten years since I had the pleasure of experimenting with collodio-bromide emulsions—not so much in manufacturing them as in using those put on the market at that time, made after the formula of Mr. Henry J. Newton. We then had to prepare our own dry plates and give a considerably longer exposure than is now necessary, but we had the satisfaction of obtaining beautifully clear, crisp, and dense negatives. There was more latitude in exposure and development than now.

Considerable attention has been given of late to lantern slide making, and as a few of our members have had difficulty in obtaining good slides on the special gelatine lantern commercial plates, owing to a loss of sensitiveness or foginess and flatness, which does not fully show itself until after the plate is fixed, it occurred to me it might be useful to explain a few formulae for making and using collodio-bromide emulsions, for the reason that they are rather more convenient for the amateur than the use of the ordinary wet plate collodion process, since the use of the silver bath is avoided, and beautiful crisp slides, full of clear, bright lights, are readily obtained.

In making lantern slides a slow washed collodio-bromide emulsion is

preferable; one to be had ready prepared, that gives fine results, is made by Mr. William Brooks, of Reigate, London, and it is what I have been lately experimenting with. The formula for making the emulsion was given by Mr. Brooks to Mr. Frederick Dunsterville, of Rayapuram, Madras, and what follows will be a description taken from Mr. Brooks's and Mr. Dunsterville's directions.

Prepare three separate solutions, in ordinary daylight, as follows:—

PLAIN COLLODION.

Alcohol, methylated	4½ drachms.
Ether	3½ "
Gun cotton, high temperature.....	12 grains.

BROMIDE SOLUTION.

Alcohol, methylated	1½ drachms.
Ammonium bromide	13 grains.
Distilled water	20 minims.

SILVER SOLUTION.

Silver nitrate.....	20 grains.
Distilled water	12 minims.

The most important feature of these solutions is the employment of a suitable kind of pyroxyline or cotton (in this country Hance's is considered the best), then the process is comparatively easy and certain. Make a stock of plain collodion and let it rest for some time, so that all insoluble particles and other impurities may sink to the bottom. Tall, narrow bottles are best to store it in. The proportion for a stock solution may be:—

Alcohol	22 ounces.
Ether	18 "
Gun cotton, high temperature.....	1 ounce.

Referring to the three solutions above mentioned, the bromide should be made by first dissolving the bromide of ammonium in the given quantity of water, heated to near the boiling point; then when cooled to 70° Fahr. the alcohol is added. The water of the silver solution should also be warmed to dissolve the silver easily and rapidly.

To make the emulsion, pour one ounce of the prepared plain collodion into a clean four-ounce bottle with glass stopper, then add the bromide solution as previously given, shaking well for some minutes. The bottle containing the bromized collodion should then be taken to the dark room, and the silver solution added little by little, shaking well between each addition. It is well to rinse out both the bromide and silver bottles with a little of the collodion to ensure the whole of the salts being taken up. The emulsion should then be kept in the dark room for about twenty-four hours, shaking well at frequent intervals, and when ready for washing it should be poured into a glass dish, which should be large enough to contain the quantity of emulsion in a mass not thicker than one-eighth of an inch. As the solvents evaporate a skin forms on the surface, which should be broken up occasionally with a silver spoon or ivory paper-knife. When the solvents are completely evaporated the pellicle should be washed in distilled water for half an hour or so, until all the soluble salts have been removed.

The pellicle should then be squeezed in pieces of clean calico until as much as possible of the water is removed, and it can then be dried by moderate heat over a water bath. The whole of the washing process should be done in a dark room, or at night-time by the light of a candle placed at some distance.

When quite dry the pellicle may be redissolved in three-quarters of an ounce of absolute alcohol (0·805) and three-quarters of an ounce of sulphuric ether, pure (0·720), pouring the ether on first; and when all the pellicle is dissolved, the bottle (a four-ounce one) should be well shaken up, and in about twenty minutes to half an hour will be ready to coat plates, after being filtered. It will be a milky coloured solution, resembling somewhat cream in consistency.

The filter for the emulsion may be merely a small funnel with a little tuft of cotton jammed in it, through which a little alcohol should first be run, or, what is better, the first portion of emulsion running through may be returned to the filter. A friend of mine, Mr. A. S. Murray, advises the use of paper filters instead of cotton, for he found particles of the cotton would find their way into the emulsion and cause specks on the plate.

Before coating a large number of plates it is advisable to test the emulsion in the dark room, to see that it is free from fog, by coating a plate; as soon as the film is set wash it in clean water by soaking until all the ether and alcohol are removed, which will be observed as soon as the greasy lines disappear. Then pour over the plate a little developer of full strength, and after letting it remain on the plate for a few minutes wash well and fix with a solution of cyanide of potassium. It should be absolutely free from fog and stains. Stains may be due to the plates not being chemically cleaned; but if fog is present a drop or two of an alcoholic solution of iodine added to the emulsion will effect a speedy cure. The emulsion must then be well shaken up again and allowed to rest half an hour before retiltering and coating plates.

Having thus prepared the emulsion, or purchased it already made, the next step is to coat the plates. These must, however, be first cleaned and prepared with a substratum, or edged with a rubber solution or some

other substitute to hold the film firmly on to the glass. Mr. Dunsterville recommends soaking them in a dilute nitric acid solution (acid one part, water ten parts), then rinse them in plenty of clean water, drying them with a clean cloth. They should then be polished on both sides with a cleaning solution (say tripoli powder mixed with methylated alcohol and a little ammonia), care being taken to wipe off the edges that were clamped in the vice with a clean cloth. They should then be either edged all the way around one-eighth of an inch wide with a rubber solution, or they may be dipped in a hot solution of gelatine (twenty grains to twenty ounces of water), and dried with a clean cloth.

Mr. Brooks advises that the plate be cleaned with a piece of clean rag, moistened with methylated alcohol, and polished with a clean chamois leather, kept for the purpose only. No substratum is recommended. He says, after cleaning the plate, holding it on a pneumatic holder, edge it with a rubber solution (this is to prevent the film from slipping during the after manipulation). The solution is best applied with a camel's hair brush cut down almost to a stump, with a piece of wire or a slip of glass tied on the side projecting below about one-eighth of an inch, to act as guide. I followed this method of cleaning, purchasing some new glass. I soaked it in nitric acid and water, then washed it and cleaned by placing the plate in an ordinary wood screw vice, pouring on a little alcohol, and polishing with soft paper called *Papier Joseph*. I then give it an edging of the Eastman rubber solution and coated the plate with the sensitive emulsion.

During the development the film loosened from the glass and became entirely detached, which I could not save. The balance of the plates thus coated I edged with the rubber solution a second time, and these films in most cases stood the development and fixing without coming off. Some would loosen slightly at the corners where the edging had not adhered sufficiently. So far, then, as Mr. Brooks's directions relate to the preparation of the plate, they are insufficient, for it is evident the collodion film will not adhere unless the edging solution is applied before and after coating. It was formerly my practice to first flow a substratum of albumen over the plate, then dry, and afterwards flow the collodion; then the film would adhere perfectly. This, I am informed, is now the general practice in the preparation of wet plates.

Mr. Murray informed me that he prepared a solution of albumen by beating up the white of an egg with an egg beater, then allowing it to settle for twenty minutes, and rebeating a second time. It is then filtered through a paper filter, a drop or two of ammonia added, and is ready for use. A glass plate that has been well soaked is washed off under the tap slightly and drained. The albumen solution is poured on at one end and gradually flowed towards the other, driving what water there is on the plate before it. The surplus is drained off into the bottle. The plate is set up in a rack to dry. After this it is coated with the emulsion, and when again dry is edged with the rubber solution. Thus there is no chance for the film to slip. Several plates may be quickly albumenised and kept ready for use in a grooved box, free from dust. Then, when it is desired to prepare plates, they have only to be coated with the emulsion and edged with the rubber solution, which takes very little time; a dozen can easily be coated in twenty minutes.

Dr. J. J. Higgins recommends the use of gum tala as an edging solution in place of rubber; it can be obtained at any drug store.

F. C. BEACH.

(To be continued.)

THE CATALYSIS OF POTASSIUM CHLORATE AND MANGANESE DIOXIDE.

Reactive the action of heat upon potassium chlorate, either alone or when aided by the addition of manganese dioxide, so well known is the decomposition that to attempt a more explicit explanation than is afforded by the numerous text-books of science would present a grave difficulty. But, as regards the addition of manganese dioxide, when we enumerate the various hypothetical reasons that are assigned to its use, and the replacement of the same by such absurd bodies as sand, &c., even by those who are supposed to hold high stations in the chemical profession, it can be readily understood that their general mode of reasoning must either be of an alchemical or an extremely orthodox type. True, to speak definitely of such a reaction would be extremely precarious, owing chiefly to the instability of the salt under question when exposed to an elevated temperature, and also to the peculiarity of the decomposition of the same, namely, the formation of a chloride, which, in its turn, either vigorously attacks, by the formation of secondary reactions, or totally destroys or contaminates the would-be products.

Evidently the surmise that manganese dioxide is attended by surface action, which is referred to by several authors, would, to any practitioner, be difficult to endorse, since the same portion, after separation by lixiviation, even to an indefinite number of times, is as active as in the first instance; but such cannot be said of surface actions in general, in which may be mentioned the case of finely divided platinum, which speedily becomes impaired.

Although manganese dioxide is not the only substance that promotes the evolution of oxygen from potassium chlorate, yet, among those substances that are influential, all are observed to bear a similar ratio to one

another; such, for instance, as cupric and plumbic oxide an unstable sesquioxide of copper appears to exist. Oxide of copper has, therefore, a feeble affinity for oxygen, and though that affinity is not sufficiently adequate to retain the oxygen when separated from the potassium chlorate, it may undoubtedly aid in effecting its liberation. Sesquioxide of iron is also susceptible in the ferric acid of a higher, but unstable stage of oxidation, and the same holds good of oxide of lead; hence their compounds facilitate the decomposition of the chlorate.

There is at present no proof of the existence of a higher oxide, either of zinc or of magnesia, and in accordance with the same, no perceptible effect is produced by the introduction of these compounds in place of manganese dioxide. This also would remove doubt why powdered glass and sand are as equally inert. It is also not improbable that, during the decomposition of potassium chlorate, minute traces of manganates may be produced, since the oxygen thus obtained is always contaminated with small quantities of free chlorine.

A somewhat striking experiment in favour of this may be performed as follows:—An intimate mixture of the two compounds is obtained and introduced into a wrought-iron tube closed at one end, the further extremity being provided with a stop-cock or tap. The tube is now raised as rapidly as possible to a heat just below redness. Owing to the increased pressure exerted by the confined gas, the decomposition is much retarded. On a sudden liberation of the gas being allowed it naturally escapes with great violence, and invariably carries with it a large supply of chlorine gas. The contents of the tube also produce, on examination, proofs of distinct traces of free alkali.

—Chemical News.

H. N. WARREN, *Research Analyst*.

KEIGHLEY PHOTOGRAPHIC EXHIBITION.

The authorities of the Keighley Mechanics' Institute, under whose auspices the Exhibition which was opened on Tuesday last is held, are sincerely to be congratulated on the success which has rewarded their enterprise. Taking into consideration that it is the first exhibition of the kind that has been held in the town the result is most creditable. The claim made in the local advertisements that it is the most important exhibition of the kind ever held in the north of England is, of course, an extravagant one, but the efforts of those who have taken the matter in hand, and the liberality of their offers of prizes, have resulted in bringing together a collection of about 400 exhibits, in which are included a large proportion of works of well-recognised merit, while the amount of rubbish is not great. The average is a very fair one.

The shortcomings in matters of detail in the arrangements are not few, and for some cases nothing short of extreme carelessness can account; but, on the other hand, there are many points open to adverse criticism for which much may be urged in extenuation. It is to be hoped that this is the first of a series of annual exhibitions, and that the experience here gained will bear fruit in the future.

It is to be noticed that an appeal is made in the catalogue to the amateur photographers of the town and neighbourhood to form a Society, the Council of the Institute promising to assist in any movement with this object. It would be a matter to be regretted if this opportunity were not taken, as the amount of work sent in from the locality is far less than should be the case, and that, with a few noticeable exceptions, is not up to average merit. A local Society would no doubt assist in mending matters in this direction, but at the present day, when the spirit of the times is against drawing a distinctive line between the amateur and the professional, and in favour of judging each man's work according to its own merits and without reference to his personal position, is it advisable to make it an *amateur* Society? In this connexion it may be mentioned that several exhibitors in the amateur classes quote a price for their pictures in the catalogue.

The Exhibition will be open every evening this week, and a further extension of time is under consideration. As there is ample accommodation, one source of discontent—that of unfavourable hanging—is reduced to a minimum. The pictures, &c., are grouped in their several classes, with a few perplexing exceptions, and a praiseworthy attempt has been made to assist comparison; this attempt has been somewhat interfered with by the eccentricities of the catalogue, but most of the failures in this direction are obviously due to want of experience, and will no doubt be remedied on subsequent occasions.

There are nineteen classes, of which five are open to professionals only. The judges were Mr. C. W. Hastings, of London, and Mr. Stevenson, Art Master, of Leeds.

Class I. *Landscape or Seascape*. Professional.—H. P. Robinson takes the silver medal with *A Lobster Boat: Early Morning*; the bronze medal is awarded to E. Greaves's *On the Heben*—a charming study of wood and water. In this the foliage is rendered with a truth as regards tone too rarely found. F. M. Sutcliffe obtains a certificate for one of a series of five studies, all of which are worthy of his name; one of these is attributed in the catalogue to M. Auty, who sends six examples of somewhat unequal merit.

Class II. *Pictures*. Professional.—W. W. Winter's *Perplexed* obtains the first award; F. M. Sutcliffe takes second place with *The Daughter-in-Law*, which, although a meritorious work, is not altogether so pleasing

as some of the productions of this artist. A certificate is given to Mr. and Mrs. Anckorn for *The Charmed Ring*, which is not a particularly pleasing work. The effect is spoiled by a stiffness in the attitudes of the figures, and the composition of the picture is not beyond criticism.

Class III. Enlargements. Professional.—The silver medal falls to T. G. Whaitte for *Market Women, Normandy*, a picture glowing with sunshine. The bronze medal is awarded to M. Anty for *A Bit of Old Newcastle*, a most pleasing picture, strong yet delicate and full of detail, reminding one strongly of the same, or a nearly similar subject, by Lyddell Sawyer in the last Pall Mall Exhibition. *The Crypt, Wingfield Manor*, by T. Scotton, for which a certificate is awarded, is a difficult subject well treated.

Class IV. Portraits. Professional.—Messrs. Byrne & Co. take the first place in a small class of three competitors, T. G. Whaitte taking the bronze medal.

Class V. Lantern Slides. Professional.—The Woodbury Company are *facile princeps*, and obtain a silver medal. Messrs. Riley Brothers' collection of forty-eight slides are good but somewhat unequal. Messrs. Fry & Co. obtain a certificate. In this class there are also only three competitors.

Class VI. Landscape and Seascape. Amateur.—This is the largest class in the Exhibition, comprising as nearly as possible one-half the whole number of the exhibits. The first prize falls to J. E. Austin for *A Peaceful Scene*. This picture represents a country lane with a brook near the foreground crossed by a bridge, which must be familiar to those who are acquainted with Mr. J. Gale's works—in fact, it might be easily mistaken for Mr. Gale's well-known picture. Mr. Austin's other exhibits, however, show that his success is not a mere accidental one. G. Davison is well represented in this class, in which he takes a well-deserved bronze medal for *The Fishing Fleet*. W. G. Brewis's series of landscapes, for which he receives a certificate, show careful manipulation; they are, however, marred by having blank white skies. The same applies, but in a less degree, to a series by F. Illingworth. H. Forsyth's *Rustic Corner*, for which a certificate is awarded, is somewhat weak; a better print might possibly be made. The Rev. H. B. Hare well deserves the certificate he has obtained. A. Keighley, a local amateur, deserves some praise for his exhibits, in which there is evidence of considerable artistic perception. The red colour adopted in some cases does not appear the most suitable tint; *A Cooling Stream*, for instance, should look cool. E. Cowper's series are good examples of landscape work, and the work of W. Mitchell and A. Haggas, both local amateurs, deserves remark, although it is not of conspicuous merit.

Class VII. Pictures. Amateur.—A. Tagliaferro takes a silver medal for *Ave Maria*, which we cannot think altogether a pleasing picture. *A Berkshire Backyard*, by J. E. Austin, is quaint and interesting. A. Keighley's exhibits are particularly good, that is to say the prints from the original negatives are, especially *Gathering Water Lilies*; the enlargements exhibited, however, lack the good qualities of the originals.

Class VIII. Architecture. Amateur.—The judges have justly withheld the awards. Yorkshire is so rich in old abbeys, and picturesque and quaint buildings, that there is some reason for surprise that the opportunities have not been made better use of.

Class IX. Enlargements (Amateur). is a good class. Perhaps the most noticeable are A. R. Dresser's enlargements from detective camera negatives.

Class X. Portraits. Amateur.—With the exception of the exhibits of Rev. F. C. Lambert and A. Keighley, both of whom show really fine studies, the competitors in this class fail to rise above the most ordinary difficulties.

Class XII. Mechanical.—This class has two competitors only, both of whom deserve their respective honours.

Class XIII. Champion.—This is a slightly disappointing class. There are twelve exhibitors only, and among the ordinary class there are many eligible works which we should have liked to have seen here.

AWARD OF PRIZES.

PROFESSIONAL.—Class I. *Landscape or Seascape*. Silver medal, H. P. Robinson; bronze medal, E. Greaves; certificate, F. Sutcliffe. Class II. *Picture*. Silver medal, W. W. Winter; bronze medal, F. Sutcliffe; certificate, Mr. and Mrs. Anckorn. Class III. *Direct Enlargements*. Silver medal, T. G. Whaitte; bronze medal, M. Anty; certificate, Thos. Scotton. Class IV. *Portraiture*. Silver medal, Byrne & Co.; bronze medal, T. G. Whaitte. Class V. *Lantern Slides*. Silver medal, Woodbury & Co.; bronze medal, Riley Brothers; certificate, Fry & Co.

AMATEUR.—Class VI. *Landscape and Seascape*. Silver medal, J. E. Austin; bronze medal, G. Davison; certificate, W. G. Brewis. H. Forsyth, Rev. H. B. Hare. Class VII. *Figure*. Silver medal, Tagliaferro; bronze medal, J. E. Austin; certificate, A. Keighley. Class VIII. *Architectural or Interiors*. Awards withheld. Class IX. *Enlargements*. Silver medal, A. Keighley; bronze medal, W. Jackson; certificate, A. R. Dresser. Class X. *Portraiture*. Bronze medal, Rev. F. C. Lambert; certificate, A. Keighley. Class XI. *Lantern Slides*. Silver medal, B. G. Wilkinson; bronze medal, J. W. Wade; certificate, A. R. Dresser. Class XII. *Mechanical*. Bronze medal and Mr. Sneed's prize, H. L., Pickles Greenwood; certificate, Thomas Scotton. Class XIII. *Champion*

(Pictures that have been awarded prizes at previous exhibitions). Silver medal, H. P. Robinson; bronze medal, F. Sutcliffe; certificate, Mr. and Mrs. Anckorn. Class XIV. Silver medal (given by Messrs. Mawson & Swan, Newcastle, for best series of pictures taken on their plates), W. Parry.

THE OLDHAM EXHIBITION.

BINGO in the neighbourhood of Oldham a few days since, I took the opportunity of visiting the photographic exhibition now being held in that town.

The exhibits it is not my desire to criticise, except to congratulate the Oldham Society on having brought together so many works of more than average excellence. The arrangements and the hanging of the pictures, however, seem to me to be a splendid example of what to avoid in their respective directions. There are, according to the catalogue, fourteen classes, but, except in those for lantern slides, in which confusion is impossible, no attempt has been made at grouping the exhibits belonging to each class, and as the pictures themselves bear no indication, nor does the catalogue give any, comparison is of course practically out of the question.

The positions given by those responsible for the hanging are at every exhibition, more or less, and perhaps in most cases unjustly, a subject for adverse criticism, and therefore, but for the fact that I am not an exhibitor, and am in no way interested in the exhibition except as one of the public, I should be very diffident in expressing any opinion. I am, however, treading on fairly safe ground in saying that if the success of an exhibition depended entirely on the hanging, this exhibition would have been a failure. As an instance, Mr. H. P. Robinson's *Caroling*, which, whatever may be its faults, at least merits a place where it can be seen, is so placed that it causes little surprise that the judges have passed it without notice. Horace Gridley's gem, *A Good Flask*, too, can only be seen by assuming an undignified position on the hands and knees.

On the evening of my visit there was a lantern exhibition, and I naturally expected to see examples of the best work of the locality. Judge my surprise and disappointment when I found the entertainment to consist of a series of commercial slides, such as may be borrowed from any optician at so much per night, with a reading from the book supplied with the same.

Oldham evidently wants the Rev. Mr. Lambert badly. A. MACKIN.

THE RICHMOND EXHIBITION.

THERE is only one bad thing connected with this Exhibition, which is that it remains open only one week, closing to-morrow. It is indeed one of the finest exhibitions of photographs that we have seen for some time.

It was opened on Tuesday by H.R.H. the Duchess of Teck, who seemed to take quite a lively interest in the various exhibits. It has not been promoted with any commercial object, as in the event of there being a surplus it will be equally divided between the Richmond Free Library and the Athletic Association. There is also a lantern entertainment (presided over by Mr. William Brooks) each afternoon and evening during the week. This has been highly successful, as under such management it could scarcely fail to be. The compendious and really well-got-up catalogue is sold for the low price of twopence.

Those who have visited any photographic exhibition of late years in any part of the United Kingdom will see on the walls and screens numerous pictures with which they have made acquaintance many times previously, for, so far as we remember at the present moment, the exhibitions of the Photographic Society of Great Britain are the only ones confined to original work.

Quite a number of medals have been awarded, these being altogether irrespective of whether or not similar awards have not been made to the same pictures many times previously, and even by judges composed of some of the same elements as the jurors in this instance.

The judges on this occasion were Messrs. James Sant, R.A., H. Moore, A.R.A., T. C. Hepworth, J. Traill Taylor, C. W. Hastings, Lionel Clark, Valentine Blanchard, S. B. Wollaston, C. Hussey, and W. L. Wyllie.

In Division A (Landscape or Seascape, or series of same, open to all exhibitors)—Silver medal to F. M. Sutcliffe for a series of his charming pictures, *Feeding Calves, Rising Mist, et seq.* Bronze medal to H. P. Robinson for his *Lobster Boat*.

Division B, Class 12, same as above, but for amateurs only—Silver medal, J. Gale, *Afternoon Rest*, and series. Bronze medal, G. Davison, *The Part of Day*.

Division A, Class 3 (Figure subjects or interior with figures, open to all exhibitors)—Silver medal, L. Sawyer, *Tam o' Shanter*. Bronze medal, W. Winter, *Perplexed*.

Division A, Class 9 (Best picture on Fry's plates)—Silver medal, T. G. Whaitte, *Let you a dollar you don't*.

Division A, Class 8 (Best enlargements on Morgan & Kidd's opal or paper)—Withheld.

Division B, Class 14 (Portraits, amateurs only)—Silver medal, Rev. F. C. Lambert, *Ageismos the Slave*. Bronze medal, D. de L. Cohen, *Portraits*.

Division B. Class 15 (Figure subjects or interior with figures)—Silver medal, D. Barnett, *The Village Apple Cart*. Bronze medal, Miss F. A. Harvey, *Studies of Stags*.

Division H. Class 16 (Architecture, amateurs only)—Silver medal, T. H. Morton, M.D. Bronze medal, withheld.

Division H. Class 13 (Landscape or seascape, amateurs only, half-plate or under)—Silver medal, F. P. Cembrano, *Landscape Studies*. Bronze medal, E. J. Bedford, *Horses at Plough*, and series.

Division H. Class 17 (Instantaneous landscape or seascape, amateurs only)—Silver medal, L. Melden, *Express Train* and others. Bronze medal, H. E. Allen, *Sunsets on Windermere*.

Division A. Class 11. Photographs taken with London Stereoscopic Company's apparatus.—No awards.

Division B. Class 20 (Views within three miles of Richmond)—Silver medal, H. Little, *Red and Fallow Deer*. Bronze medal, F. Crookes, *Winter-tide*.

Division A. Class 2 (Portraits, open to all)—Silver medal, W. Crooke, *W. E. Lockhart*. Bronze medal, Werner & Son, *Portrait of a Lady*.

Champion Division. Class 22 (Open to all)—Silver-gilt medal, F. Thurston, *A Misty Morning*. Silver medal, H. P. Robinson, *Caroling*. Bronze medal, W. J. Byrne, *F. Tolmache*.

Champion Division. Class 23 (Amateurs only)—Silver-gilt medal, H. D. Arnold, *Roman Wall at Burgh*. Silver medal, J. Gale, *Cornish Doorway*. Bronze medal, Surgeon-Major Mantell, M.D., *Bristol Floating Harbour*.

Division A. Class 4 (Architecture, open to all)—Silver medal, L. Sawyer, *In the Castle Garth, Newcastle*. Bronze medal, G. W. Wilson & Co., *Rosslyn Chapel*.

Division B. Class 21 (Amateur Photographer, for best Amateur work)—Silver medal, J. Gale, *Homestead from Plough*. Bronze medal, L. Melden, *A Series of Pictures*.

Much credit is due to Mr. Chancellor, Hon. Secretary, for the success of the exhibition.

APPARATUS AND APPLIANCES.

The following appears in the *Thames Valley Times* of Wednesday evening:—"Mr. Whipple had the arranging of an excellent collection of photographic apparatus and appliances, sent in by various firms, and embracing some of the latest novelties, as well as other inventions that are better known and have stood the test of time. A prominent position is occupied by the 'Optimus' enlarging lantern, given by Messrs. Perkin, Son, & Rayment, for the best series of lantern transparencies. Messrs. Sands & Hunter exhibit their Imperial and Exhibition cameras, and a patent time shutter, which can be set for any length of exposure. Various lenses, cameras, stands, &c., are shown by Messrs. Spicer Brothers, as well as specimen photographs taken on their sensitised paper. Messrs. J. F. Shew & Co. are large exhibitors, their stand displaying pocket and detective cameras, their Eclipse hand apparatus, and the Eclipse enlarging apparatus, besides various other appliances. An enlarging camera of imposing proportions is shown by Messrs. Marion & Co., compared with which, in point of size, is Dr. Krugener's patent book camera, resembling in appearance a small book, while McKellan's detective camera is also worthy of notice. Messrs. Taylor, Taylor, & Hobson show a variety of lenses, and Messrs. C. Bracher & Co. exhibit their metal dark slides. Mr. Henry Parker directs attention to his improved Victoria cameras, and a cheap form of detective camera. Mr. W. Tylar has an excellent 5l. outfit, besides compressed pulp trays (with names prominently attached so as to be visible in the dim light of the 'dark room'), patent plate lifters (by which the staining of the fingers with chemicals is avoided), and other useful items. Mr. Jonathan Fallowfield shows an excellent detective camera, enclosed in an innocent-looking black box with strap handle, which would never be likely to arouse the suspicion of a shy and involuntary sitter. The instantaneous shutters of the most approved construction shown by the same exhibitor are well worthy of attention, as well as another form of detective camera which fits under the waistcoat of the operator, all that is visible being a tiny lens made to resemble a waistcoat button. Here also is a well-conceived magnesium lamp for studio illumination, besides enlarging cameras, petroleum lamps, dark tents, &c. Messrs. Bourn Brothers, of Richmond, show various cameras by Lancaster & Son, the exquisite finish of which would delight the heart of the most fastidious of amateurs, as well as detective cameras, enlarging lanterns, negative boxes, draining racks, and in fact all that an amateur is likely to require. Messrs. Hiffe & Son exhibit their photographic publications, and Messrs. W. Watson & Sons have an attractive stand, their specialities including tourists' cameras, folding tripods, a detective camera with Eastman's roller and regulating shutter for different exposures, an improved dark slide, a handsome studio stand, and other exhibits. A developing port-manteau, arranged to contain a complete photographic outfit, is shown by Messrs. G. Houghton & Son, who also display a developing sink with cover, arranged to form a complete dark room, and a portable garden or lawn studio."

After the exhibition of lantern slides of Windsor Castle, &c., by Mr. W. Brooks on Tuesday afternoon, before H.R.H. Princess Mary, Duchess of Teck, H.R.H. the Duke of Teck, H.R.H. Princess Victoria, and

suite, Mr. Brooks obtained permission to take a group of the Royal party by the aid of F. W. Hart's patent flash-light lamp, and having borrowed a tourist camera and lens from the stand of Watson & Sons he took two successful pictures, a lantern slide being made from one, which will be shown on the screen every afternoon and evening during the Exhibition. The whole thing was conceived and plates exposed within ten minutes.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 14	North Middlesex Club	The Iron Room, Stroud Green.
" 15	North London	Myddelton Hall, Upper-st., Islington.
" 15	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
" 15	Bolton Club	The Studio, Chancery-lane, Bolton.
" 16	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 16	Bury	
" 16	Burnley and District	Mechanics' Institution.
" 16	Hyde	
" 16	Manchester Camera Club	Victoria Hotel.
" 16	Edinburgh Photo. Club	5, St. Andrew-square.
" 16	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 17	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

LAST Tuesday night, at a meeting of the above Society, held at 5A, Pall Mall East, London, Mr. James Glaisher, F.R.S., President, occupied the chair.

The PRESIDENT, on behalf of himself and of the meeting, expressed pleasure at seeing Mr. Leon Warnerke in their midst once more, he having just returned after prolonged absence in Russia.

Mr. Frank Newlan exhibited a detective camera consisting chiefly of an angular vessel of tin; in the interior quarter-plates were arranged round the outside of a drum, and half a turn of a key on the outside of the apparatus would so turn the drum as to bring a fresh plate into the field of the lens; the apparatus would take six quarter-plates. He also exhibited a new view meter, consisting of two sets of cross wires, the one disposed vertically and the other horizontally; between them was a reflecting and slightly convex mirror placed at an angle of 45°, so that by looking down upon this finder and view meter, and making the two sets of wires coincide to the eye, any object could be accurately centred for the camera, and would be nearly as brilliantly illuminated in doing so as when looking at the object direct.

Mr. JOHN SPILLER remarked that it seemed to be an admirable instrument with distinct features of novelty. Would not the Metropolitan Police and foreign Custom House officers suspect it to be a dynamite case?

Mr. NEWLAN intended to enclose it in a light case so as to externally resemble other detective cameras.

Mr. J. G. B. WOLLASTON remarked that the drum might be made to hold more plates by making it to encircle the body like a belt.

The PRESIDENT said that, under the new rules, all the officers of the Society would retire at the next annual meeting, and that nominations for their successors must reach the Secretary, at 5A, Pall Mall East, not later than January 21 next. He then moved that Mr. W. E. Debenham and Mr. George Scamell be appointed Auditors.

This was agreed to.

The meeting then appointed as Scrutineers Messrs. T. Samuels, J. D. England, Friese Greene, Arnold Spiller, Charles Sawyer, George Scamell, W. Cobb, J. A. Harrison, and J. R. Gottz.

Mr. LEON WARNERKE, in response to an invitation from the President to give any news about photography in Russia, said that this was the Jubilee year of photography, fifty years having elapsed since Daguerre first made known his discovery to the French Academy; the Moscow Photographic Society, which was formed three years ago, had, therefore, resolved to celebrate the Jubilee by holding a photographic exhibition. Before he left Moscow everything connected with the coming exhibition promised well. It had been opened that very day, and he had just received the following telegram, which he would translate from the Russian language:—"Observing the Fiftieth Year, Jubilee of Photography.—The Committee appointed for the organization of the Exhibition, at the Comrades' Dinner, drink your health as the person to whom the Moscow Society is thankful for its existence: Entschewsky, Clugenau, Klatschke, Zirmen, Thiele, Lauine, Fischer, Reine, Eichenwald, Rodionoff, Nelline, Golitzin, Kneopp, Matterne." The Moscow Exhibition is a very large one, and patronised by influential people; it has excellent rooms in an enormous museum—a new one and quite a palace; the Society was allowed the use of the rooms on condition that it furnished and decorated them; this it agreed to do, and took fifteen rooms for the purpose. There is not much platinotype work in Russia; what is done is upon an experimental scale only, because the platinotype paper is made in England alone, and by the time it reaches Russia it is spoilt. The Moscow Exhibition is an "All Russians' Exhibition," and will be followed by others annually. He started a photographic exhibition in St. Petersburg last year, and invited about three hundred influential persons to be present at its opening. The Emperor said, "Why did you not invite me?" but it would not have been etiquette to have done so, so he said that he intended to come; he did so and brought all his family. He (Mr. Warnerke) started the St. Petersburg Exhibition because the photographic society there had not the courage to do it; it proved successful in every sense, even commercially, although they had been bound down to charge very low rates for admission; the overplus will go towards the expenses of this year's photographic exhibition at St. Petersburg, which will be international in character and held in April. Magnesium flash lights and detective cameras are coming into use in Russia.

The President having vacated the chair, Mr. W. S. BIRD stated that it is intended to have a public dinner of the members of the Society, and that those who wish to purchase tickets should write to Mr. W. England, 7, St. James's-square, W.

CAMERA CLUB.

On Thursday, January 3, a discussion on *Hydroquinone* was opened by the reading of a paper by Mr. T. CHARTERS WHITE. Sir George Prescott presided.

The lecturer referred to the chemical constitution of hydroquinone, and summed up the advantages which, in his opinion, were obtained from it as a developer. He also gave his experience with the several commercial samples obtainable, and handed round negatives of microscopic subjects in illustration of the use of hydroquinone as a developer.

Mr. A. MASEKILL then read a short paper on the same subject, giving the view taken of this reagent in France, and alluding to the advantage accruing from its use in developing bromide paper.

The discussion was continued by Messrs. Rodgers, Elder, Deed, Wilson, Noble, Orton, Graham, Balfour, Stormey, Betjemann, Grimshaw, King, Clark, Davison, and the Chairman.

On Thursday, January 17, Mr. Pringle will discourse on *Photo-micrography*. Apparatus and illustrations will be on exhibition. Meeting at eight p.m.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

On Thursday night, January 3, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. A. L. Henderson presided, and, as the founder of the Association, he was warmly welcomed and congratulated on his comparative recovery from his recent illness.

Mr. J. B. R. WELLINGTON exhibited some excellent platinotype prints, and stated that one of them was faulty because he had neglected to stir the developer.

Mr. A. HADDON said: It is hard to see one's cherished idols demolished, broken, and trampled under foot, but if by so doing better substitutes can be erected in their stead it is a thing rather to be desired than to be regretted. There are many fallacies in photography, and at times, when they are supported by some of our leading men, it requires a considerable amount of courage to rise and endeavour to remove them and replace them by truths. In this very room, about a year or so ago, one of our authorities on lens matters told the meeting, when speaking of go-and-return shutters between the lenses of a doublet, that as soon as the smallest opening was produced by the moving part of the shutter that the light which passed through spread itself uniformly over the whole of the plate. At the time, though I said nothing, like the old woman's parrot, I thought a lot, and the result of my cogitations was that our authority was not quite correct in his dictum. I have always intended to appeal to Dame Nature in this matter, and I think her answer will be more to the point than the most powerful language I can command or the most elaborate diagrams I could produce on the subject. I have asked her ladyship a simple question, i.e., by cutting away a small portion of a piece of vulcanised fibre and placing it in the diaphragm slot. Her answer I now hand to the Chairman. I think it will be clear to him at a glance that when only a small eccentric opening is made that the light does not fall on the whole of the plate but is confined to a small portion of the field only. So much for small eccentric apertures between the lenses. Many present will perhaps remember that at our very last meeting, when discussing a certain question in connection with roller-blind shutters, it was stated that as soon as the slot in the blind uncovered the smallest portion of the lens the light admitted spread over the whole field uniformly. I endeavoured to illustrate on the blackboard that such could not be; but it was of no avail, the meeting was against me, and, according to the majority, the light still spread itself as they had said. We had no means at hand of proving the matter one way or the other, and I determined the very next time I had a few minutes to spare to try the experiment. Christmas is a merry time with most, in fact a lary time; with me it has been a period for experimenting, and one of the results I now lay before you. A small disc of opaque material with a segment cut off was placed as close to the front lens of a doublet as possible, and the result, as the negative shows, is that a portion of the picture is entirely absent. I again say, and I say most emphatically, that unless a considerable portion of the lens is uncovered the light which passes through is confined to a portion of the plate only. I remember, to my cost, the result of not carefully securing the focusing cloth on the front of the camera when exposing some plates instantaneously in Paris three years ago. In consequence of the wind the focusing cloth was blown down so as to partly cover the lens, a portion, and a portion only, of the plate received an impression, due to the light reflected from the Opera House, the rest was blank. If it is of no consequence whether the whole of the lens is uncovered or not, how is it that we are all so careful in pulling back the focusing cloth before exposing the plate by removing the cap? It cannot be simply because we cannot get the cap off that we attend to this small matter. The reason why all shutters in front of a doublet lens which opens at the centre and close up centrally give weak margins is because the edges of the lens are protected during a portion of the exposure, and no light can, consequently, fall on the margins of the plate. Shutters which open centrally and close again at the centre should be placed between the lenses, as in the case of Sands & Hunter's shutter, Wollaston's, and others of that class. The best places for shutters, therefore, according to these results, would be either between the lenses, so as to open and close centrally, or just in front of the plate. If by these few remarks I shall have convinced some that for uniform illumination a shutter cannot be placed anywhere, and that a stop, in order to be most effective, must be central, my time will not have been wasted.

Mr. HADDON then exhibited prints showing that the shutters he had described cut off a part of the image. He added that shutters should be placed between the lenses and should open at the centre.

A question in the box asked the percentage of relative difference in illumina-

tion given by a roller shutter in front of the lens and a roller shutter next the plate.

Mr. A. COWAN said that he believed that placing the shutter next the plate would give at least double the illumination. When the exposures were not to be excessively short more means of exposing the plate were available without such serious loss of light.

Mr. KERR thought that shutters in front of the lens gave more light than Mr. Cowan supposed.

Mr. WILLIAM ENGLAND, when taking instantaneous views of Paris in the old wet plate days, could only get sufficient light by a drop shutter next the plate; it fell from a bag above the back of the camera into a bag below. He believed that there was nothing to beat the roller-blind shutter next the plate. In reply to a request made by the Chairman, he added that he should be happy to show transparencies from those old instantaneous wet plate negatives at the next lantern meeting of the Association.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting was held on January 1 at Myddelton Hall, Islington, — Mr. E. Clifton, Vice President, in the chair.

Mr. W. T. COVENTON showed some bromide prints and a mounted silver print covered with small spots which were thought to have been caused by bronze powder.

Mr. L. MEDLAND asked if any chemical could be added to the developer which would give a warm tone to lantern transparencies without a previous long exposure.

Mr. CLIFTON thought that warm tones could be obtained only by giving a long exposure and using a suitable developer.

Mr. R. R. FULLER asked how to remove a black margin round an opal caused by the rabbit mark on the negative.

Mr. CLIFTON said that if the film were cut round with a sharp knife and the opal soaked in water the margin could be peeled off; this would not be noticed in the case of a vignette.

The ferricyanide reducer and rubbing down with pumice stone were also recommended.

Mr. MEDLAND asked how he could obtain a good transparency from a cracked negative without showing the crack.

Mr. CLIFTON said that if two thicknesses of tissue paper were put over the printing frame and the latter turned about in the hand before a gaslight turned down low no trace of the crack should be seen.

The HOS. SECRETARY said that the film could be stripped off the glass by means of hydrofluoric acid and a gelatine skin.

Tuesday, January 15, will be the annual dinner; Tuesday, February 5, lantern evening; and Tuesday, February 19, an exhibition of members' work.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

THE first annual exhibition and *soiree* of this Society was held at the West Norwood Institute on Thursday evening, January 3. Over two hundred and fifty prints were sent in for exhibition.

The Society offered three medals for competition, and Messrs. Gale and Davison acted as judges. They awarded the first silver medal to Mr. B. Wilkinson, jun., for a set of six platinum prints, and the second silver medal to Mr. J. Morris for a set of six in silver, and the third bronze medal to Mr. L. Wolff for a set comprising both silver, platinum, and bromide prints. Among those not sent for competition was a collection of thirty half-plate silver prints of views in the North of Scotland, the work of Mr. A. H. Leaf.

Among the main features of the evening were two lantern slide exhibitions. The first included some slides by Mr. A. R. Dresser, among which a series illustrating the various phases of a dog jumping into the water for a stick were very clever. Slides by Messrs. W. H. Baldwin, H. Senier, J. Downes, R. Crothwaite, F. J. Bright, and the Eastman Company followed.

The second exhibition included the works of a few masters in the art of lantern slide making, and was a combination of such excellence as is seldom seen together. The first series were instantaneous views in London, Brighton, and some continental cities, by Mr. F. Fincham, produced by the collodion process. Then followed a fine set by Mr. B. Wilkinson, jun., which included many of that gentleman's best-known pictures. Next came a contribution by Mr. L. Wolff, concluding with a splendid collection by Mr. J. Gale. The audience, which had frequently given evidence of its appreciation of the work of the various exhibitors, applauded again and again as Mr. Gale's slides were thrown upon the screen.

Over a hundred members and their friends attended the exhibition, and it is satisfactory to note that the sale of tickets very nearly covered the expense of the undertaking. The exhibition was held within two days of the second anniversary of the foundation of the Society, and the members are to be congratulated upon the progress made during that time.

The next meeting will be held at the West Norwood Constitutional Club on Tuesday, January 15, when a demonstration of lantern slide making will be given by Messrs. Senier and Wolff.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

On Friday night, January 4, at the ordinary fortnightly meeting of the above Society, held at the Institute, Beley, Mr. Pringle presided.

Mr. B. SHOTON exhibited a plate which had been given to him to develop; it had received a drop-shutter exposure in a room late on a summer evening, the subject being a portrait. Upon development he obtained, instead of a negative, a positive of a rich red colour.

In the discussion which followed it was stated that the red colour was red fog, and that if a plate received so extremely short an exposure a positive would be the usual result.

The President then introduced Mr. DRESSER, who gave the members an address upon *Hand Cameras*, illustrating his remarks by showing his camera,

and prints, enlargements, and lantern slides made from negatives taken with his camera.

The next meeting will be held on Friday, January 11 (this evening), on which occasion Mr. Hushon will read a paper entitled *Six Months in Switzerland*.

CRYSTON MICROSCOPICAL AND NATURAL HISTORY CLUB.

There was a good attendance of members at the ordinary monthly meeting of the Photographic Section of the above Club, held at the Public Hall, Croydon, on January 4.—Mr. W. Low Sarjeant in the chair.

Nearly two hundred lantern slides, the work of members, were thrown on the screen, and a selection made for exhibition at the annual general meeting of the Club on January 9. The new Club lantern was used for the first time and gave general satisfaction.

It was decided that, in addition to the ordinary monthly meeting, a special monthly lantern slide exhibition should be held on the third Friday in each month during the winter season.

On February 1, Mr. Bellsmith of the Eastman Company will give a demonstration of *Transfertype and Printing and Enlarging on Bromide Paper*.

SHEFFIELD CAMERA CLUB.

The first annual general meeting of the Club was held on Friday evening, the 6th instant, at the rooms of the Society, 8, Fitzalan-square. The chair was occupied by Mr. Morton.

The minutes of the previous meeting having been read and confirmed, Mr. W. Jenkinson was duly elected a member of the Club.

The officers for the ensuing year were then elected:—*President*: Dr. Thomas H. Morton. — *Vice-Presidents*: Messrs. B. W. Winder, F.C.S., and G. E. Moleham. — *Committee*: Messrs. C. F. Coombe, M.R.C.S., J. O. Arnold, F.C.S., E. Howarth, F.R.A.S., G. T. W. Newsholme, M.P.S., J. H. Rawson, and C. Yeomans. — *Treasurer*: Mr. W. Gilley, jun. — *Hon. Secretary*: Mr. Henry J. Hanly, F.C.S.

The condition of the Club, both financially and otherwise, is most satisfactory, and larger and more commodious premises, which will include a lecture hall, reading room, and dark room, are shortly about to be taken.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on January 2.—Mr. Concorlier Andrews in the chair.

Mr. F. W. Dix read a paper on *The Carbonate of Soda Developer*, pointing out its merits and disadvantages. The paper was illustrated by some negatives and transparencies produced by the developer, which were much admired; and several members expressed their intention of giving the developer a trial.

After the question box had been opened and the queries replied to, the chair was vacated and the discussion took a conversational turn and was continued for some time.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual fortnightly meeting of the above Association was held on the 7th instant.—The President, Mr. Henry Blandy, L.D.S. Edin., in the chair.

Mr. J. Henry Hanly, of Oak Lodge, Kimberley, was elected a member.

The President in his opening remarks referred to the monthly circular issued for the first time this month, and congratulated the Committee on the new departure they had taken in this matter, as he had no doubt it would be very beneficial to the Society's prosperity. He was also pleased to see that they were taking steps for the formation of a reference library on photographic subjects. He then introduced:

Mr. H. S. BELLSMITH, of the Eastman Dry Plate and Film Company, who explained and demonstrated before them the processes for which this Company is famous. Mr. Bellsmith also explained the working of the Kodak camera. A quantity of film negatives were then handed round for inspection, and also flexible enlargements taken by the Kodak camera and larger negatives.

Many questions were asked by the members, which were fully answered by the lecturer.

Mr. BOLAN proposed a vote of thanks to Mr. Bellsmith, who in acknowledgment said that he had visited many photographic societies since his arrival in England, but he had not been in such comfortable rooms with but one exception.

The meeting was largely attended.

OLDHAM PHOTOGRAPHIC SOCIETY.

On Thursday evening last the annual supper in connexion with the above Society was held in the Freemasons' Hall, Union-street, between thirty and forty members and friends being present. The evening was spent in an agreeable manner; vocal and instrumental music, recitations, &c., were given by members and friends. Representatives of London and provincial societies were present.

This being the Society's twenty-first anniversary, the Hon. Secretary and Librarian recognised the event by presenting to each member a suitable card of a unique character, the description of which is as follows:—The background is formed of the covers of twelve of the principal photographic journals and almanacs. In the centre is a photograph in miniature of members of the present Council, below which is the coat of arms of the borough of Oldham and the Society's presentation print for the year 1888; in the top left-hand corner is a photograph of the first meeting-place of the Society; on the same side, at the bottom, is a list of the first Council formed in 1867; in the top right-hand corner is a photograph of the Lyceum, the present meeting-place; in the corresponding corner below is a list of the present Council for the year 1888; the whole is surmounted by a photograph of the President (Mr. Greaves).

The toast, "Success to the Oldham Photographic Society," coupled with the

name of the President, was proposed by Mr. J. CHADWICK and suitably acknowledged.

A pleasant evening was spent, the party reluctantly breaking up about twelve o'clock.

Correspondence.

Correspondents should never write on both sides of the paper.

PHOTOGRAPHERS' DEFENCE UNION: POLLARD VERSUS PHOTOGRAPHIC COMPANY.

To the Editor.

SIR,—I suggested in the columns of a contemporary, some weeks ago, the formation of a Photographers' Defence Union, but did not anticipate the idea would be adopted for the furtherance of a cause such as Mr. Hubert advocates.

It would be a disastrous start for such an undertaking to take up such a case as is proposed. If, as Mr. Hubert remarks, there is no direct case as to photographs, the case of Tuck *versus* Priester, cited by the judge in Pollard *versus* Photographic Company, is so strongly in point that an appeal against his judgment would, I fear, be hopeless. In that case, decided in 1887, the plaintiffs employed the defendant, a printer, to make them copies of a drawing of which they had the copyright. He executed the order, and without their knowledge or consent made other copies and sold them in England. It was held by all the Judges of Appeal that there was an implied contract not to make any copies of the drawing other than those ordered by the plaintiffs, and that, independently of the Copyright Act (which, however, was of some use to them), the plaintiffs were entitled to an injunction and damages.

Mr. Hubert says photographers have always thought they possessed the copyright, and not the sitter. I do not think many will agree with him. A reference to the Copyright Act, 1862, will at all events dispel the illusion. Not the less is a Photographers' Defence Union a desirable thing if properly taken in hand.—I am, yours, &c., S. J. DEBENHAM.

January 7, 1889.

To the Editor.

SIR,—Though I must acknowledge your wisdom in curtailing a paragraph of my letter in last week's issue, I must say that it cannot fail to weaken my argument considerably, and when, in addition to this, "Junius," in *Echoes*, pronounces the proposed society powerless on account of the uncertainty of the law, my scheme would almost seem doomed to failure but for the fact (which will be apparent to most) that "Junius's" argument is as poor a one as could possibly be advanced, for the principal aim of such a society should be to convert such an uncertain law into a definite one, and furthermore to guard against possible chances of one judge's common-sense view running in an opposing direction to that of another, or, what is more, to that of the whole photographic profession. Moreover, the very name of a trade protection society would cause intending litigants to reconsider any hasty or haphazard step, it being well known that these bodies carry cases to the highest courts. The very gist of "Junius's" argument is against him, because the pictured happy-go-lucky way of magistrates, &c., is the strongest reason that that tendency should be checked.

A society as proposed would, of course, be represented by the ablest counsel, and supported in its defensive proceedings by scientists of the first order.

It must also not be forgotten that the case Pollard *versus* Photographic Company is not the only type that may crop up. There are such where the surveyor interferes with the skylights, customers suing photographers for the return of money on the ground that in *their opinion* the picture is unlike, &c.

I propose shortly to call upon the leading photographers with a view of enlisting their sympathies and to hear their opinions.—I am, yours, &c., Royal Photographic Studio, 238, Mare-street, Hackney. J. HUBERT.

P.S.—I suggest 5s. for the annual subscription, and the solicitation of outside help in exceptional cases.

[We curtailed the paragraph referred to as it offered a chance for an action for libel.—ED.]

To the Editor.

SIR,—It appears to me that photographers would be exceedingly ill-advised to accede to the request made by Mr. J. Hubert in your last issue, that they should subscribe for the expense of an appeal in the recently decided case of Pollard *versus* The Photographic Company. Had such a course been proposed in the case of Marston and Barnes, in which a County Court judge decreed that the negatives taken by the photographer had to be given up to the customer ordering the photographs, a proceeding at variance with the practice and understanding well settled in the profession—at variance also, I believe, with decisions that have been pronounced by other courts—there would have been much to say in its favour. In the present instance, however, the contention on behalf of the defendant was that a photographer is at liberty, without the consent of the sitter, to make what use he pleased of a portrait negative of a lady

customer. The case was fully gone into by an able judge, who, after postponing judgment for further consideration, decided that the photographer has no such right. I suppose that photographers, for the most part, will willingly admit that they do not desire to assert such a claim as that put forward; indeed, Mr. Hubert himself, in another part of his letter, says, "No respectable photographer would part with any copies other than to the sitter or relatives, or with the former's permission." Rather a severe comment upon the proceedings of his friend, for whose cause he now asks subscriptions. "Thrice armed is he who has his quarrel just." If photographers do band together to have some test case reheard, let it be one which vindicates a principle of which they can approve.

The customary proceeding and understanding amongst photographers with regard to possession and use of the negatives of private sitters is one which has the sanction of many years, and will, I believe, be found to be in accordance with common sense, and for the most part with such judicial decisions as have been given in the courts of law. It may be briefly stated as follows, of course supposing that no special arrangement has been made:—

The negative is the property of the photographer, who has, however, no such copyright in the work as to prevent the sitter from having any kind of copy made from the prints with which he may have been supplied.

The use of the negative is joint. The sitter cannot, of course, print from it without the photographer's consent, and the photographer has no right to do so without the sitter's consent.

The case put by Mr. Hubert, that it will be necessary to obtain the consent of each individual in a group before supplying copies, is, I think, a little fanciful. The photographer, in the absence of notice to the contrary, would probably be held justified in supplying copies to any member of the group; at all events, the person who originally ordered and paid for the copies would be presumed to be entitled to order further copies.

The case of portraits printed as specimens merely is a little different. There are many, probably most people, who do not object to such use being made of their portraits, but who yet would not give any written consent to it. They would fancy that the doing so would make them appear vain of their personal appearance. Moreover, whilst they have given no consent, they are at liberty, at any time, to request the removal of the specimen. Here, again, custom has established a common-sense proceeding, at all events amongst the right-feeling. If any objection is made to the use of a portrait as a specimen, such objection is at once met by the withdrawal of the picture.

If it could be supposed, which appears to me exceedingly improbable, that the ruling of Mr. Justice North can be disturbed, and the contention of the defendant that a photographer is at liberty to make what use he pleases of his customer's portrait were to be established, there would, in all probability, arise such an outcry from the public, that legislation injuriously affecting the photographer's rights might be speedily looked for. In this view, the success of an appeal in the case of Pollard *versus* The Photographic Company would be the worst misfortune that could happen to photographers.—I am, yours, &c., W. E. DENHAM.

OWNERSHIP OF THE NEGATIVE.

To the Editor.

SIR,—The letters on the copyright and the ownership of negatives of portraits taken in the usual course of business, and for which we have been paid, which have appeared from time to time in your excellent JOURNAL, seem to me very much away from what the profession ought to discuss for their own interests.

The law is very definite that the copyright of such portraits is not ours. Then why store the negative? *As honest men we cannot use it for ourselves*—that is, for our own interest—in any way whatever without permission. Then why keep it? Why not settle the vexed question at once by cleaning what some incorrectly call their loss of trade, but what I call the portrait itself? Wipe the portrait off. Doing so would benefit the profession. More portraits, more sittings. And if one particular portrait was wanted—copy it. The copyright and ownership of the negative would then be easily and satisfactorily settled. "Lead us not into temptation" ought to be the prayer of many photographers; for the fact cannot be denied that many abuse the confidence placed in them.

The decision in the case "Pollard *versus* the Photographic Company" is a wise and a just one. And I consider that to ask the profession to defend and justify a wrong is an insult.

The letter dated from the Camera Club is scarcely a wise one, and gives evidence that the writer has not read the correspondence which has appeared on the question. The law is well defined and explained by Le Nève Forester in an article in the JOURNAL ALMANAC for 1869.

The law relating to photographs will be altered I have not the least doubt; and it behoves us, as practical men, to look at the probable alterations in a business manner. Perhaps some of our business men will suggest what alterations should be made that would make the law fair and honest alike to the public and the photographer.—I am, yours, &c., J. T.

January 5, 1889.

INTENSIFICATION.

To the Editor.

SIR,—Referring to an article under this heading, printed in No. 1495, your contributor, "Junius," asks, *inter alia*, "Why mercuric chloride?" Read by the light of the sentence immediately preceding the interrogative, I imagine that it was intended to run, "Why mercuric bi-chloride?" I hasten to say that my use of this latter term was due to a slip of the pen. If "Junius" will do me the honour to cast another glance over the article, he will find Hg Cl₂ correctly named in two or three places. It is unfortunate that your contributor, in attempting to put me right, should himself have stumbled.

I have no desire to be understood as fathering the proposition that the Ag Cl of the double salt sensibly darkens in the light—although, from observations made a year or two since, I was temporarily led to believe that an appreciable alteration does sometimes take place. My reason for recommending the avoidance of direct sunlight during intensification arises from the fact that I am not wholly disinclined to favour the hypothesis that, under some conditions, the solar rays induce a latent action in the Ag Cl, and that possibly to this cause may be traced, in a partial degree, the fading to which the mercurially treated image of a gelatine negative is often susceptible.

I grant that the particular passage dealing therewith lacks the perspicacity that might, upon reconsideration, have been imparted to it; but I am unable to agree that the suggested method of adding K Cl to the mercury solution is "needlessly roundabout." The operation is the work of a few seconds. The stated solubility of many substances at, say, sixty degrees—an unknown natural temperature for several months of our year—is often delusive. I recommend "Junius" to try the experiment of making the addition both ways, to note the time occupied in dissolution, and to compare the appearances of the resulting compounds. The point, however, is of slight moment.

It is interesting news to me that the practice of adding K Cl to the mercury solution is of "frequent" occurrence. I do not hesitate to avow that until I mentioned the plan myself I believed that it had not been described. As I gather that "Junius" has an acquaintance with the works of the accepted authorities upon photography and chemistry, he will, perhaps, be good enough to refer me to a published formula in which potassium chloride figures as a constituent of the mercury intensifying solution. The mighty mass of photographic literature deters me from passing upon him the harsh sentence of wading through any but the smallest fraction of it. I will, therefore, only indicate at random two standard books in both—or one—of which it should surely find a place. These are, Abney's *Instructions* (1884 edition), and THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, 1889.—I am, yours, &c., THOMAS BEDDING.

THE ETHONOL LIGHT.

To the Editor.

SIR,—I learn from a communication to your JOURNAL, of December 14, p. 789, that Mr. Hardwich is using the old style of Ives' ether saturator. It will interest Mr. Hardwich, and others, to know that my improved single tube saturator is the only form now made in this country, and that the petroleum ether, recommended by me, is also now generally used here in preference to sulphuric ether. A paper describing these improvements was reprinted in your JOURNAL some months ago.—I am, yours, &c., FRED. E. IVES.

2750, Eleventh-street, Philadelphia, December 26, 1888.

COPYING OIL PAINTINGS.

To the Editor.

SIR,—"Pictor," in his last communication, states a truism, "that common sense is not technical knowledge," but technical knowledge is in a great measure compounded of common sense, and, so far as its application to this discussion is concerned, it is very certain that, without common sense, technical knowledge would be of little avail, but this he inferentially ignores. So much for his argument.

Again, glycerine seems to be a particularly objectionable substance to "Pictor," because it will not dry alone. Glycerine and water is the mixture advocated, and this will dry, slowly or not, according to the proportion of glycerine. Are not moist water colours compounded with glycerine? Yet water colours dry. In its application to oil paintings just so much glycerine is added to the water that the otherwise rapid evaporation of the water is retarded. If the painting is to be several days under treatment, as inferred by "Pictor," common sense would indicate drying off after each day's work. Moreover, moistening the surface to bring out detail can scarcely be called saturating the substance.

If "Pictor" objects to any preparation of an oil painting before copying, he will not, I fancy, have many with him if the best possible results are expected; but "the wilful" men maun hae his way."—I am, yours, &c., E. DUNMORE.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.—The Annual General Meeting of the Club will be held in the Iron Room, Granville-road, Stroud Green, on Monday evening next, the 14th instant, at eight o'clock. Business.—The election of officers for the year 1889, and to confirm (if approved) the report of the past half year.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column ; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange a C. D. V. lens, by Jamin, for a good half-plate rectilinear ditto.—Address, C. BASSON, 364, Harrow-road, Faldington, W.

Desire to exchange Kodak and lantern slides of Irish views given in exchange for quarter or half-size dry plates.—Address, EDWARD J. HUGHES, Graigne, co. Kerry, Ireland.

Wanted, Kodak or other detective camera, also half-plate set, in exchange for first-class backgrounds and accessories and Benth's four and a half inch mitring machine.—Address, W. S. ANDERSON, Ilkerton.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co., 2, York-street, Covent Garden, London, W.C."

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS RESHARED:—

Mr. A. SUMMONS, London.—Three photographs taken by the flash light.

F. H. HANDY (N. Z.).—Received. Thanks.

RECEIVER.—D. Johnson and Harding Warner.

M. J. E.—The process is not protected by patent.

STEELE & STEWART (Edinburgh).—The Platinotype Company, 29, Southampton-row, London, supply the paper.

YELLOW STRAIN.—Try the effect of a dilute solution of cyanide of potassium. We fear, however, the case is hopeless.

ARTIST inquires if America, or Australia, or any of the Colonies, is a good field for a photographer and portrait painter, and which is considered the best.

J. T.—Any good cemented doublet of the "rapid" class, and having a focus of from ten to twelve inches, will answer your purpose. A single lens would be rather too slow.

C. WILSON.—If you make the work copyright you must register it at Stationers' Hall. This should be done before any copies are issued, otherwise there will be no copyright in them.

H. T. SHEPARD, M.D.—The silver is converted into the ammonio-nitrate by first dissolving the nitrate in distilled water and then adding ammonia, drop by drop, until the precipitate, which at first is thrown down, is all redissolved.

THOMAS J. O'CONNOR.—Seven reliable formulae for a hydroquinone developer are given on pages 631-3 of the current ALMANAC. Let our correspondent commence with No. 1, and adopt that which best suits his special requirements.

LEADS.—1. The lens you mention will make a negative sufficiently large to fold all that is required.—2 and 3. Having taken the negative, say a cabinet size, send it to any of those who advertise as printing for the profession and they will do all the rest.

H. K. W.—We know of no places. Study the portraits taken by good artists and begin by imitating them closely both in lighting and pose. In this way you will soon immensely improve yourself in art knowledge. Also read any good works on composition.

H. WORLEY inquires where he can obtain the proper optical glass to make a photographic lens.—Messrs. Chance Brothers, Birmingham, supply optical glass; it may also be obtained from Houghton & Sons, Holborn, or from Birtley & Co., Soho-square.

R. T. J.—1. See the collector to the County Court.—2. If by opalines you mean prints in optical contact with glass, they must be in contact all over and not at margins alone.—3. Dry all the silver residues, mix them together, and keep the gold residues apart.

G. H. A.—Your trouble arises from the presence of iron. After the precipitate from old toning baths, thrown down by sulphate of iron, is collected, it should be treated with either sulphuric or hydrochloric acid to remove all traces of iron; then, after well washing, it is ready for dissolving in the aqua regia.

T. writes: "I have got a pen-and-ink testimonial to photograph—it is written in violet ink—and no matter what light I take it in the result is as faint as to be useless. Can you suggest a way out of my difficulty?"—The secret of success lies in the adoption of orthochromatic or isochromatic plates.

R. A. (Cambridge). To copy a cabinet picture the same size with a lens of nine inches focus the camera must be capable of extending to eighteen inches. By the way you write we suspect you have taken the back focus of the lens and not the equivalent focus. If this be the case the camera will have to be a few inches longer still.

F. DUNSTONVILLE.—In the toning of the transparencies, the washing after the mercurial treatment was not sufficient, hence the lights become stained with the sulphide of potassium. If you refer to the article in the JOURNAL for November 16 you will see particular stress is laid upon the absolute necessity of perfect washing between each operation. We fear there is no way of removing the stain now. You might, however, try the effect of a brief immersion in the solution of bichloride of mercury.

S. A. R.—The sample of glass sent would be quite safe if only a feeble light, such as a night-light, were used; but with a stronger source of illumination or with daylight it would be dangerous.

A. RICHES wishes to know how to give a ground-glass appearance to a large window at which he intends to attempt portraiture. He has been recommended to stipple the glass over with white paint, but he does not want to do that as it will be only a temporary arrangement, and the paint would be difficult to remove.—Make up some starch paste (rather thin) and then mix some common whitening with it. This stippled on the glass answers very well. Tissue paper attached to the glass with paste is an excellent way of subduing the light, and it is easily removed.

R. C. MACLEOD inquires: "1. What is the safest and most powerful form of limelight for the magic lantern?—2. Can one now with any form of limelight be absolutely secure from risk of explosion? if so, with what form?—3. I have the lantern lens four-wick lamp, &c., with the light of which I am dissatisfied; at what cost could I get limelight fittings?"—In reply: 1 and 2. The most powerful light is that obtained by a mixed gas jet; the safest jet is the blow-through.—3. Limelight burners cost from twelve to twenty-five shillings. One of fairly good quality will cost halfway between these sums. But a bag or bottle for compressed gas will also be required. Better get an estimate from some of those specialists who advertise in the ALMANAC.

A. GLASS writes: "Wanting to cement the front combination of a large portrait lens, I got some Canada balsam from the local chemist, which proves to be too thick, as I cannot force it to the edges. Will you kindly say if it can be thinned, and what with, also method of cementing? Also is there any advantage in its being cemented as against leaving it undone?"—In reply: The balsam may be thinned by the addition of turpentine. To cement the lenses, have the contact surfaces made quite clean, using ether or benzole to remove all traces of the former cement. Place a drop of the balsam on the centre of the concave surface, then apply the other lens with a gentle pressure, so as to cause the balsam to ooze out all around the edges. The advantage of cementing is that two reflecting surfaces are nullified.

SCOTTS writes as follows: "A class of view which is especially common at this time of the year is where there are large masses of shadow and also of bright sunlight, the former perhaps being in the near foreground. Street views are an instance. How ought these to be treated? 1. Should exposure be full, or bare, or just right?—2. Should the negative be made thin or dense?—3. Should the extreme shadow be clear (or at least nearly clear) glass, or should it have a fairly deep deposit? (Of course, I do not refer in this question to fog.)—4. Would a slight fog on plate help?—5. Whether is tentative or quick development more advisable? I know that such a view should be taken when there are white clouds, but my queries are intended to deal solely with exposure and development.—6. Would you kindly inform me if any type of transparency to expose by contact would answer the same purpose?"—In reply: 1. The exposure should be full—sufficient to secure detail in the deepest shadows.—2. Not too dense.—3. Only the extreme shadows should be clear glass.—4. Not if the negative be good.—5. A tentative development, so as to obtain all the detail in the shadows before the lights acquire too much density.—6. This query is not clear.

THE CHAMPION PHOTOGRAPHIC EXHIBITION.—This exhibition of works which have taken prizes at other exhibitions is now open at the Fine Art Society's Rooms, 148, New Bond-street, London. There are one hundred and ninety-three frames, and these comprise many of the finest photographs that have been displayed at other exhibitions. We shall give a more detailed account of it on an early occasion, and meantime recommend our readers to pay it a visit.

CAMERA CLUB.—The second of the "one man" series of photographic exhibitions is now open at the Camera Club. It is composed of large direct pictures in platinum by Mr. Harry Tolley, of Nottingham. This gentleman has made for himself so good a reputation as an artist that all ought to avail themselves of this opportunity of seeing his works under such favourable auspices. The exhibition was inaugurated by a smoking concert on Monday evening.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of the Club, January 16, 1889, will be on *Hydroquinone*.

HUDERSFIELD PHOTOGRAPHIC SOCIETY.—January 16, at eight p.m., demonstration by Mr. H. J. Bellsmith, of the Eastman Dry Plate and Film Company.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, January 17, Mr. Friese Greene will read a paper on *Photography by Means of the Eye*, also *The Effects of a Bromide Plate under Pressure and in a Vacuum*.

HASTINGS AND ST. LEONARDS PHOTOGRAPHIC SOCIETY.—Next meeting at the Brassey Institute, January 14. Exhibition by limelight of lantern slides contributed by members. All members are invited to leave their slides with the Hon. Secretaries before the date of the meeting.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1498. Vol. XXXVI.—JANUARY 18, 1889.

THE REACTIONS OF MERCURIAL SALTS ON INTENSIFYING SOLUTIONS.

MERCURIAL intensification has, rightly or wrongly, gained anything but a favourable reputation in connexion with gelatine negatives, owing to the alleged want of permanency of its results; though, on the other hand, there are very many who deny that this character is deserved, or at least that the fault belongs entirely to the method. Very probably the supporters of the latter view are correct, for it is not at all unlikely that, considering the complex reactions that occur between the soluble salts of mercury and other metals and alkalis, mismanagement on the part of the operator is too often the cause of the trouble. It may not be amiss at the present time to briefly summarise the chief reactions that occur in the commonly used intensifying solution of mercuric chloride, especially as a controversy on the subject is now proceeding between two of our contributors.

Mercuric chloride or, as it was formerly called, bichloride of mercury has been applied to photographic purposes from the very earliest days, both as an intensifying agent and also in the production of the once popular and, when well executed, really beautiful "alabastrine" pictures, consisting of a collodion positive on glass bleached to a pearly whiteness by means of a solution of the mercurial salt. This bleaching action—which is not confined to the mercuric chloride, but is shared by the chlorides of other of the dyad metals whose affinity for chlorine is less than that of silver, notably cupric and ferric chlorides—arises from the decomposition of the mercuric chloride by the metallic silver forming the image. In the interchange that takes place, one of the atoms of chlorine of the HgCl_2 becomes dissociated from the latter and goes to the silver image forming AgCl , mercurous chloride or calomel being formed at the same time. The latter salt being insoluble is necessarily precipitated, and either remains in the liquid or is deposited in and upon the film under treatment, probably also taking an important part in the formation of the new image.

The first question that naturally arises in connexion with an image composed chiefly of silver chloride, and containing traces also of mercurous chloride, is its liability to change when exposed to light. Chloride of silver we know in the pure and moist state rapidly darkens and is decomposed when submitted to light, though when perfectly dry it undergoes little, if any, change under similar circumstances. Mercurous chloride, too, the text-books tell us, darkens and becomes grey under the action of light, so that we might fairly predict for the bleached

image but a brief life. In the face of this, however, we have the fact that the alabastrine pictures of a former generation are still in existence in apparently their original state, and failing any record of experiments proving the contrary we may assume such images to be as reasonably permanent as any other in which silver forms a part.

The sensitiveness of chloride of silver to light is destroyed and its darkening prevented by many substances, as is well known, such as nitric acid, chromic acid and the chromates, chlorine, and such of the chlorides as we have mentioned above; but whether the immunity from change possessed by the bleached image depends upon the action of minute traces of mercuric chloride left in contact with it in the film, or whether its permanency is inherently due to its composition, there is no direct evidence to prove. It is most probable, however, that the latter is the case, for we may consider that, as the action of light upon silver chloride sets free chlorine, which in turn would combine with any mercurous chloride contained in the image, converting it to the mercuric state, there is always present as the result of exposure that which will prevent the darkening of the deposit, for it must be borne in mind that the dissociation of the elements commences before any visible colouration of the silver salt takes place.

Another important point, especially when a plain solution of mercuric chloride is employed, is the formation of the mercurous salt. In the old collodion days no trouble arose on this score because of the nature of the material forming the film, but with gelatine the case is altogether different. The absorbent character of the latter, and the powerful manner in which it clings to any insoluble matter that may be formed on it, are well known, and consequently it is of the greatest importance to prevent, as far as possible, any formation in the gelatine film of the insoluble and objectionable mercurous salt. Objectionable in more ways than one, for, while even in its unaltered condition it will deprive the shadows of their transparency and so destroy contact and increase the time occupied in printing, it will produce still worse results when darkened by the application of the final solution used in intensification. Fortunately, a large proportion of the calomel so formed remains suspended in the solution itself, as any one may notice from the turbidity that occurs in use with a plain solution of bichloride; still, a portion of the solution is absorbed into the film before decomposition commences, and the insoluble salt precipitated from this remains *in situ*.

This precipitation is prevented by the addition of a variety of substances to the mercuric chloride solution, *inter alia*,

by hydrochloric acid, or any of the alkaline chlorides, which may therefore be used with advantage in combination with the mercurial salt. As a matter of fact the latter are, and have been from the earliest times, so used, though principally for a different purpose, while hydrochloric acid has been specially recommended for the purpose of preventing the formation of this deposit, either in film or solution. The proverb says that "prevention is better than cure," and in this case it is emphatically so, owing to the tenacity with which gelatine clings to any deposit formed in its pores, otherwise the practice of soaking the film, after bleaching, in a solution of an alkaline chloride or weak hydrochloric acid would equally serve the same purpose.

Bichloride of mercury is a salt that is slowly and sparingly soluble in pure water, but its solubility is both increased and hastened by the addition of any of the alkaline chlorides with which it forms double salts possessing a greater degree of solubility than its own. Mercurous chloride, or calomel, which is practically insoluble in water alone, becomes soluble when the addition of a soluble chloride is made, or, more correctly, it is converted into mercuric chloride, which dissolves. Hydrochloric acid has a similar effect. Thus it will be seen that the addition of a soluble chloride to the mercury solution, originally made for the purpose of increasing the solubility of the bichloride, performs an additional and even more important function in preventing the deposition of insoluble mercurous chloride.

We next come to the action of alkalis upon mercurous and mercuric chloride, these being the agents generally employed as the after applications to produce density in the previously bleached image. This side of the question affects not only the colour and degree of density of the final image, but also the character and extent of the fog or veil produced in the case of carelessness in manipulation or insufficient washing. The behaviour of the fixed alkalis in this respect differs somewhat from that of ammonia, upon both the mercurous and mercuric salts. With calomel, aqueous solutions of the fixed alkalis produce a dense black discolouration, owing to the formation of mercurous oxide, but in the case of ammonia the black substance formed is a compound of chlorine, mercury, and ammonia, known as chloride of mercurous ammonium. The caustic alkalis may, therefore, all be employed as final applications, but the action of the carbonate is not sufficiently definite or uniform to recommend them.

Sulphuretted hydrogen and the alkaline sulphides convert calomel into black mercurous sulphide, which is insoluble in nitric acid and excess of sulphide of ammonium, but soluble in sulphide of potassium. Sulphide of ammonium may, therefore, be used for darkening the image, but the potassium salt, if used in excess, would tend to reduce it. There are many other substances that decompose mercurous chloride, and may be used for darkening the image, but they possess no features to recommend them over those already mentioned.

The aqueous fixed alkali instantly decomposes mercuric chloride with formation of mercuric oxide in the form of a dense orange-yellow precipitate and chloride of the alkaline metal. Aqueous ammonia and ammonium carbonate cause a white precipitate composed of oxide and carbonate respectively of mercurammonium. The carbonates of the fixed alkalis precipitate brown mercuric carbonate. If, however, a salt of ammonia accompany the mercuric chloride in solution, then the fixed alkalis, either in the caustic or carbonated condition, throw down first a white precipitate of the mercurammonium

salts, and, if added in excess, subsequently mercuric oxidized carbonate. Our contributor, Mr. Thomas Bedding, appears to have been speaking of a solution of chloride of mercury with chloride of ammonium as generally used, and not of a plain solution of bichloride, as his article would lead us to suppose. The sulphides form black mercuric sulphide.

With regard to the comparative effects produced in intensification by the different substances employed to darken the image, there is, perhaps, not a great deal of difference, except such as arises from varying degrees of concentration. The oxide of mercurous ammonium formed by the application of aqueous ammonia is, however, said to be unstable under the action of light—with what justice we are not prepared to say—but ammonia remains undoubtedly the favourite application.

The effects produced upon imperfectly washed films will, however, vary very materially from decomposition of the unremoved mercuric chloride. Thus, while ammonia would only throw down a white, or slightly yellow, precipitate of oxide, or carbonate of mercurammonium, producing a sickly yellow veil over the whole negative, the fixed alkalis, either caustic or carbonate, are bound to give a more or less pronounced brown or black colour, and the same may be said of the sulphides. Too many of our readers are familiar with this black veil, which appears sometimes unaccountably. Upon inquiry it will, perhaps, be found it has occurred when the final intensifying agent has been varied from ammonia to one or other of the substances last named.

These remarks may, we trust, serve to explain some hitherto existing discrepancies in many minds, and will, at any rate, direct attention afresh to the absolute necessity for thorough washing in every part of the process of mercury intensification.

"INSTANTANEOUS" EXPOSURES.

ONE frequently sees written on a photograph, or may be told, that it was taken in some extraordinary brief space of time—sometimes the fiftieth, the hundredth, or a still smaller fraction of a second—when even a casual examination, by one understanding the matter, will show that the exposure was of a much longer duration. In some instances a little consideration and calculation would prove, by the extent of the blurring of the image, that the time of exposure must have been, often, as much as ten times that stated. Now the producer of the picture has no intention of deceiving, as he fully imagines that the time stated was really the correct one, inasmuch as his shutter was said by its maker to work in the period mentioned. The manufacturer made the statement in perfect good faith, because the instrument, when it left his hands, was capable of giving fairly accurate exposures, according to the speeds marked on the index. But how long is this accuracy maintained after a shutter is taken into every-day use out of doors?

There are so many disturbing causes which may impair the accuracy in the working of the instrument. Springs, it is well known, will get weaker with use; and this, after a time, will cause a retardation in the speed of the shutter. Working parts will wear away; and this may make the shutter work faster or slower, according to circumstances. Sometimes the pivots or bearings are lubricated with oil; this may corrode, or accumulate dust and dirt, and so produce a slowing action. The shutter itself, or any of its bearings, may become imperceptibly bent; and the friction arising therefrom will produce a marked effect on the rapidity. The more intricate the

mechanism, the more liable is the speed of the shutter to be influenced by extraneous causes.

We recently saw a shutter which had been in use for some time, when the speeds marked on the index were of no value whatever. When it was set for the fifth of a second's exposure the time was fully half a second, and when set for half a second the exposure was quite a second and a half. This was due to one of the sliding metal plates having become very slightly bent; but so trifling was the injury that it had hitherto passed unnoticed. Even the simplest form of drop-shutter is liable to variation. For example, a particle or two of grit in the groove will usually have a decided influence in modifying its speed; and if the moving parts be of wood, a little moisture will, in addition, increase the effect.

Now instantaneous shutters are generally employed under such conditions that it is impossible to avoid their rate being subjected to various disturbing conditions. For instance, when working on the beach spray and moisture from the sea cannot be prevented from reaching the instrument, and if it be of metal it is liable, after a time, to become corroded, or if of wood to become swollen or warped. Again, when the apparatus is worked in a dusty road, or possibly carried on a bicycle, it is impossible to avoid gritty particles from gaining access to the working parts. Hence such an amount of friction may be introduced as will considerably impair its action. However, sufficient has been said to show that, so far as shutters which have been subjected to the ordinary vicissitudes of outdoor work, no actual reliance can be placed on them as regards the real measurement of the time of exposure, notwithstanding that they may have been accurately rated at the time of manufacture.

One point in connexion with shutters may be alluded to here, namely, that they seldom receive at the hands of their employers that care which is essential to retain them in their original working condition. Some of them are really delicate pieces of mechanism; yet they are usually subjected to much rougher usage in handling, working, and in packing, than are most instruments of a similar character. However, the actual measurement of the duration of the exposure, except for scientific purposes, is of little real moment, so long as the shutter secures the effect desired. This brings to our mind another topic.

Is absolute instantaneity, as the term is understood, desirable? For most scientific purposes, or as a photographic achievement, it decidedly is; but pictorially it frequently is not, simply because it may convey an impression precisely the reverse of that intended. Indeed we have seen many examples, where the exposure has been a near approach to instantaneity, that, instead of conveying the idea of life and action, the moving objects appeared to be in a state of absolute immobility.

This subject was well illustrated, many years ago, by the late Mr. Rejlander, who produced two pictures of a girl at a spinning wheel. One showed the effect of an instantaneous exposure, and the other, one of some seconds' duration. The former picture had the spokes of the wheel as well as the foot of the worker sharply defined. The effect was that the wheel and the girl were at perfect rest. The picture which received the longer exposure had, of course, the spokes of the wheel, together with the foot of its worker, very indistinct, but it showed motion and conveyed the best impression of an "instantaneous picture." Here is another illustration. If, say, a bicycle driven at a rapid speed be photographed instan-

aneously, the spokes of the wheels, as well as the feet of the rider, will be perfectly sharp, hence the machine and its rider will seem to be perfectly motionless, as if waiting to be photographed. Such a picture may be a triumph photographically, but it does not convey the idea of reality. The same may be said of a railway train, however fast it might be travelling, if the exposure were sufficiently rapid to secure the spokes of the wheels and the outlines of the engine and carriages perfectly sharp. Such a picture would represent the train as standing perfectly still, as if stopped by a signal, for there would be nothing in the picture to indicate that it was moving.

In the portion of Mr. F. C. Beach's article on *Collodio-Bromide Emulsions*, published in our last issue, we notice that he gives a formula for an albumen substratum. Now this form of preliminary coating is all very well where an acid developer is employed, as in the wet collodion process—though there it is said by many operators to throw the bath out of order—but when alkaline development is used it is scarcely of much value, since the alkali dissolves the albumen, and more thoroughly loosens the collodion film from the glass than if it were left to its own resources with a first grip of the glass surface. That the substratum fails in keeping the film on the plate is proved in this case by the recommendation to edge with indiarubber after drying the film, so that really the albumen only serves the purpose of providing a clean surface for the sensitive material to be spread upon. With a suitable pyroxyline, and this is not difficult to find, nothing more than polishing with powdered talc is at all needful.

YELLOW stains on negatives, making their appearance after a few months, appear to have been troubling some of our readers of late. At the meeting of the London and Provincial Association, reported on another page, this subject has been discussed, and a plan for removing such stains recommended by Mr. A. Cowan. It consists in first bleaching the negative with a solution of perchloride of iron and then applying the ferrous-oxalate developer, by which a black image will be brought out.

OUR New York contemporary, the *Photographic Times*, is issued this year with a new cover of a drab colour, which we like much better than any of its several predecessors. It is to contain weekly illustrations.

At a meeting of the Physical Society of Berlin some of the most remarkable photographic exploits hitherto achieved were recorded. Artillery projectiles in the act of flight, it is known, have been successfully taken, but as to the position of the shot at various portions of its career—that is to say, its vertical and horizontal deviations—nothing has been ascertained and nothing known. It occurred to Professor Treason to make the projectile itself the means of photographically registering the peculiarities of its own motions, and this he did by making a small aperture in its hollow conical end, and placing opposite to this aperture a photographic plate. The gun is then fixed point-blank at the sun, which, shining down through the little hole, sends on to the plate a tiny beam of light, whose direction is altered according as the shot points more or less away from the direct line of flight. The direction of the elongation of the image of the point into a line shows the amount and the direction of the deviation, while a rotary motion is shown by the point assuming the form of a spiral line. Negatives exhibiting these phenomena were shown at the meeting. America thus is proved to possess the largest camera in the world; but it has been reserved for Europe to achieve the feat of taking useful photographs in a pinhole camera travelling at the rate of a mile in a few seconds of time.

A CURIOUS property of iodine has been incidentally shown by a writer in the *Moniteur Scientifique*, namely, the decolourisation of its solution in alcohol by certain essential oils, and its unalterability by

others. Thus, oil of peppermint instantly decolourises the solution; oils of ginger and of juniper in a minute; oils of pepper and cardamon in two minutes; and oil of mace in from three to eight minutes. It was not decolourised at all by oils of coriander, carraway, turpentine, rue, saffron, rose, rosemary, orange, aniseed, fennel, angelica, or wormwood.

THE condition of the surface of the glass is a factor which is taken little account of in estimating the relative rapidities of lenses; but that it is by no means a negligible quantity, is shown by a paper by Sir John Conroy recently read before the Royal Society. He says it seems probable that the amount of light reflected by freshly polished glass varies with the way in which it was polished, and that it is sometimes more and sometimes less than that indicated by a certain theory. The amount of light transmitted is of course complementary to that reflected. Sir John Conroy says that the surface of polished flint glass seems to alter somewhat readily, the amount of the reflected light decreasing, and the amount of transmitted increasing, whilst with crown glass the change, if any, proceeds very slowly. He further cannot find any evidence as to the particular cause to which the changes are due.

THIS report, however, will be another timely reminder to every photographer of the necessity that exists for taking great care of the lenses he employs. They should always be protected from atmospheric circulation when not in use, as practically all bodies receive a deposit from the atmosphere when it freely circulates about them, no matter in what position their surfaces may be placed, and the repeated removal of this deposit by even the most gentle friction must eventually interfere with the integrity of the original polished surface, quite apart from any action such as Sir John Conroy describes. How often has not the thoughtful photographer been horrified to see a careless operator bring out from his waistcoat, or, mayhap, his coat-tails, the several members of his battery and lenses, and at once set to work to photograph after a preliminary rub with his handkerchief. Lenses so treated are bound to suffer eventually, when even such mild treatment as that whose repetition we have just deprecated may be fairly expected to result in injury.

THE *Chemical News* lately contained a very interesting extract from the *Contributions from the Jefferson Physical Laboratory*, by Mr. J. C. B. Burbank, in regard to the photographing of the invisible rays beyond the red of the solar spectrum by means of stained plates. He says, "The direct action of absorbents in the infra red has not hitherto been tried with any success; moreover, it has been stated by so eminent an authority as Captain Abney that it was impossible to make plates sensitive to any rays below the A of the solar spectrum by means of the addition of dyes to a film. It is true, however, that Major Waterhouse has succeeded by means of turmeric in obtaining evidence of the existence of a few lines on the less refrangible side of A; but in all cases except one they were reversed." Mr. Burbank, substantially following Mr. J. B. B. Wellington's plan, and using the very vague preparation termed cyanine with his plates, and working with Rowland diffraction gratings, found no difficulty in photographing from the A line to wave length 9000, or to the limit assigned by Captain Abney as the limit of the diffraction spectrum, none of the lines being reversed. There are cyanines and cyanines, and the achievements which were impossible at one time with then existing dyes, may be comparatively easy by the new materials offered by the march of invention; but, quite apart from any previous ideas on the subject, further interesting light is by this article thrown on the important topic of orthochromatic plates.

HOW I MADE AN ENLARGING ILLUMINANT.

I WAS much interested in the series of leading articles on *Enlarging for Amateurs* in last year's volume, especially in the so-called "makeshifts," which, if carefully and well constructed, are frequently deserving of a far better name, and actually remain for years as permanent adjuncts of the studio or laboratory. Such a "makeshift" I have had in use now for a considerable time—three or four

years—as occasion requires, in the form of a lamp or illuminant, for enlarging by artificial light; and as when not required for enlarging purposes it fulfils other, its legitimate functions, and is ready at the shortest notice for its newer duties. It may be at the same time described as a "makeshift" and an established institution.

Until the introduction of gelatine-bromide paper for enlarging purposes so greatly reduced the exposure, daylight was practically the only light by which ordinary photographers, especially amateurs, could enlarge; indeed, for the latter class enlarging may be said to have been really a closed pursuit. How different at the present day, when every exhibition teems with amateur enlargements, some, too, of the very highest quality. The increase of rapidity rendered possible the use of different forms of artificial light that were hitherto out of the question; and I well remember the surprise felt and expressed by others as well as myself, when, at a demonstration of enlarging at an hotel in the Strand, the work was performed by an ordinary paraffin lamp enclosed in a box glazed with ground glass. This was some eight or nine years ago I think, but who would nowadays wonder at such a performance.

Of course a proper enlarging lantern is the thing, but it is not every amateur who cares to go to that expense, while the ordinary optical lantern has but a limited application for purposes of enlarging, vignettes from quarter-plate negatives being about all it will effect. Daylight is much used by others as well as myself, but there are, of course, times when it is requisite to work at night, and then some method of evenly lighting the negative becomes a *sine quâ non*. Now this is a very easy, simple, and not a costly matter, but how few amateurs in comparison to the vast number there now are ever buckle-to and undertake the task. Many, it is true, are not amateur mechanics, and cannot rig up the necessary contrivance for themselves, even if they know what they want, which many do not. Others, again, have little spare space to cumber with additional apparatus, and amongst these I may reckon myself, and consequently they either deny themselves altogether the luxury of enlarging, or confine themselves solely to daylight, as I formerly did until I devised my "makeshift," which answers the purpose—that is the main thing—without necessitating any joinering operations, or occupying any additional room when not in use. It is true it is not in every amateur's household that the necessary material is found ready to hand, but where it is found that in procuring it it will fill two useful purposes at a small cost, the expense will frequently not stand in the way.

I may explain that my enlarging arrangement for daylight use consists of a long-bodied camera, carrying the negative at one end and the sensitive paper at the other, the lens occupying a variable position in the interior, the whole being adjustable for use either in the horizontal or in an inclined position, and it can be moved about the room in which I use it. I am thus fortunately placed in being able to use the same apparatus for daylight as for artificial light; for the latter purpose only requiring what I call the "illuminant," as being a better term than lamp or lantern. But with very slight alteration my arrangement of light can be adapted for use where the sensitive paper is not enclosed in a camera, but worked in the open room. The necessary modification I shall speak of later.

The basis of my "illuminant" consists of a Ripingille's portable heating and cooking stove of the upright square form, burning paraffin oil, with a wick about four and a half inches wide. Similar stoves are sent out by other makers, notably Wright and Butler, but the particular form or make is not of much importance, provided it fulfils the necessary requirements of having a broad wick enclosed in a metal casing with a glazed front aperture. Mine consists of an upright pedestal, square in plan, standing about twenty inches high, enclosing the lamp and reflector, and had originally a ruby glass front, calculated, I presume, to give it a warm and cheerful appearance when employed for heating purposes. The whole costs, I know, something under a sovereign, but exactly how much I forget, and is capable of comfortably warming a moderate sized room for a whole day with one filling of the reservoir, so that it is not a useless addition to the house if not often required for enlarging.

To adapt it for the latter purpose I first of all exchanged the ruby glass strips forming the front for similar sized pieces of plain glass. This glazing is absolutely necessary for the proper combustion of the

stove, as it completes the "chimney;" if the front be left open the lamp smokes badly and gives very little light. This glass is set back some inches into the body of the pedestal and close to the flame, so in front of that again, in the well-like opening, I fit a frame carrying a sheet of ground glass, or, better still, of oiled tissue paper, to diffuse the light. If the stove, so modified, be lit up in a dark room it will, however, be found to shed an abundant supply of light over the place, even when the front is covered up, owing to the rays that escape through the ventilating apertures. This matters very little, if at all, to me as I work, but for convenience' sake I place the stove in an empty case, *minus* the lid, the opening forming the front, and I find no difficulty about ventilation, as the open front sufficiently provides for that.

In the case of working in an open room the escaping light even from the front would prove fatal, but I would add to the arrangement in the following way; in fact I have long meditated doing so in my own case:—Pierce in the top and bottom of the back of the outer case several holes to supply ingress and exit for ventilation, and "trap" them with a piece of brown paper, dark cloth, or other material to shut off all light. Fit a door to the front having a square central aperture, with a ledge or support upon which to rest the negative; the front then becomes the negative holder at the same time that it shuts in all light, except what passes through the negative. If it be fitted with guides or runners after the manner of the sliding front of a camera, so much the better, for the negative can then be easily and quickly adjusted in position.

The affair is now complete, and all that remains is to gain a little practical experience in the best positions of diffusing screen, flame, and negative to secure the best and most even illumination. The reflection of the broad flame from the corrugated reflector and other portions of the polished metallic interior of the stove or lantern throw a beautifully even light on the diffusing screen, which suffices to light a half-plate or $7\frac{1}{2} \times 5$ negative. I am well aware that the illumination thus obtained is not of the highest class as regards rapidity, but it is certainly very good indeed for a "makeshift," and has satisfied me for some time. When operating on a dense negative I find I can gain a little more light for a short time by turning up the wick until the flame just smokes a little, but it soon burns down again to its normal light. The brief increase, however, is often useful.

ERNEST GRAHAM.

ECHOES.

I NEED scarcely refer further to the case of Pollard *versus* The Photographic Company than to express my satisfaction to find in last week's issue that more than one correspondent takes the same view as myself. With regard to Mr. J. Hubert's assertion that my "argument is as poor a one as could be advanced," because "the principal aim of such a society should be to convert" an uncertain law into a definite one, I can only say that if the society commenced by, or made a practice of, what another correspondent describes as "defending and justifying a wrong," I don't think it would gain sufficient support to enable it to do anything, let alone reform the law of the country. Its aim "should &c." Quite so. "I can call spirits from the vasty deep." "Yes, but will they come?"

My thanks are due to Mr. Bedding for pointing out my "stumble" in the attempt to pick him up. It is too often the fashion to blame such things on to the printer or "reader," but I do not consider that fair to either, and in the case of the latter, if he is to "query" every apparent slip in the copy that passes him, it assumes the possession of a general intelligence which few printing offices can boast of in their collective staff, much less in an individual. I therefore elect to set it down to carelessness on my own part.

In speaking of the "frequent" use of potassium chloride also, I may confess that perhaps my language "lacks the perspicacity that might upon reconsideration have been imparted to it," because if I had written "an alkaline chloride" instead of "potassium chloride" I should have expressed precisely what I meant. Ammonium chloride is no doubt generally employed, and is perhaps the best for the purpose; I myself most "frequently" use sodium chloride for no other reason than that it is usually the most convenient, and for the same reason, at the time, I have also used the potassium salt, but do not attach the

faintest importance, so far as intensification is concerned, to the base employed. The alkaline chloride is added simply to increase the solubility of the corrosive sublimate, for which purpose the ammonium is the most suitable. Whether any formula including potassium chloride has ever been published or not—and I think such a one is to be found—I shall not quarrel with Mr. Bedding on the originality of his discovery, but I cannot afford the time to wade through back literature to satisfy him. I may, however, offer a suggestion accounting for the absence of such a formula from both the publications he mentions; it is that probably neither the author of the one nor the numerous contributors to the other attach any more importance to the matter than I do.

But as Mr. Bedding invited, or rather "recommended," me to try his method, I thought it only fair to do so, and accordingly proceeded to republish his instructions. These I found ambiguous in the extreme; the strength of the solutions of mercuric chloride and potassium hydrate are definite enough, but how much of the latter to add puzzled me. It is to be added slowly in sufficient quantity to cause "turbidity," and "stopped the instant precipitation occurs," but above all an *excess* is to be avoided, as it would "ensure the formation of the yellow precipitate of mercuric oxide." Now I want to know how far "turbidity" may proceed before it becomes "a precipitate," and, further, I should like to be informed what constitutes an "excess," when, so far as I am aware, it is impossible to add caustic potash to mercuric chloride *without* precipitating the oxide? Then again, though the quantity of potash to be used is left beautifully vague, the absolute quantity of hydrochloric acid to be added to a given volume of a solution of variable contents is stated with mathematical exactitude, though, unfortunately, the value of this accuracy is somewhat lessened by the omission of all mention of the strength of the acid.

Now one of two things struck me as being absolutely necessary, either that the mercurial solution in Mr. Bedding's formula must be extremely acid and contain very little potassium, or else that it must contain very little mercury, for I found by calculation that to neutralise half a drachm of hydrochloric acid of the strength usually employed in photography about fifteen grains of potassium hydrate would be required, and that therefore each ounce of Mr. Bedding's "mercury-potassium solution" would contain three-quarters of an ounce of twenty-grain solution of potash, and a quarter of an ounce of the original twenty-grain solution of bichloride of mercury. A five-grain solution of mercuric chloride does not seem to me calculated to produce the accelerated bleaching action Mr. Bedding leads us to expect!

However, I went on to make the actual trial in order to test, as suggested, the comparative time occupied by the two methods. In one bottle a plain solution of chloride of mercury was made, in a second a solution of potassium hydrate, both of the strength given, while in a third twenty grains each of chloride of mercury and chloride of potassium to each ounce of water were placed, and the three were shaken up at regular intervals, each receiving the same amount of attention. I may say that the compound solution was complete in a little more than half the time occupied by the plain solution of bichloride, the former being *finished*, therefore, in half the time required for the *first stage* of Mr. Bedding's plan. That gentleman in moralising over the "stated solubility of many substances at, say, sixty degrees," &c., appears to have overlooked the fact that the potassium hydrate as well as the chloride has to be dissolved before it can be used; and that in making the mercurial solution in his way the bichloride *must* be dissolved *separately*, and, as a consequence, takes far longer. So much for the alleged advantage of celebrity; I need not say anything about the time that must be occupied in "dosing" the mercury with potash. But when, after dissolving the plain bichloride, I proceeded to add the potassium hydrate, I regret to say I got no turbidity—at least in the sense I anticipated from the description—nor even a "rapid formation of a white precipitate," as I was also led to suppose; but instead an *instantaneous* formation of the oxide of mercury as I had fully expected. This occurred with the first drop of potash solution, and certainly caused turbidity, but of the character, Mr. Bedding tells us, that is produced by the use of excess of potash; so that while anxiously awaiting further explanations, I must say that present evidence decidedly *contra* indicates the use of potassium hydrate in

the manner recommended since a single minim proves to be an "excess." The hydrochloric acid might just as well be used alone, but even then the brightness of the solution cannot be more perfect than in the mixture of the chlorides of mercury and potassium.

I am afraid it will be considered presumption on my part to venture to dissent from an editorial statement, but I must say I differ in my opinion from that expressed in the leading article on *Defects in Sensitized Paper* with regard to a certain photographer who "was never tired of inculcating the necessity of cleanliness of manipulation," &c., and who, the writer proceeds to state, he "knows" also practices what he preaches. The gentleman who leaves his freshly sensitized paper lying about on a table covered with old, and only "apparently" clean, newspaper with disastrous results scarcely, to my mind, deserves the unlimited confidence thus reposed in him. "Who generally practiced what he preached" would have been better, for in all ranks of life it remains true that *nemo mortalium omnibus horis sapit*.

Two valuable and suggestive articles on printing subjects have appeared from the pen of the veteran E. Dunmore—I use the term veteran not because he is "on in years," for I believe he is not, but on account of the length of time I have known his name as a contributor to THE BRITISH JOURNAL OF PHOTOGRAPHY. One point in his first article I do not remember ever previously to have seen emphasized, though glancing back mentally I cannot help thinking it is quite in accord with experience. I allude to the difference in the effect stated to produce by a *transparent* and a merely translucent yellow screen. It is difficult to explain why the clear glass should produce a better result in modifying an insufficiently dense negative, but that it is so in some cases at least I am certain. I had to produce a number of prints, some vignetted, from a portrait negative of such extreme thinness that it almost mastered me until I tried interposing a screen of glass coated with pale aurine varnish. The improvement was marvellous, at least with the "printed-out" proofs, but when I came to the vignettes, in the production of which an additional tissue paper screen was used, the effect obtained was, perhaps, worse than without the coloured glass, and the length of time taken in printing simply atrocious.

Without the colour a translucent screen does, in my opinion, operate favourably in modifying a thin negative, though this is denied by many operators or printers of experience, but it is certainly difficult to reconcile this result, if any view be correct, with that obtained in the case of the coloured screen. Mr. Dunmore's remarks also upon the effect exercised by coloured glass upon the tone of the print are also worth noting in connexion with the subject of pyro-stained negatives—the only evil effects being usually attributed to a stained film, an increased time in printing, and perhaps a "flattening" of the picture, or destruction of its brilliancy. But there can be no doubt the result reaches further, and probably more of the unsatisfactory prints one meets with nowadays owe that quality to the presence of pyro stain in the negative than to any other cause short of downright out-and-out bad manipulation.

Some years ago there was published, I think, in this JOURNAL—I do not remember the date precisely, but it was about twelve or thirteen years ago—a translation from a foreign journal of the account of some researches on the effect of coloured screens upon the tone of the resulting print. Captain Abney more recently has alluded somewhere to the same subject, which is one that would be well worth thorough investigation at the present time. Or, if not scientifically proved, it would be well if not printers only, but the operators who make the negatives, would bear in mind that the colour of the shadows of a negative, as well as the density of its gradations, exercise an influence in the final tone of the print that no modification of the gold bath will altogether overcome. Every one of the readers of this JOURNAL must have met with negatives from which it was almost impossible to make a bad print—so far as colour is concerned—and also with others which were equally incapable of rendering anything that could be coaxed or coerced into decent tone. Most frequently these are thin, feeble images which will not bear sufficient exposure to give a respectable deposit of silver in the shadows of the positive; but not infrequently they are of the class described by Mr. Dunmore as "yellow and slightly fogged," though all right as regards density.

The article by the same author on *Vignetting* in last number is also

worth reading, especially his remarks on vignetting landscapes, a practice that finds far too little favour, chiefly, I dare say, on account of its surrounding difficulties. With a *suitable* negative nothing is easier; indeed, it is then easier than the majority of portrait negatives; but, unfortunately, very few good landscape subjects will bear vignetting without a good deal of judicious "dodging." Still, the result, if the subject be a really suitable one, will well repay the trouble, and I think that vignette landscape would form a comparatively new field to be worked by artistic amateurs who have the taste, skill, and, above all, the time to devote to it.

By the way, while on the subject of vignetting, how unsatisfactory, as a rule, is the graduation of vignetted enlargements, especially those made by amateurs! I do not at all refer to the productions of some of the best professional enlargers, for these are difficult to improve upon; but even among the "pros" perfection is by no means general. This is not to be wondered at when the rough-and-ready method of vignetting is taken into account. Who will improve the method or let out, at least, part of the secret of how it may be done? Such a communication would be a valuable help to modern artistic work, especially among amateurs. JUNIUS.

THE COMMERCIAL ASPECT OF THE FLASH LIGHT.

[A Communication to the Glasgow Photographic Society.]

DOUBTLESS there are among you a goodly number who were present at the meeting of our Association which was held in these rooms rather over twelve months ago, and when I for the first time had the honour of bringing before the notice of the members of this Association, and, through them, to the great army of professional and amateur photographers of the rest of the world, the marvellous actinic power of light to be derived by simply blowing a few grains of magnesium powder, by the aid of an ordinary wash bottle, into a flame of common hydrogen or house gas.

No sooner had we, as an Association, considered this subject, and discussed the utility, for photographic purposes, of the extraordinary flash of light so derived, then nearly every Association throughout the length and breadth of the land followed in our footsteps and gave similar demonstrations.

Enterprising tradesmen also soon came upon the *tapis*, and before long offered to the public what has now come to be known as flash lamps for photographic purposes.

Into the many forms of these lamps or the various means employed to produce a flash of light of sufficient intensity to yield a fully exposed negative I do not, on the present occasion, think it necessary to inquire, for doubtless nearly all of you must be acquainted more or less with the different forms of these lamps as now advertised by so many makers.

They all, however, start from the point which we, as an Association, were the first to discuss, viz., the blowing of the magnesium powder into some flame or other, and so produce a flash of intense actinic light. In several instances I notice that attempts have been made to claim patent rights for such lamps, and quite recently I read in the columns of a photographic paper that a certain maker had actually prohibited others from employing an Argand burner for the purpose of yielding this light.

All I can say is, before I brought the public acquainted with the magnesium flash light I had experimented with an Argand burner, and gave over using it because I knew of a better means of getting the flash. But, gentlemen, those of you who are familiar with the flash light must be aware that at the outset, when we discussed and gave demonstrations at our last meeting, that we had to contend with a good many little difficulties and drawbacks which it was necessary to remove before it could *honestly* be said that such a means of gaining exposures was perfected. Some of these difficulties and drawbacks I promised at the time to endeavour to overcome, and to-night, along with our worthy treasurer, Mr. Bell, I mean to show you that such has really been accomplished, and that in such a manner as to make the flash light without doubt a commercial success.

When I say this I wish it to be distinctly understood that I do not include some of the ridiculous toys which the public have had placed before them during the year that has just passed away.

To my mind, if the flash light is to become of any practical value in the studio such must be lifted out of the category of an artificial toy, and made of such a character that exposures can comfortably be made with unerring precision in any studio.

In working out some ideas which struck me early last year I thought myself of what I once had the pleasure of witnessing in the

way of taking portraits on a very numerous scale by means of artificial light. I refer to the marvellous success which attended the efforts of the late Horatio Paterson, to whom was allotted the contract for photographing those who attended the last two calico balls which were held in Glasgow, and when I tell you that for several hours on end a constant stream of ladies and gentlemen eagerly pressed forward to have their portraits taken in all sorts of fancy costumes at St. Andrew's Hall (where Mr. Paterson had rigged up two studios in one of the ante rooms), and that on the occasion of the first ball somewhere approaching three hundred negatives were taken by artificial light, nearly every one of which were satisfactory to a very high degree, it struck me, when recently bringing to mind the *modus operandi* which Mr. Paterson employed on that occasion, that it would be a step in advance were I to work on similar lines with the flash light.

Into details of the manner in which Mr. Paterson had constructed his elegant little studios I do not think it necessary at this stage to refer further than merely remarking that he used as an illuminating compound a very dangerous mixture of chlorate of potash with other substances, and that the half tones in his picture were got largely by a clever arrangement of gas jets running round the entire room just somewhat resembling the footlights and wings of a theatre, the light from which was quite ample to allow of his focussing and posing properly previous to igniting the mixture in the lamp.

But some of you may say, "How is it, if Mr. Paterson was so successful on that occasion, that you do not now continue to advocate the use of the same means for securing pictures?" Such a question I grant would be a very natural one, and I shall at once answer it by saying, unfortunately for Mr. Paterson the highly explosive nature of the mixture which he used on the first occasion led to what might have proved a most serious catastrophe. As it was, the premises actually did take fire and the brigade had to be summoned. Luckily the mishap happened at the far end of the hall, when a large proportion of those who took part in it had left, and before the arrival of the brigade the efforts of those present was successful in overcoming the flames.

So much for the use of such a highly dangerous compound as was then and is still in use by some who make a speciality of artificial light.

Although I should never think of recommending any one to use this mixture, still, when recently considering this subject, I was forcibly struck with the simplicity of the lamp in which Mr. Paterson burned the compound. Such a lamp, gentlemen, you will see present to-night, and so, when Mr. Bell and I came to discuss the best form of lamp to experiment with, I unhesitatingly recommended him to try this one, and as luck had it we had not far to look for the same, for, hidden away in Mr. Bell's back premises we found the very thing we wanted, and which was doing duty as a cupboard in a dark room. It was not long before Mr. Bell caused it to be brought forth and done up with a little fresh paint, and now it looks quite a royal piece of apparatus.

So much for the past history of the flash light. I shall now proceed to explain to you a few of the experiments which Mr. Bell and myself have made.

I dare say most of you will remember that when I gave my first demonstration on this subject I used, in conjunction with the magnesium powder, a nice little lamp, which was actuated by clockwork, and burned magnesium ribbon. My reason for this was the necessity of having a penetrating light to get the sitter properly focussed; this little lamp did its work well, and answered the purpose for which it was intended admirably, but it gave off too much smoke, and was somewhat expensive.

Now Mr. Bell entered fully into the necessity of being able to comfortably pose and focus his sitters, and to him is due the credit of bringing in the aid of the limelight for this purpose. As an Association we are much indebted to him also for the untiring patience he has displayed in his studio in helping, with me, to bring this light to the state of perfection which you will see to-night. Not only has his studio been placed at my disposal, but he has spared no pains and expense in making our experiments a complete success. From the fact Mr. Bell and myself were singularly at one on the necessity of having some certain and reliable means of getting a sufficiently strong light to enable the sitter being comfortably posed and focussed, without such the enormous power of the flash light would be simply useless, for what would be the use of making exposures upon which no reliance could be placed for sharpness? We also claim further advantages by utilising the limelight in conjunction with the burning of magnesium powder.

In the course of the experiments which we made, we found that our exposures, when made with the hydrogen gas flame alone, did

not yield the same plucky results as when the limelight was being played on the sitter along with the flash. I account for this in the following way:—The flash light, when used in a certain manner, undoubtedly yields a broad diffused light, and seems to lighten up every nook and cranny of the room in which it is burned. Now we all know that in portraiture it is best to employ not only a good diffused light, but also at times a good strong side light, so as to bring up the high lights in contrast to the shadows and half tones of the face. In several of the experiments we made we noticed this result in a marked manner, and Mr. Bell will tell you that he has come to a strong belief that the best results can only be obtained when the two lights are burned in conjunction.

I know it may be argued that much could be done by allowing the flash light to fall on the sitter from a certain direction, so as it were to cast shadows on the face from the high points of the same, it must, however, be borne in mind that such a way of working would entail much more trouble in the studio; and I am also aware that there are those who, on theoretical principles, will argue and maintain that this verging of the lesser light of the lime jet into that of the more powerful one yielded by the magnesium powder in a sense completely overpowers the former, and therefore causes the same to be of no benefit further than yielding a general light of greater intensity. This may appear sound reasoning, but in the experiments which Mr. Bell and I made we formed a very strong opinion that a decided benefit was obtained when using them in conjunction. True, for a second or two previous to the flash the lens was opened on the sitter when only the limelight illuminated him, and this may have had some effect in assisting the high lights. The difference was, however, decidedly noticeable in the negatives we produced.

Be this as it may, undoubtedly the limelight answers most admirably for focussing with, and at the same time I believe helps considerably to bring up the high lights in the picture.

In the experiments which we made we used an ordinary blow-through, or as some choose to call it, safety jet, but with this marked difference, that immediately beside the nozzles of the jets we had an auxiliary jet of hydrogen gas, the flame from which was of the ordinary household type. This can be turned up or down just like an ordinary gas bracket, and it is into this hydrogen flame, along with the face of the lime, that we inject the magnesium powder by means of the wash bottle.

To Mr. Bell is due the credit of suggesting the addition of this extra hydrogen jet. In the course of our experiments we noticed also that such an arrangement seemed to yield far less smoke than when using a hydrogen flame alone, and that a very much better light is obtained when the lime is dusted and freed from any magnesia that may attach itself from a previous exposure. Mr. Bell considers this cleaning of the lime a very important point. Over the face of the lamp you will observe we have placed an arrangement which acts as a curtain, but in such a way that the same can be raised or lowered in such a manner as to throw more light on the drapery of the sitter if desired than on the face. The dimensions of the lamp are 34 x 30 x 12 inches, and to shield the eyes of the operator when blowing the powder into the hydrogen flame we have intervened a sheet of blue glass which allows him to see nicely how to direct the nozzle of the wash bottle and so work in comfort.

Later on, gentlemen, you will be invited to inspect the arrangements of the jets and the lamp, which is simplicity itself, and which could be made out of any old box with the greatest of ease.

Such, I think, lifts the flash light out of the category of a drawing-room or amateurist toy, and in the hands of any average operator in the studio is certain to yield regular and uniform results.

With regard to the other accessories which we used, these were just those in every-day use in Mr. Bell's studio.

To overcome the shadows the sitter must be so placed in position that the light does not throw the same on to the background. This is easily arranged for by slanting the background so as just to escape the shadow. We used an ordinary white sheet for a reflector thrown over and stretched on a three-panelled screen.

We had no smoke. This was got rid of by leading a funnel from the top of the lamp to a few inches under a little window in the roof of the studio. The construction of the lamp, you will observe, is such as provides ample ventilation for blowing the smoke out at the top.

We had not a particle of dust, what little there was never left the inside of the lamp.

We had no doors in the lamp to open for the insertion of the wash bottle, this was arranged for by only glazing the side of the lamp less than half way down, the bottom portion being quite open at all times.

Now just a word to those who may be unacquainted with the working of the limelight, and who, from what they may have read in the past, have formed some opinion that such is not a safe light

to work with. Without detaining you, gentlemen, with any long remarks on this point, I would just briefly state that, in my opinion, much of the prejudice which has existed against the use of this light, on account of some real or fancied danger, has arisen from some of the original drawbacks, such as the idea that the gases are used in a mixed condition. Such old-fashioned ways of working were discarded long ago, and with the blow-through jet it is impossible that such can occur. Then, again, the old-fashioned gas bags, with their heavy weights and pressure boards, and which took up so much room, are also things of the past, and in their place is used bottles with regulators which make the limelight simplicity itself, at the same time removing any little chances of danger which might previously have arisen. I consider there is far more danger to be apprehended from a common oil lamp than from a limelight jet at any time.

Then as to the expense of working the same. With gas, as it is now supplied in compressed bottles, either hydrogen or oxygen can always be kept in stock in any part of the country, and a few shillings will be ample to cover the cost of burning the jet continuously for an hour or so every night during the week, when not required the gas can be turned off.

Another important advantage which attaches itself to the use of gas bottles in place of bags, is the possibility of so erecting the lamp and gas cylinders upon the same stand, and when such is furnished with castors like an ordinary camera stand, the same can, with the greatest of ease, be moved about in the studio, such being impossible in the case of gas bags, or when the hydrogen is supplied from a gas bracket by means of a lengthy rubber tube.

With regard to the smoke, which it is necessary to provide for, at a very little cost a few yards of common wire can easily be made into the form of a spiral spring; and when the same is covered over with any suitable material, such as cloth or stiff paper, an extemporised funnel is the result, and one which will do all that is necessary to lead the smoke to some aperture in the roof of a studio, or the top of a window in an ordinary room. We have such an home-made article here to-night for your inspection.

I would just say, gentlemen, that Mr. Bell and myself will be very pleased indeed to learn of any lady or gentleman who are specially desirous of sitting for their portrait to-night. It is our intention on this occasion to confine ourselves to bust pictures, taking inch heads with the view of afterwards vignetting same.

We are much indebted to Mr. Mason for assisting us in furnishing our little studio to-night. He has, as formerly, kindly placed at our disposal all that we required in the way of background, &c.

So much, gentlemen, for what we hope to demonstrate to you to-night. As to the utility of the flash light, in my opinion, in the hands of a competent operator, it is capable of yielding most excellent results, far and away better than some who have a deep-rooted prejudice against artificial lighting are aware of. We all know that occasions will crop up—such as fancy dress parties, large dinners, balls, &c.—where, unless some means can be devised of taking the pictures of those present on the spur of the moment, as the saying goes, the opportunity is lost, and no photographing ever takes place. But when any one can arrange for a room to set up such a little studio as you see to-night, there need be no difficulty on the part of a professional undertaking to work at such times and places as I have stated.

T. N. ARMSTRONG.

COLLODIO-BROMIDE EMULSION.*

There are, doubtless, many amateurs who never saw a plate coated with collodion; it is very easy when you know how, but there is a slight knack or calculation about it that has to be acquired. Mr. Dunsterville thus clearly describes the process:—"After securely fixing a pneumatic holder to the back of the plate, dust the top surface with a flat camel's hair brush, and pour on the centre of the plate a pool of emulsion that will cover about one fourth of the whole area; now tilt the plate slightly so that the emulsion will run to the right-hand far corner, then to the left-hand far corner, then to the left-hand near corner, and finally pour off the surplus by the right-hand near corner into the filter; the plate should then be raised to an almost vertical position and rocked vigorously to and fro, to prevent marking or lines; when the emulsion is apparently set and no more drops from the plate, it may be put in a grooved rack to dry spontaneously, or laid upon a flat surface and dried by gentle heat, say 150° Fahr.

Mr. Brooks states that care should be taken to remove any hard particles from the neck of the bottle before coating, and that the plates should be placed an inch and a half apart on the drying rack, which may be set in any suitable cupboard. If they are set closer they will not dry evenly. The plates will dry ordinarily in about two hours.

Coming to the matter of exposure, we find a great difference between

* Continued from page 20.

these plates and the regular gelatine lantern plates; I should say they were from ten to twenty times slower, as, for example, in reducing by the camera. I used a Bausch & Lomb universal lens with nearly full aperture, and gave an exposure of six minutes at 3 p.m. with a fairly dense negative backed by a clear sky. In developing I found the plate was very much under exposed. I then made another exposure of twelve minutes on the same negative, the latter being illuminated by sunlight at 10 a.m., and obtained a fair slide, which, though I used a very weak developer, came out rapidly. In fact, it was considerably over exposed. Probably six minutes in sunlight, and perhaps four, would have been enough.

I would have given about a minute's exposure on the same negative, using the same lens stopped down to $\frac{1}{4}$ upon an ordinary lantern slide gelatine plate. Mr. Brooks advises an exposure in the camera from one to ten minutes or more, using a quarter-plate portrait lens of short focus at nearly full aperture. A long, full exposure gives warm tones, which can be changed to other colours by toning baths, but a short exposure gives cold tones, which cannot be altered by subsequent treatment. In the tropics, where the light is stronger, Mr. Dunsterville reduces a $6\frac{1}{2} \times 4\frac{1}{2}$ negative to $3\frac{1}{2}$ inches square, using a Ross' rapid symmetrical lens at full aperture, and a clear sky as background, at an exposure varying from two to six minutes. This emulsion is therefore better adapted for printing slides by contact than for reducing, though the latter can be done easily enough if one has the time to spare. In contact work the exposure varies from one to six seconds to diffused daylight; or from two to four minutes one foot away from a six-foot fish-tail gas jet; or the burning, about eighteen inches from the printing frame, of one inch in length of ordinary magnesium ribbon held in a pair of pliers. During the exposure the magnesium must be moved around in front of the frame to ensure even illumination of every portion of the negative. I tried the experiment of burning eighteen inches of magnesium in front of the negative. When I removed the plate, to my surprise a faint image of the picture was imprinted on it, which I successfully developed out by weakening the developer. Mr. Murray tells me he has brought such an image out by simply flowing the plate with the ordinary pyro solution. Sufficient ammonia was liberated from the plate to accelerate the action of the pyro.

Too much care cannot be exercised in handling these plates, as the surface is much more delicate than the gelatine plate. The negative must be carefully dusted with a flat camel's hair brush, and then the plate must be laid directly on the negative in the printing frame, taking care that while fastening the springs no sliding or rubbing action takes place. The springs may be considerably lighter than is usual. The least movement of the plate over the surface of the negative is apt to cause scratches.

The developer advocated as the best is alkaline pyro. According to Mr. Brooks it is prepared as follows:—

SOLUTION P.	
Pyrogallie acid	96 grains.
Absolute alcohol.....	1 ounce.

SOLUTION A.	
Saturated solution of carbonate ammonia	4 ounces.
Potassium bromide	1 drachm.
Soda acetate	2 drachms.
Water	12 ounces.

The carbonate of ammonia for the solution should be fresh and hard, and smell strongly of ammonia, otherwise it is of no account.

Four ounces of the salt are broken up and put in a twenty-four-ounce bottle, and eighteen ounces of cold water poured on it. The bottle is well corked, preferably with a rubber cork, and is then vigorously shaken. In twelve hours the water should be found to be completely saturated with ammonia and in a prime condition, and if kept in a dark place will last for several weeks.

On mixing the developer take of—

Solution A.....	3 drachms.
Solution P.....	5 to 10 drops.

It will be noticed that solution P has a strength of twelve grains of pyro to the drachm, so that ten drops (equivalent to ten minims), would represent two grains of pyro. The amount of solution P is very important; if the negative is very intense two or three drops will be found ample, and will give harmony, but the development will be somewhat slow; in extreme cases the developer may be diluted to twice or thrice its bulk with water. With an ordinary negative the full amount of solution P may be used. A glass dish is best to develop in, so Mr. Brooks advises; but I find it very easy to develop by holding the plate at one corner or by a pneumatic holder or manipulator, and ponring on and off the developer, having a tray underneath to catch any that may spill over. After exposure, pour over the plate from a bottle common alcohol three parts, water one part, and allow it to soak on the film for about half a minute, then immerse in a tray of clean water to soak out the alcohol; when the water blends with the film, pour off and apply the developer as previously stated. If properly exposed the image soon makes its appearance, and gradually but surely gains in intensity.

Mr. Dunsterville uses the same pyro solution, but substitutes for Mr. Brooks's alkaline, or A solution, the following, calling it No. 2 solution:—

No. 2.

Carbonate of ammonia	60 grains.
Potassium bromide	5 "
Acetate of soda	10 "
Distilled water	3 ounces.

Or instead of these the following:—

1A.

Pyrogallie acid	1 ounce.
Sulphite of soda	4 ounces.
Distilled water	9 "

Make faintly acid with citric acid.

2A.

Liquor ammonia	1 ounce.
Potassium bromide	2 ounces.
Distilled water	9 "

To make the developer he takes of—

Solution P	15 minims.
Carbonate ammonia solution	2 drachms.
Water	2 "

Or instead—

1A	40 minims.
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Equal to 4 grains of pyro.

2A	10 minims.
Water	3 drachms.

If the plate is fully exposed, the developer may be diluted with another drachm or two of water. When there is any sign of a veil coming over the high lights at once wash off the developer and fix the plate, which takes place in less than half a minute, with a solution of cyanide of potassium—strength, twenty grains to each ounce of water; wash well by placing the plate in a large dish of clean water for about a quarter of an hour.

The potassium cyanide, as is well known, is a most deadly poison (two grains being a fatal dose), and it is not necessary to keep the dish containing this solution in the dark room. If the plate is well washed after developing it may be safely taken outside the dark room and dropped into the fixing solution, or the latter may be poured upon it and off, the plate being held by a pneumatic holder.

In this connexion I may as well state that hypo will fix just as well as cyanide, only it takes longer and also requires more time to eliminate it from the film by washing. Mr. Newton advises fixing with a solution of four ounces of hyposulphite of soda dissolved in sixteen ounces of water.

(To be continued.)

F. C. BRACH.

THE RICHMOND EXHIBITION.

We are now able to supplement our notice of last week by giving the remainder of the awards:—

AWARDS FOR LANTERN TRANSPARENCIES.

- A. 5.—Silver medal, 675, G. W. Wilson & Co.
- A. 5.—Bronze medal, 676, Woodbury Printing Company.
- A. 10.—Fry's Silver medal, 683, A. B. Dresser.
- B. 18.—Silver medal, 699, B. G. Wilkinson, jun.
- B. 18.—Bronze medal, 689, W. A. Greene.
- B. 18.—Extra Bronze medal, 700*, F. Howlett.
- B. 19.—Bronze medal, 702, T. H. Morton, M.D.
- A. 6.—Silver medal, 705, G. W. Wilson & Co.
- A. 7.—Bronze medal, 706, P. W. Edwards.
- Optimus Prize for best Lantern Slide awarded to B. G. Wilkinson, jun., 699, B. 18.

AWARDS FOR APPARATUS.

- Silver medal, Watson & Son, for their new Camera.
- Silver medal, Shew & Co., for their new Changing Box.
- Bronze medal, F. W. Hart, for his patent Flash Lamp.
- Bronze medal, W. Tylar, for his Current Producer.
- Bronze medal, Marion & Co., for Dr. Krugener's Book Camera.
- Bronze medal, Houghton & Son, for their improved Developing Stand.

AMATEUR PHOTOGRAPHERS' MEDALS.

- B. 12.—Silver medal, 151, J. Gale.
- B. 17.—Bronze medal, 462, L. Meldon.

Our Editorial Table.

THE LONDON BRIDGE DIARY FOR 1889.

London: Chas. Straker & Sons, King William-street.

CONTAINING as it does an unusually large mass of that class of information peculiar to almanacs, and which will ensure it a welcome space on our table, this Diary is profusely illustrated by full-page

phototypes printed from Husnik blocks, being scenes and buildings in and around London from G. W. Wilson's photographs. It contains, also, useful information to authors and publishers. Each page of the diary contains one week.

THE PHOTOGRAPHER'S DIARY AND DESK BOOK.

London: Wyman & Sons.

A USEFUL Diary, containing three days to the page. It is prefaced by a variety of useful matter and tables, such as ready reckoners for calculating income and wages, stamp and legacy duties, photographic formulæ, English sovereigns since the Conquest, the Corporation of the City of London, and other things worth knowing by photographers and the general public.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 37.—"Improvements in the Production of certain Novel Magic Lantern Effects." H. VAN DER WYDE. *Dated January 1, 1889.*

No. 53.—"Improvements in Photographic Cameras." O. ANSCHÜTZ.—*Dated January 2, 1889.*

No. 114.—"Apparatus for Enlarging Negatives by Daylight." A. R. WORMALD.—*Dated January 3, 1889.*

No. 207.—"Improved Arrangement for Cameras whereby a Clearer View is obtained of a Portion of the Image on the Ground Glass and the Use of a Focussing Cloth rendered unnecessary." J. H. WOODWORTH.—*Dated January 5, 1889.*

No. 484.—"Improved Packing for the Transmission of Photographs." E. A. HAMILTON.—*Dated January 10, 1889.*

No. 494.—"Improvements in Apparatus for Taking Photographs, Exhibiting Magic Lantern Pictures, and the like." C. WINTER.—*Dated January 10, 1889.*

No. 611.—"Improvements in Magic or Scientific Demonstrating Lanterns." G. H. WEST.—*Dated January 12, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 2352. EDMUND PHIPPS, 11, Breeze-hill, Bootle, in the County of Lancaster.—*February 17, 1888.*

THE invention relates to cameras, commonly known as reflecting cameras, in which the image is, for focussing purposes, reflected by a mirror on to a screen. The objects are to adapt such cameras for instantaneous work and to enable the operator to regulate the time of exposure of different portions of the sensitive film.

The first part of my invention comprises certain adaptations to the well-known form of camera in which the image for the purposes of arrangement and focussing is thrown upon a horizontal translucent screen placed on the top of the camera, rendering same well adapted for instantaneous work, and particularly applicable where the camera is of the kind known commonly as a "detective camera." For this purpose a box camera is usually employed, but the camera may be partly of the box form with the necessary arrangements for extension, whether by bellows or otherwise.

At the front of the camera is placed the lens, and at the back is the usual receptacle for the sensitive film. Hinged at the top of the back, or by preference to a sliding inner frame at the back of the camera, is a frame or board carrying a plane mirror. The mirror must be arranged so that when placed in position for arranging and focussing the reflecting surface (whether glass or metal) makes an angle of 45° with both the ground surface of the focussing screen and the sensitive film. The base of the mirror may conveniently be permitted to rest on a vertical projection at the bottom of the camera. Attached to the front of the mirror frame, and of suitable width, is a hanging flexible, or partly flexible and partly rigid, screen or curtain of some opaque material. I find black cloth or velvet answers every purpose. In this screen is cut an aperture in such a position that when the frame and mirror is moved from its position of 45° towards a horizontal position, the aperture will pass vertically behind the lens, so allowing the cone of rays proceeding from the lens to fall for a greater or less length of time upon the sensitive film, the lower portion of the opaque screen by the same upward motion acting as a shutter cutting off the rays of light when the exposure is effected.

It will be found advantageous to attach a small plate of some solid substance to the hanging flexible shutter and let the aperture referred to be cut in this plate. The flexible shutter, either with or without the plate referred to, must be so arranged as to always hang vertically from the swinging mirror frame. The vertical dimension of the aperture will be governed by the rapidity of the lens and sensitive film employed. If a plate (as above described) is employed a diaphragm allowing the dimensions or shape of the aperture to be altered at the will of the operator as hereinafter described may be employed.

It may be found advantageous in some cases to use a perforated plate as a diaphragm sliding vertically behind the lens aperture in grooves attached to the woodwork of the camera; in such case the sliding plate may be furnished with a projection so arranged as to be caught by the mirror frame in its upward motion, or by some mechanical contrivance whereby the plate with the necessary aperture will by the movement of the mirror be carried upwards in a strictly vertical direction immediately behind the lens aperture and so effect the exposure, the lower portion of the plate, or a flexible attachment thereto, acting as a screen shutting off the rays of light after the exposure is made.

To exclude any diffused light which may enter between the sides of the camera and the mirror frame, I avoid the use of solid sides to the mirror frame as being apt to produce vibration during exposure, and I adopt hanging screens or curtains of some flexible opaque material, or being partly flexible and partly rigid, attached to the sides of the mirror frame, by preference attached to the under side diagonally and parallel to the path of the cone of rays passing from the lens, or the screen may be in the form of fan-shaped bellows.

The upward movement of the framed mirror carrying the exposure diaphragm may be effected by hand, or if a rapid motion is required may be forced up by a piece of ordinary clock spring fastened to some internal portion of the camera and acting against the under part of the mirror frame, or may be drawn up by an elastic band attached to the end of the mirror frame and at the top of the camera, or by a weight attached to the mirror frame working over a pulley. I attach a small spindle at one side of the mirror frame towards the front, allowing it to pass through one of the sides of the camera, a slot forming the arc of a circle being cut in the camera to allow of its passage upwards. By this method it is open to the operator by the pressure of a finger on the projecting spindle to cause the mirror to move at a slower rate at any period of its upward course, thus by allowing the shutter to move upwards for about one-half the distance at a rapid rate, and by then gradually slowing its motion, the exposure given to the foreground of the picture will be greatly in excess of that given to the sky. When the framed mirror rests at 45° the projecting spindle is retained in position by a hook or like mechanical contrivance placed externally on the camera and so fixed as to be readily released in the so-called "detective" cameras which are usually held in the hand during exposure, and where a varying exposure is not deemed necessary the hook or other like contrivance for holding the spindle may be advantageously placed inside the camera (the curved slot in the side of the camera in such case being dispensed with), the hook being fitted with an arm projecting through the bottom of the camera enabling the operator to release the mirror.

Another part of my invention consists in the means whereby I can alter the shape and dimensions of the exposure aperture (in the diaphragm passing behind the lens).

To the plate referred to I attach on either side of the aperture a band of metal so arranged as to allow of the insertion of a thin strip of some opaque material between the bands and the diaphragm plate, thus enabling the operator to diminish the size of the aperture, generally to permit it to diminish gradually to one or other of the sides; thus if the exposure aperture is a square in parallelism and the strip is placed diagonally the exposure aperture will assume the shape of a right angled triangle, and accordingly one side of the plate will receive an exposure considerably in excess of that received by the other.

The claims are:—1. In a photographic camera a hanging flexible, or partly flexible and partly rigid curtains or screens, attached to a swinging mirror or its frame, substantially in the manner and for the purpose set forth. 2. In a photographic camera the several means hereinbefore described whereby the diaphragm containing the exposure aperture is caused to pass vertically behind the lens by the upward motion of the swinging mirror. 3. The combination with a photographic camera of a spindle attached to a mirror, or its frame projecting through one of the sides of the camera and working in a curved slot, substantially in the manner and for the purpose set forth. 4. In a photographic camera the combination of an adjustable plate working on the face of a diaphragm, with a swinging mirror, substantially in the manner and for the purposes set forth.

A LAMP TO BE USED FOR PHOTOGRAPHING BY MAGNESIUM LIGHT.

No. 8598. WILLIAM GUTTENBERG, 29, Triangle, Queens-road, Bristol.—
June 11, 1888.

A LAMP for photographing by magnesium light, consisting of a glass case composed of two parts, namely, the bottom and cover, so fitted that when smoke is generated by the ignition of magnesium powder inside the lamp the smoke does not escape until the lamp is opened. The magnesium powder is mixed with powdered chlorate of potash in the proportion of one of potash to four parts of magnesium, and for use is laid in a train on the upper surface of the ground glass bottom, and when the cover has been placed in position the mixture is ignited through a hole cut in one of the ends of the lamp and a glass door is slid over the hole to prevent smoke escaping. The duration of the exposure is regulated by the length of the train.

For taking portraits, the lamp should be suspended at a suitable height by means of chains attached to a strip of wood fitting on top of the lamp.

My invention consists of a lamp in which magnesium powder is burned in conjunction with chlorate of potash, gunpowder, or any other combustible mixture, for photographing by artificial light. It has sides, ends, and bottom (and top, if so desired, according to shape) of glass, and is composed of two parts. The one part being the bottom, which is a thick piece of ground glass, whereon a train of the illuminating mixture is placed for ignition. The other part being the cover for retaining the smoke generated by the ignition of the powder. The said cover is made of pieces of clear glass bound together with tin (the shape of the cover I am describing is that of an inverted V with ends fitted to the sides).

The piece of glass used for the bottom of the lamp has a wooden frame round it with a beading on the upper side of the frame, so that when the glass cover is placed on the frame, the upper part of which is covered with felt, the cover just fits outside the beading, making the lamp smoke-tight, or the wooden frame may be attached to the glass cover and the bottom ground glass can be made to slide into the frame after the manner of a drawer. In both cases a strip of wood, having an angular groove cut into it and two chains attached a suitable distance apart, in the middle of the strip of wood is placed on the apex of the lamp, and the chains are brought round under the lamp and hooked on the other side of the strip of wood. The lamp can now be fitted with any sort of loop attached to said strip of wood and suspended at any suitable height for use. In one end of the glass cover a semi-circular hole is cut in the middle of the glass where it sits on the wooden frame, and a sliding glass door is fitted. The purpose of this hole and door is to enable the operator to ignite the mixture and close the door, thus keeping the smoke generated from coming into the studio or room where the artificial light is used.

A tissue paper screen should be used between the lamp and sitter to soften the light.

Claims:—1. A lamp for photographing by magnesium light, having all sides made of glass, thus causing a radiation of light in all directions, so that an even illumination is given on the subject to be photographed. 2. A lamp for the above purpose composed of two parts so fitted that the smoke generated by the combustion does not escape into the room, thus enabling repeated exposures to be made without getting the image veiled by fog. 3. A lamp for the above purpose so constructed that it can be suspended in such a manner that the light falls on the sitter from the same directions as in daylight portraiture, so that no shadow of the sitter is thrown on the background. 4. A lamp for the above purpose, the construction of which admits of a train of the illuminating powder to be laid, thereby giving a latitude of exposure from one to any number of seconds according to the length of the train, so that the resulting light is not so sudden and intense, thus avoiding the consequent contraction of the facial or optic muscles caused by a flash light. 5. A lamp for the purpose stated the size and shape of which are immaterial. It is advisable not to make it smaller than twenty-one inches in length, seventeen and a half inches in breadth, and twelve inches in height.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 22	Great Britain (Technical)	5A, Pall Mall East.
" 22	Bolton Club	The Studio, Chancery-lane, Bolton.
" 23	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 24	Burton-on-Trent	The Institute, Union-street.
" 24	London and Provincial	Masons Hall, Basinghall-street.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

On Thursday night, January 10, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. A. Cowan presided.

The HON. SECRETARY announced the resignation of Mr. William Ayres, in consequence of prolonged illness, and expressed his (the Secretary's) regret at the information, Mr. Ayres being one of the oldest and most experienced photographers in this country from Daguerreotype days downwards.

By unanimous resolution Mr. Ayres was appointed one of the honorary members of the Association.

A question in the box asked, "Is there any means of decolourising a negative which has become yellow from supposed insufficient washing?"

Mr. J. B. WELLINGTON said that insufficient fixing was a more frequent cause of yellowness in negatives.

Mr. W. COMB knew of a case of the kind in which the negative grew more yellow with age.

Mr. P. EVERETT knew such yellowing to come on a year after the negative had been taken, and it was deepest at the end of the plate from which the washing water had drained.

The CHAIRMAN believed that most negatives were insufficiently fixed.

Mr. W. COLES thought that that depended much upon the presence of iodides in the plates. Bromide plates properly washed required less time in the fixing bath.

The CHAIRMAN said that one plan of removing the yellow stain would be to bleach it with perchloride of iron and then redevelop the picture with ferrous oxalate; a black image can then be brought out, and to any desired density. If, however, the original yellow extends over the whole negative the plan will not answer, as a veil will redevelop.

Mr. T. E. FRESHWATER exhibited an old-fashioned stand, very light, which he preferred to any other portable stand in his possession. It had no loose parts and had a folding top.

Mr. L. MEDLAND had had one in use for four years and had no fault to find with it. It had, he said, been made by Horne & Thornthwaite.

Lantern pictures by Messrs. Atkinson, Starnes, Medland, Hastings, and Wellington were then projected on the screen; those by Mr. H. M. Hastings had a rich brown colour, and had been developed with pyro; carbonate of ammonia, and caustic potash; those by Mr. Medland were detective camera pictures of animals in the Zoological Gardens.

CAMERA CLUB.

On Thursday, January 10, the one hundred lantern slides just received from America, in connexion with the international exchange, were exhibited for the first time. Sir George Prescott presided, and prior to the lantern exhibition called for any objects of interest which might have been brought.

The Secretary handed round some prints on ivory films, and also specimen of a one-bottle developer in powder form, introduced by Mr. Oldham of Eton, for development whilst travelling.

The circumstances of the lantern slide exchange were then referred to and the names of the societies included in the exchange were given. They are as follows:—Photographic Society of Philadelphia, the Cincinnati Camera Club, the New York Society of Amateur Photographers, the Philadelphia Amateur Photographic Club, the St. Louis Camera Club, the Pittsburgh Amateur Photographic Society, and the Chicago Lantern Slide Club. The pictures shown on the screen were received with much admiration, and the work proved to be finer than any yet received in the exchange. The average is high throughout, and some of the slides are extraordinarily effective in colour and general technique. *Elephantia Caves* and *A Moonlight Effect* are gems of transparency work.

Subsequently other slides by Messrs. Brownrigg, Lambert, Leventhorpe,

Charters White, Elder, Orton, and Hansard were shown. Mr. Brownrigg unlavished the exhibition of a very fine and varied set by humorous description. Some of Mr. Leventhorpe's slides were of exquisite colour and quality.

The subject at the Club on Thursday, January 24, will be *The Application of Photography to Meteorology*, when Mr. Marriott, of the Royal Meteorological Society, will give an address, and illustrations will be shown.

WEST LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on the 11th instant at the Addison Hall, the President occupying the chair.

After the disposal of the usual business, Mr. G. F. BLACKMORE read a paper entitled *Notes on Ferrous Oxalate Development*.

The lecturer said: With regard to the materials necessary for compounding the ferrous oxalate developer, he considered it was highly desirable that they should not be purchased in solution, and that they should be procured from a reliable source; and he hoped to show that the ability to compound the solutions was not exclusively vested in the dealers in photographic requisites. If the worker was without an accurate knowledge of the strength of the solutions it was impossible to develop a plate intelligently. Notwithstanding the fact that high authorities had recommended various additions to the ferrous oxalate developer, he found that simple solutions of neutral oxalate of potash, pure ferric-stallard protosulphate of iron, and bromide of potassium, were all the chemicals that were really essential. He recommended that a pound of neutral oxalate of potash should be put into a twenty-ounce bottle and boiling water added to nearly fill it. When the solution was cold it should be tested with litmus paper in order to see whether it was really neutral, because commercial samples were frequently alkaline, or in some cases highly acid; if neutral, half a drachm of sulphuric acid should be added; the solution was then ready for use. He had found if left alkaline that the solution appeared to deteriorate rapidly and throw down a white precipitate. If it were found to be acid it would be unwise to make further addition of acid, as that would cause an increased tendency to frilling; in that case it should be neutralized by the addition of carbonate of potash, a few grains at a time, and then the known quantity of acid should be put in. It was said that oxalic acid might be substituted for the sulphuric, but he had never used it. The iron solution should be prepared by putting half a pound of protosulphate of iron into a ten-ounce bottle, to which half a pint of water should be added; the bottle should be immediately shaken up vigorously and the water poured away, the object being to remove all trace of a possible yellowish powdery crust frequently found on some of the crystals; a slight film might take place, but it was more than compensated for by the superior results obtained. The water having been poured off, sufficient boiling water was to be added to nearly fill the bottle, the solution being then allowed to cool slowly, and when cold half a drachm of sulphuric acid should be added. With solutions prepared in this way a deposition of crystals would take place when the solution cooled, which showed that they were saturated. An ordinary ten per cent. solution of bromide of potassium would complete the list of solutions necessary for compounding the mixed developer. The deterioration of the ferrous oxalate solutions appeared to be hastened by being principally due, as was the case with other developers, to the oxygenizing effect of the atmosphere upon them, to impure water, to the use of impure or oxidized crystals, or to their being in an alkaline state when made. The visible indication of deterioration in the potash solution was a cloudy or murky appearance, and with the iron solution a yellow, rusty, turbid colour instead of a brilliant emerald green. The first case of deterioration might be effectually overcome by keeping the iron solution in a bottle with an orifice near the bottom (which might be purchased at the philosophical instrument makers) and drawing off the solution from below. In lieu of a cork a layer of pure tallow oil should be employed, which would prevent the action of the atmosphere on the solution. The potash solution was less liable to deterioration, but if any appeared it could be removed by filtration. The functions of the three constituents of the ferrous oxalate developer were probably well known, but he might state briefly that the potash was the density giver, the iron the accelerator, and the bromide performed the same duty as in other developers, namely, that of a restrainer. His own practice was to use very little bromide; he preferred to rely upon adding iron in small doses, and in no case should the iron exceed one-fifth of the potash; if more were added there was great risk of turning the developer muddy. Another fertile source of muddy developer was the dilution of the potash solution with water before adding the iron; if such addition was imperative the water should be distilled. It had been recently recommended in the photographic periodicals to shake the bottles before using. This he had no hesitation in asserting was exactly what should be avoided. The lecturer was sorry to have to fall foul of authorities, yet, having tested the matter, he felt bound to lay his conclusions before the members. It was particularly necessary to add bromide with rapid plates containing iodide. With regard to the development of underexposed plates, he was bound to confess that the ferrous oxalate developer appeared less trustworthy than pyro. The difficulty appeared to be in getting minute details out before the blanching of the high lights and distances, the only remedy for each case was the addition of a small quantity of hyposulphite of soda. The amount of hypo must be very small; for instance, one drachm of a mixture composed of one drop of saturated solution of hypo in half an ounce of water. An effective method of coating up details was by applying two or three fresh solutions to the same plate. This, however, was apt to cause green fog. The lecturer was bound to make this statement deliberately, in spite of the fact that so low an authority than Captain Abney had stated, in the seventh edition of his *Lustrations*, that "green fog is never seen when using ferrous oxalate which has not an alkaline reaction." [The lecturer handled round a negative developed with ferrous oxalate exhibiting a green fog.] The treatment of plates having received correct exposure was much the same as when using other developers, and the same expedients might be resorted to. A slight acceleration of the shadows might be obtained by gently rubbing the part with the finger whilst in the tray or by removing the plate and brushing on the backward parts. He sometimes applied the back of the hand to the glass side of the negative in order to slightly increase the temperature; this, however, involved the danger of frilling unless carefully performed. Another point in development was the question of the ability of rocking the dish or tray. Although that matter had been freely discussed, in his opinion the root of the matter had not yet been reached; it appeared to him to be correct both to rock the tray and not to rock it. The process of developing the negative had the effect of slowing the developer; that is, a chemical action was going on, and the solution was making an exchange with the chemicals in the film. If this were considered it would be evident that the parts of the plates most acted on by light would be most active in making the exchange, consequently, if the tray were left still the developer overlying the most active portions of the film would be acted upon most and that portion of the solution would become slower or restrained. At the same time the less exposed parts of the plate were also acted upon by the solution overlying them, and not having been contaminated, through rocking the tray, with the slower part of the developer, would be in the best condition to bring up density on those parts of the plate. The converse was also true, that continually rocking the tray very much helped to increase contrast. It was in cases of over exposure that the ferrous oxalate developer seemed especially valuable, as it was possible to restrain it to an almost unlimited extent without frilling. In regard to cost, it had often been objected that this developer was an expensive one, and he was inclined to agree with that opinion if the usual practice of throwing the used developer away was followed, but if a bottle was filled to the stopper with used solution it might

be, with a further addition of iron, used over and over again. Finally, he hoped that if his observations did not have the effect of causing the ferrous oxalate developer to be more extensively used, they would at least be useful to those who wanted occasionally to make use of the developer in keeping.

Mr. J. D. ENGLAND said that he did not think Mr. Blackmore had sufficient impressed upon the members the necessity of using distilled water. He had found that the air imprisoned in ordinary tap water quickly caused the iron solution to deteriorate.

Mr. FOXLEE stated that on the introduction of gelatino-bromide plates he first used the ferrous oxalate developer on account of the wet plate character of the negatives produced by it, but he quickly came to the conclusion that pyro was a better all-round developer on account of the greater latitude of exposure permissible with it. A professional friend of his, having an extensive business in South America, employed until quite recently the ferrous oxalate developer for all his work; if any of the plates were very long in coming up he dipped a piece of paper in the hypo bath and stirred up the developer with it, which was a practical though certainly not very scientific mode of working. The developer, after use, was bottled off and a little tartaric acid added; the old solution could then when added to a small quantity of fresh developer be used over again and worked well. Worked in this way it was an economic developer.

Mr. WHITING said the great charm of ferrous oxalate was its cleanliness and its non-liability to give green fog, although in that respect Mr. Blackmore had been unfortunate. He also thought in the matter of simplicity it could hold its own against pyro, and with correctly exposed plates would give good results. He much wondered at the disproportion of the various components of the developer in formulae given by different plate makers, and thought it would be better if they discontinued issuing formulae with the plate, it being understood that any standard formula would produce good results.

Mr. J. D. ENGLAND called attention to the fact that a very strong ferrous oxalate developer could be formed by dissolving precipitated ferrous oxalate in a saturated solution of oxalate of potassium.

The PRESIDENT remarked that there could be no question that ferrous oxalate was a very valuable developer for transparency work, but with regard to its use for developing negatives much would depend on the character of the plates used. With some plates (whatever might be the cause) he had found it impossible to get density with ferrous oxalate, but pyro gave good results. With a suitable plate and correct exposure, no doubt ferrous oxalate would produce a technically perfect negative, but those conditions were essential. He knew that one of the largest portraitists in London used the ferrous oxalate developer. His plan was to put all the negatives in a large tray and develop them together, the progress of development was watched, and the plates were taken out as soon as they had acquired sufficient density. But that was certainly not a mode of working which he should recommend any one to adopt. He reminded them that the late Jabez Hughes when asked what developer he was in the habit of using replied, "Branu."

Mr. J. A. HODGKINS was of opinion that although the ferrous oxalate developer was valuable for certain special purposes it could not compare, for general work, with the pyro developer, which he recommended to be used in ten per cent. solutions. He thought the powdery deposit occurring in the oxalate solution would not occur if distilled water were used in making the solution. Although he gave Mr. Blackmore credit for the ingenuity of his mode of preserving the iron solution, he thought if the solution were made freely acid with sulphuric acid it would keep well in an ordinary stoppered bottle. He considered it an imperative condition that the developer should show an acid reaction with red litmus paper. Plates of his own manufacture which both frilled and gave green fog with pyro gave clean bright negatives when developed with ferrous oxalate.

Mr. STERN mentioned that he had tried a system of development with ferrous oxalate after bleaching with mercury, which had been recently advocated, but without the success which the author claimed for the process. He thought it a good one, as the process of redevelopment was a slow one and could be checked at any moment.

Mr. BLACKMORE having replied, the proceedings terminated.

The next meeting will be held on Friday, the 25th instant, when Mr. Hodgkins will give an account of a visit to North Wales with the camera, illustrated by views in the optical lantern. Visitors are invited.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

This Club held its first annual general meeting on the 14th instant, when Messrs. H. Beckford, S. Bolton, F. Cherry, C. Baffery, and M. Sanders were elected members.

The report and balance sheet were read and adopted, from which it appeared that a marked degree of success has attended the Club's proceedings since its commencement in June last. It numbers forty-five members. During the half-year papers and demonstrations have been given as follows:—*Photography, Past and Present*, The President; *The Flash Light*, F. W. Hart, F.R.S.; *Eastern Slide Making*, E. T. Hiscock; *Tuning and Focusing*, W. Hart; *Micro-photography*, The President; *Phototypes*, F. W. Cox; *Optical Contact Printing*, E. T. Hiscock; *Enlarging*, J. Oakley.

The election of honorary officers for the ensuing year then took place, the following being elected:—*President*: Mr. J. Humphries, F.S.A.; *Vice-Presidents*: Messrs. Beckett and Hiscock; *Committee*: Messrs. F. W. Hart, T. C. Lathbridge, W. A. Lavanchy, J. Saville, J. Stewart, and H. Walker; *Secretary*: Mr. H. R. Martin; *Treasurer*: Mr. E. Seymour Paul.

Mr. Ernest E. C. Damant, 25, Granville-road, Strand Green.

The next meeting of the Club will be held on Monday evening, the 28th instant, at the Iron Room, Granville-road, Strand Green, N.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of the above was held in the Free Public Library, Hamilton-street, on Thursday evening, the 10th instant,—the President (Mr. Paul Lange) in the chair.

Messrs. F. Atkinson, W. R. Beaton, H. C. Hitchmough, H. B. Sharpe, and Jas. P. King were elected as members.

The **PRESIDENT**, after a few introductory remarks, drew the attention of the members to a new feature in connexion with the Association, which had been introduced by the Secretary (Mr. S. L. Mackrell). It was a synopsis of a provisional programme of first practical demonstrations for each meeting during 1889 which will be printed in the form of a membership card, and will also act as a reminder for the members when away from home, for the use of dark rooms, &c. The following is a programme of the practical demonstrations:—*Enlargements on Bromide Paper and Glass Negatives; Paper Negatives; The Art of Retouching; Developing Platinum Prints—Hot and Cold-bath Processes; Transferring; Practical Hints on Lenses, their Uses and Advantages; The New Dry Etching Process with Magnesium Light; Practical Hints how to Manipulate the Lantern (By M.L.). Photo-micrography; Stripping Films.*

The **PRESIDENT** then read a translation which he had made from the report of the Vienna Exhibition on the English section.

Mr. H. WILKINSON exhibited two exceedingly good prints, 10×8, done by contact on bromide paper, one of which he had developed with hydroquinone and the other with ferrous oxalate. He contended that in his opinion the one developed with hydroquinone was equal to any platinum print.

Mr. WILKINSON showed a platinum print which he had made from one of his own negatives, but after a short discussion the President preferred to take a print in platinum type from Mr. Wilkinson's negative, and compare the same with the bromide prints at the next meeting.

Mr. F. N. KATON exhibited four transparencies made by contact from one negative and developed with the same solution of hydroquinone, exposures of which he had given being eight, fifteen, thirty, and sixty seconds respectively, the only apparent difference in the transparencies being a very slight tint of yellow in the skies of three and four.

A practical demonstration, *Enlargements with Anthony's Apparatus and Bromide Paper, and how to Produce Enlarged Glass Negatives with Enlarging Camera*, was then presented (Mr. Paul Lange), ably assisted by Mr. W. B. BEATON, who then proceeded with the President making an enlarged glass negative, 12×10, from half-plate transparency, using an enlarged camera for same, from which he had a most novel way of illuminating the negative. It consisted of a gridiron form of three rows of piping, about eighteen inches long, each row having three gas burners, and the whole being fixed on a stand perpendicular; the gas being conveyed through a piece of tubing from one of the brackets in the room. An exposure of twenty-five minutes was given. During the exposure of the glass negative Mr. Beaton made two enlarged prints, 10×8 and 15×12, from half-plate negatives on Anthony's bromide paper, which he also developed and fixed, using ferrous oxalate for developing. The prints when finished received much commendation from all present.

DERBY PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held on the 8th instant, Mr. J. A. Cope presiding.

The **HON. SECRETARY** presented his annual report and balance sheet, which showed the Society to be still in a flourishing condition.

Eight new members were elected.

The **CHAIRMAN** introduced to the meeting Mr. H. S. BELLSMITH (of the Eastman Dry Plate and Film Company), who gave a demonstration of the manipulation of the Company's stripping films, transferotype paper, bromide enlargements, &c., also showing and describing the use of their Kodak camera.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE monthly meeting of this Society was held in the Masonic Hall, Surrey-street, on Thursday evening, January 10. The chair was taken by Mr. B. J. Taylor. There was a good attendance of members.

The minutes of the previous meeting having been passed, a committee of management were elected to carry out details of the *conversazione* to be held on February 12.

Mr. ALFRED REYNOLDS then read his paper on *Platinum-uranotype and Mercur-uranotype* (this will appear in a future number), two new uranium printing processes. A large number of prints made by these processes were passed round, and were much admired for their fine detail and softness.

The annual lantern slide competition is arranged to take place at the next meeting of the Society, on February 5.

DEVON AND CORNWALL CAMERA CLUB.

THE members of the Devon and Cornwall Camera Club held a *conversazione* at the Freemasons' Hall, Cornwall-street, Plymouth, on Wednesday evening last week. The weather probably deterred many of the members from attending, but in spite of the storm there was a fair muster of ladies and gentlemen.

The rooms were tastefully and comfortably arranged under the superintendence of Mrs. Carnell and Mrs. Harrington Baker. Cameras and stands of various patterns and by different makers were placed here and there for inspection, and on a long table were shown shutters, lenses, roll-holders, &c. Particular attention was given to a very handsome eight by five stereoscopic camera, built by Perken, Son, and Rayment for one of the members, and fitted with a pair of Optimum lenses.

Mr. A. A. CARNELL explained the mode of using the Eastman roll holder, some dummy spools having been kindly given by the Eastman Company for the purpose.

Tylar's metal dark slides were also noted by many as being both serviceable and cheap.

Some excellent framed photographs, presented by Mr. J. H. Edwards, adorned the walls, and were much admired.

The difference in photographs of flowers taken by an ordinary and by an isochromatic plate was much commented on; these latter plates were strongly recommended for portraits in dull weather, some of the members stating that

they had tried them for that purpose, and that they were most useful when the person to be taken had a yellow or red tint in the hair.

An album of photographs in platinum type, from paper negatives of views in a chair, and an enlargement of a cat on Ilford paper from an Eastman stripping film, were objects of great admiration, and the latter, which was almost life-size, was quite equal to any direct print.

Some prints on Ilford slow bromide, Alpha, and Edwards's sensitised paper were also shown and favourably commented upon.

Mr. Carnell then photographed several groups by magnesium flash light. This new process excited much interest and amusement, the brilliant flash causing some of the ladies, who were engaged in conversation, to give a considerable start, but, of course, after the exposure had been made.

Messrs. Henry G. Phillips, R. A. Penrose, and F. Popplestone were elected members.

The next meeting will be held on the 23rd instant, when Mr. R. Murray will give *A Retrospect by an Old Photographer, with a Few Hints to the New Generation*.

IPSWICH PHOTOGRAPHIC SOCIETY.

THE first annual meeting of this young but flourishing Society was held at the Town Hall, on Tuesday evening, the 8th instant. Mr. J. Dixon Piper, the President of the Society, occupied the chair.

The Committee's report was read, and proved to be encouraging. Since its formation, in March last, the Society had made steady progress. The financial position of the Society was satisfactory. The Treasurer's account showed that up to December 31, 1888, the receipts amounted to 6*l.* 10*s.*, with payments of 4*l.* 4*s.* 4*d.*, leaving a balance of 2*l.* 5*s.* 8*d.* in the Treasurer's hands. There were still, however, unpaid subscriptions amounting to 2*l.* 5*s.*, and outstanding liabilities of over 3*l.* 8*s.*, so that there only remains a few shillings credit balance in the Society's funds.

The meeting then proceeded with the election of officers. The present President was elected to continue in that office for the ensuing year. Messrs. Mason and Cade were nominated to fill the post of Vice-Presidents, and a Committee of six gentlemen was also chosen. In re-electing Mr. Pringle to the post of Secretary, the meeting acknowledged the spirit and energy he had infused into his labours.

Mr. Wiggan exhibited a magnesium flash light, and he passed several negatives round as specimens.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE usual fortnightly meeting of the above Society was held in the Priory Rooms, Old-square, on Thursday, the 10th instant,—Mr. W. J. Harrison, F.G.S., in the chair. There was a very large attendance of members and friends.

Messrs. T. Coud, H. A. Dugard, R. Folland, T. W. Lloyd, Herbert Miller, A. W. Wills, J.P., and W. L. Wills, B.S., were nominated for election as members.

The remainder of the evening was devoted to a lantern display and a paper by Mr. A. W. Pumphrey on *A Tour in Italy and Switzerland*; some one hundred and fifty slides were passed through the lantern illustrating the same, and Mrs. Pumphrey kindly read her descriptive diary, explanatory of the slides and places visited, the pictures of Rome, Naples, Florence, Venice, and Pompeii being exceptionally interesting.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

AN ordinary meeting was held on January 11 at the Institute, Bexley,—Mr. Dresser, Vice-President, in the chair.

Mr. Rushton was elected a member.

Mr. HAWKINS, when exhibiting a number of stripping-film negatives, pointed out one great advantage in films, viz., the frequency with which natural clouds are secured.

The **SECRETARY** showed a bromide print developed with hydroquinone from which he could not eliminate a slight yellowness although several acid baths had been tried.

It was stated that this yellowness was caused by over exposure and could not be removed by any known method.

Mr. REFFELL showed the monthly *Album* of the "Argosy" Postal Club.

Mr. RUSHTON gave the members a short account of *Six Months in Switzerland*, illustrating his remarks by showing a fine collection of views he had taken. He recommended tourists to suspend the camera, &c., from the shoulders, only carrying the tripod in the hand; it could be used as an alpenstock. He also advocated the use of a half-plate camera, as it was possible to obtain plates on the Continent which would fit an English half-plate slide.

A discussion ensued upon various points in Mr. Rushton's paper.

The next meeting will be held on Friday, January 25, on which occasion the President, Mr. Pringle, will read a paper entitled *Practical Photography*.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE annual meeting was held on the 8th instant,—Mr. H. R. Procter in the chair.

The annual report of the Hon. Secretary stated that outdoor meetings had been held at Barnard Castle, Tynemouth, Bellingham, and Chollerford. Ten new members were elected during 1888; on the other hand, several had been lost through removal and resignation.

The Treasurer's report showed a balance of 3*l.* 19*s.* 5*d.* in hand.

The election of officers for the current year resulted as follows:—**President**: Mr. A. S. Stevenson.—**Vice-Presidents**: Messrs. J. P. Gibson and H. R. Procter.—**Council**: Messrs. M. Auty, J. Brown, T. Galloway, J. E. Gould, H. C. Hemy,

P. M. LAWS, W. PARRY, H. G. RIDGWAY, E. SCHUMANN, and L. WILLIAMSON.—*Hon. Treasurer*: Mr. J. W. ROBSON.—*Hon. Secretary*: Mr. EDGAR G. LEE, 3, Woodbine-road, Gosforth, near Newcastle-on-Tyne.

Six new members were elected, and a vote of thanks was passed to the Treasurer and Secretary for their services during the past year.

LEWES PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting was held on Tuesday, the 8th instant, at the Glee Room, Cliffe. Mr. J. TUNKS, Vice-President, occupied the chair.

Special reference was made by the CHAIRMAN to a vote of condolence to the President (who had lost his wife) which had been passed by the Committee.

One new member was elected.

The subject for discussion—*Toning, Fixing, and Mounting Prints*—was then opened by Mr. G. FOXALL.

At the close of the discussion some micro-photographs were shown by Mr. P. MORRIS, prints toned with borax by Mr. E. FULLER and the Secretary, and negatives developed with hydroquinone.

It was decided that *The Making of Eastern Slides* should form the subject for discussion and demonstration at the next meeting, to be held on February 5.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

THIS Society commenced their winter session on Wednesday evening under most favourable auspices. Mr. S. W. ALLEN occupied the chair.

The lecturer for the evening, Mr. ALEXANDER KEILAR, delivered a discourse on *Photographic Optics*, describing the combination of a lens, distortion, depth of focus, width of angle, rapidity, relation between aperture and focal length, &c., illustrated by coloured diagrams. Arrangements are pending with the Cardiff Naturalist Society to obtain photographs of the neighbourhood which are worthy of permanent record, such as sections of rocky strata, large trees, old monuments, &c.

The next lecture, on *Hydroquinone as a Developer*, will be given by Mr. C. H. MANUEL, on the 23rd instant; and on the 30th instant Mr. ALBERT LIMBEN will give a lantern exhibition of Brazilian scenery.

Following up the example set by the Camera Club, the Society have decided to hold a few "one man exhibitions" in their commodious studio, Mr. W. H. KITCHIN, who was favourably noticed at their recent exhibition, being the first exhibitor.

Those wishing to join the Society should communicate with the Hon. Secretary, 127, Bute-road.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting of the above was held on Wednesday evening, the 9th instant, in the Mechanics' Institute.—Mr. SCOTT, jun., Vice-President, in the chair.

Messrs. FERRIS, KERR, and WILLIAM DAKERS, were admitted members.

Mr. WILLIAM JAMIESON read a paper on *Apparatus*, and showed and explained an Eastman's roll holder and new Kodak hand camera lent for the purpose by two of the members.

Dr. ANDERSON, in a racy paper, strongly recommended those who took only small negatives to go in for enlarging, the Association's lantern being very suitable for that purpose. Thereafter he gave a practical demonstration of how it was done, a very good enlargement in brown of the *Boy n' Dog* on Eastman's permanent bromide paper being the result.

A vote of thanks to the Chairman brought to a close a most enjoyable meeting.

At a meeting of the Council Mr. FOOTE-BROOMLEY was unanimously elected an honorary member of the Association.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE fourth general meeting of the session was held in the rooms, 207, Bath-street, on Thursday, the 10th instant.—The President, Mr. WILLIAM LANG, jun., F.R.S., in the chair.

The minutes of last meeting were approved, and Messrs. WILLIAM A. BROWN, WILLIAM GEMMILL, JAMES G. MAINS, FRANK MACKENZIE, and MATTHEW MCKENZIE, were elected members of the Association.

The PRESIDENT gave a short address, wishing the members success in 1889, which, he reminded them, was the Jubilee year of photography.

After some discussion, it was agreed to devote part of the fund left in trust by the old Glasgow and West of Scotland Photographic Society to the purchase of a first-rate optical lantern for the use of the Society.

Mr. JOHN ARNAY then exhibited prints from some reversed negatives, which he had obtained by exposing a plate under the original negative sufficiently long to cause a complete reversal of the image. Some of the reversed prints shown were quite equal in quality to the originals. The exposure required was about three hundred and fifty times that necessary to obtain a positive. The developer used was weak in ammonia and bromide and strong in pyro, and was composed approximately of six parts of ammonia, three parts of bromide of ammonium, and twelve parts of pyro, to one thousand parts of water. The exposure permitted considerable latitude, and, practically, was found to be from forty-five to sixty minutes at six inches from a No. 5 gas burner, or from fifty to eighty seconds to diffused daylight.

Messrs. T. N. ARMSTRONG and GEORGE HILL gave a joint demonstration of a flash light which they had worked out together [see page 38]. It consisted of an oxyhydrogen limelight with an extra hydrogen flame through which magnesium powder was blown from a wash bottle. The whole was enclosed in a glass case with a chimney to carry off the fumes. Several practical experiments were made with most satisfactory results.

Correspondence.

Our Correspondents should never write on both sides of the paper.

JANUARY MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—CONGRATULATIONS, &c., FROM A FOREIGN SOCIETY.—NOMINATION OF JUDGES.—A NEW LENS.—M. GUILLIMINOT'S PRESENTATIONS.—A NEW DEVELOPER FOR SILVER CHLORIDE PRINTS.

THE Photographic Society of France held their monthly meeting on Friday evening last, the 11th instant. This meeting had been postponed one week, on account of the New Year's holiday. M. DAVANNE was in the chair. A letter of congratulation, sent from the Photographic Society of Moscow to their colleagues of Paris, was read by the Secretary. A bond of union must be established between the two Societies, &c. The President of the Moscow Society was unanimously elected honorary member of the Photographic Society of France.

Voting was carried on for the nomination of the judges who will distribute the different awards in the competitions now on hand. Judges for Optics were elected: Messrs. BORDET, CHARDON, JANSSEN, LONDE; Commandants FRIBOURG and MOESSARD; the Colonels SEBERT, VIDAL, and WOLFF. Judges for M. Gaillard's Prize: Messrs. ANDRA, BALAGNY, BARDY, GOBERT; Commandants JOLY, LEMERCIER, and VILLECHOLE. Judges for Photographic Positives: Messrs. ANDRA, BALAGNY, CHARDON, HAINQUE de St. Serroch and LEVY.

The Photographic Society of France were about to organize a large show of photographic prints, but, in consideration of the forthcoming Universal Exhibition of 1889, it was thought wise to forbear.

A novel kind of lens was presented by M. SERMAISE. This lens is intended to take part in the forthcoming struggle for fame, as it is entered in the competition for Optics. The lens, instead of being of tint and crown, as transparent as possible, is cut out of blue and yellow glass. The inventor thus endeavours to do away with the coloured shades when orthochromatic effects are required. The idea was received as good and novel, but time will show if or not it is useful in practice.

M. GUILLIMINOT presented a number of sheets of zinc perforated in the centre. The oval hole is at the same time pressed upward by means of a die. These plates render great service in producing photographic busts, &c. Their low price will put them in the hands of all. M. Guilliminot at the same time presented some gelatino-bromide of silver plates so prepared that, after development, fixing, and the other manipulations, the film will rise from its support with the greatest ease, which is a valuable quality for those who print photographs mechanically. The film, it is said, is very firm, will not extend or contract, and will resist even hot water.

M. RAYMOND presented a new developer for positive prints, with which it appears excellent tones can be obtained.

SOLUTION A.	
Distilled water	150
Potassium bromide	2

SOLUTION B.	
Distilled water	100
Chlorhydrate of hydroxylamine	4
Alcohol	50

SOLUTION C.	
Distilled water	100
Ordinary carbonate of soda saturated to 36°	50

In order to develop proofs which have been obtained on paper prepared with silver chloride the manipulator must take—

Water	100 parts.
Solution A	3 "
" B	4 "
" C	5 "

Several presentations were passed over to the next meeting; the members being under the influence of the holidays, very little was seen or done.

PROF. E. STERNING.

OWNERSHIP OF NEGATIVE.

To the Editor.

SIR,—Perhaps you will allow me to draw the attention of photographers generally to the last paragraph of Mr. W. E. Debenham's letter in your last issue. The paragraph is suggestive and of present importance to every business photographer.

"If it could be supposed, which appears to me exceedingly improbable, that the ruling of Mr. Justice North can be disturbed, and the contention of the defendant that a photographer is at liberty to make what use he pleases of his customer's portrait were to be established, there would, in all probability, arise such an outcry from the public, that legislation injuriously affecting the photographer's rights might be speedily looked for. In this view, the success of an appeal in the case of Pollard *versus* The Photographic Company would be the worst misfortune that could happen to photographers."

The correspondence which has appeared in your columns respecting the ownership of the portrait negative shows that many of the writers are ignorant of the law of copyright. Let me tell all such that a copy of the law may be had for fourpence from the Queen's printers; and in an article in *The British Journal of Photography Almanac* for 1869 it is carefully explained by Mr. Le Neve Foster, a barrister, and, if I mistake not, one of the framers of the act. Mr. Foster was a distinguished amateur photographer, consequently understood the nature of a negative.

The custom of the trade has been mentioned by some of your correspondents—well, custom is said by some to be unwritten law. For this custom among our best photographers I would again draw the attention of photographers to the excellent letter of Mr. Debenham. He writes:—

"The customary proceeding and understanding amongst photographers with regard to possession and use of the negatives of private sitters is one which has the sanction of many years, and will, I believe, be found to be in accordance with common sense, and for the most part with such judicial decisions as have been given in the courts of law. It may be briefly stated as follows, of course supposing that no special arrangement has been made:—

"The negative is the property of the photographer, who has, however, no such copyright in the work as to prevent the sitter from having any kind of copy made from the prints with which he may have been supplied.

"The use of the negative is joint. The sitter cannot, of course, print from it without the photographer's consent, and the photographer has no right to do so without the sitter's consent."

To this I would add that in your issue of March 19, 1886, the writer of a leading article says, "When an artist is paid for taking a portrait he has no moral right to the negative for any purpose of his own. He has been paid for his work, and there is, or ought to be, an end to the transaction."

With a copy of the law for fourpence, and it so ably explained by Mr. Le Neve Foster, the custom of trade so clearly given by Mr. Debenham, and the substance of the law so briefly stated by the writer in the *Journal*, no photographer need break the law in ignorance, and breakers of the law are enemies to the profession.

I therefore suggest that all who are not satisfied with the law as it stands give in the *Journal* their objections to it, and state what alterations they propose should be made, that their alterations may be seriously considered by our business men, and thus prepare us for the time when alterations are proposed from outside the profession.—I am, yours, &c., J. T.

January 14, 1889.

To the Editor.

Sir,—I am sure you will allow me a space in your valuable paper to explain the case "*Pollard versus Photographic Company*," being myself the defendant in the case, and because most of the reports about this case are entirely wrong.

Mrs. Pollard and family were photographed at our establishment, and, according to her own statement, received every satisfaction. The photograph of herself was exhibited in the window in the usual way, also two of her children, all in cabinet size. The two children were painted in oils for specimen purposes only, and during the time that those portraits were exhibited the lady visited the establishment on several occasions. One day she called in and wanted to inspect the two cabinet portraits of her children which were in the window, and between which was placed her own portrait. The photographs were taken out and shown to her. She liked them so much that she ordered a couple of them, after which they were placed again in the window. Now, although she must have seen her own portrait at the same time, she never gave us the slightest hint that she objected to it being exhibited; in fact, we had every reason to believe that she did not object. This was about September. In the beginning of November I printed another copy of Mrs. Pollard, with "A Merry Christmas and a Happy New Year" on it, from one of Mariou & Co.'s paper negatives, and exhibited as an ordinary specimen in the window, certainly not thinking for one moment that this could in the slightest degree offend, knowing that she had not objected to being exhibited. (One photograph only was printed in the Christmas style, and certainly not offered for sale, nor ever intended for such. One evening a gentleman called to ask if he could buy the photograph in question, and was informed the photograph was not for sale. However, he particularly wanted to buy that portrait, and accordingly was asked if he had the right to do so. I asked him three times distinctly, "Are you sure you have the right to purchase?" and he declared in an emphatic way, "Decidedly I have." Taking his word as a gentleman, I sold it to him in good faith.

This was the only photograph sold, and, I consider, was sold to the lady herself, because she really sent him to purchase same. Now, tell me where is the wrong done? I never for one moment gave our solicitors to understand that we claimed the right to do with the negative what we liked; on the contrary, we distinctly informed them that if she had given us the slightest hint of her objections, we should have been too pleased to remove it at once; our counsel simply said that we had the right of making use of the negative for specimen purposes as long as we did not do anything unlawful, and as long as no objection was raised by the person. Now, I ask, is there a photographer in the United Kingdom

who has not done the same thing over and over again? We wrote to our solicitors to ask why the plaintiffs applied for an injunction and put us to unnecessary expense, when they might have requested us to abstain from exhibiting the lady any more. I hope that this explanation will be satisfactory to all your correspondents, and surely it justifies the letter written in such a patriotic way by Mr. Hubert. There are other matters I could mention which would still more prove that our dealing was strictly honourable, but, as the defence did not go deep enough into these matters, I am obliged to keep silent. I think the case concerns every photographer and should be supported by all, as it is only what might happen to-morrow to any one in the profession. I may add that an extension of time for the appeal has been granted.—I am, yours, &c., W. C. Bax, Manager.

Photographic Company, Rochester.

To the Editor.

Sir,—I am quite sure that when Mr. Debenham thinks fit to make a statement he knows what he is about; and taking into consideration the kind way in which he makes his attacks, one can scarcely fail to forgive him for a slight oversight which however, unfortunately, tends to do me an injustice. To explain this to him thoroughly in these columns is, to my intense disappointment, impossible. Suffice it then to remind him, and "Junius" in *Echoes*, that I stated distinctly that I thought it wrong to contend that the photographer could make what use he pleased of a negative; and, furthermore, that in the case cited an implied permission existed, because of the plaintiff's wife visiting the establishment for months, being fully aware of the exhibition of the photograph.

But why create a dispute about the matter, and endanger so important a project which Mr. Debenham himself strongly advocates? Even if the case "*Pollard versus The Photographic Company*" seemed uppermost in my mind, a careful perusal of my original letter proves that I had other cases besides this one in view when I urged such a scheme. For instance, the sentence "Photographers will probably have to part with a valuable negative to an amateur friend," &c., evidently refers to the case "*Marston versus Barnes*."

I own that I ought to have expressed this more clearly; but pressure of business prevented me from going deeply into this matter, as it has prevented me from attending at our several society meetings, which I scarcely need say is a punishment to me.

No sacrifice, however, I shall deem too great to assist in bringing about the great work of a union amongst photographers; and I rejoice to think that to conclude from the general tone of Mr. Debenham's letter his valuable patronage will practically be assured, whilst judging from his interest in photographers, and the able exposition of the law as related to the art, Mr. Debenham's brother would be an important help in the organization if his aid could be procured.

Once more I earnestly ask my colleagues to co-operate heartily to bring about the early formation of the society; which will then be prepared to meet a case when it presents itself, besides acting as a caution to malicious and reckless litigants.—I am, Yours, &c., J. HUBERT.

238, Mare-street, Hackney, E.

P.S.—With regard to what Mr. S. J. Debenham says about the copyright being vested in the sitter, I have always understood that the same is vested in the operator who actually takes the negative, a special assignment being made in the case of such operator not being the proprietor of the business. Of what use would this arrangement be if it belonged to the sitter? However, not having read the Act, I may be wrong.

COLLODIO-BROMIDE EMULSION.

To the Editor.

Sir,—I have just read in the last issue of *THE BRITISH JOURNAL OF PHOTOGRAPHY* a communication that was read at the Amateur Society in New York by Mr. F. C. Beach. It is entirely without foundation as to its being, as he states, a formula given by me to Mr. F. Dunsterville, and I know nothing whatever about it in any way, and I trust your readers will not be misled by such a statement, as every one will know, with the least grain of sense, that a manufacturer of collodio-emulsion for so many years, like myself, would not give my formula to a client, more than Messrs. Wratten & Wainwright or Messrs. Mawson & Swan would give the formula of the plate-making to their customers. I look upon the formula that Mr. Beach quotes as mine as most ragged in the extreme.—I am, yours, &c., Wm. Brooks.

Reigate, January 14, 1889.

HYDROQUINONE.

To the Editor.

Sir,—In your issue of the 9th November last you give prominent space to a leading article entitled *Permanent Hydroquinone*, and speaking in favour of a new form of hydroquinone offering the advantage of permanency.

This so-called permanent hydroquinone is described as of lemon colour and manufactured by Dr. Byk.

Your article has attracted attention in photographic circles in Germany, and the *Photographische Wochenblatt* recently brings the report that an analysis has been made of this hydroquinone by independent chemical authority with the result that this lemon-coloured product can no longer be described as hydroquinone, it being a mixture of hydroquinone and several per cents. of sulphurous acid. It is a well-known practice of all those wishing to prevent a change in a solution of hydroquinone to add sulphite of soda, which gives exactly the desired result. In the interest of pure chemistry it is not desirable that a mixture of hydroquinone and sulphurous acid should any longer be termed hydroquinone, which in its properly pure state is a chemical body most delicate to keep, and least of all can be termed permanent in solution. It is for the operator to mix his ingredients at will, but it would be dangerous to term chemical mixtures by the name of that chemical of which there is the larger proportion present.

Trusting that, in the interest of chemical purity, which is so essential to the photographer, you will be good enough to give space to this letter in your next issue.—We are, yours, &c., A. & M. ZIMMERMANN.

6 & 7, Cross-lane, St. Mary-at-Hill, London, E.C., Jan. 14, 1889.

[The sample of "permanent hydroquinone" upon which we reported was perfectly neutral, so could scarcely contain any free sulphurous acid, though the latter may have been employed in the process of manufacture.—Ed.]

SULPHITES.

To the Editor.

SIR.—The sulphites are very interesting, but they have one drawback—at least sulphite of soda in combination with pure carbonate of soda, that at a very low temperature it crystallises solid at bottom of bottle. I always use Platt's developer winter and summer, and get fine negatives (THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, 1886, page 199).

Water (hot or cold)	8 ounces.
Carbonate of soda (pure)	13 drachms.
Sulphite soda	6½ "

Carbonate potash same quantities.

Now it has occurred to me that if meta-bisulphate of potash be used, say 2½ drachms in each 8 ounces of water to 13 drachms carbonate of soda or carbonate of potash, from the sulphurous acid contained therein it would keep much better, though after a lapse of three or four weeks the carbonate of potash throws down a flocculent deposit. I always use my pyro dry—8 grains to the ounce. I have half a gross of small, thick, wooden boxes: 3 dozen contain 30 grains pyro each; 3 dozen contain 20 grains each—this answers for whole-plates. 20 grains to 6 ounces of water with half a grain of bromide of ammonium and 30 grains to 10 ounces of water for 12 × 10 plates, with same quantity of bromide ammonium, and in every case I get fine clear negatives like wet plates. But then I have a special mode of development. I use Rouch and Mall's plates, and rarely spoil one. I should like to have some opinions on the meta-bisulphate of potash as against the sulphite. With ammonia the former gives inky tones, with soda and potash clear, delicate, pinky brown, full of half tone.—I am, yours, &c., HARDING WARNER.

The Hollies, Clyde Park, Clifton, Bristol, January 5, 1889.

THE OLDHAM PHOTOGRAPHIC EXHIBITION.

To the Editor.

SIR.—I notice a letter on the above subject in your last issue which I cannot allow to pass without a few words in reply.

Mr. Mackie appears to be under the impression that the exhibition was promoted by the Oldham Photographic Society. This is not so; but, by the Free Libraries Committee. This Committee requested the assistance of the Oldham Photographic Society in getting together the exhibits, the arrangement of lantern lectures, and many other matters too numerous to mention here. The Council of the Oldham Photographic Society willingly assented, and the success of the exhibition is, in a great measure, due to their exertions.

The hanging of the pictures, however, was not done by the Oldham Photographic Society, but by the officials of the Free Library, and I certainly agree with Mr. Mackie (and many others who have complained) that it is a splendid example of the bill-stickers art. No wonder that the judges themselves were confused!

A series of evening lantern lectures were arranged by the Oldham Photographic Society to be given by gentlemen well acquainted with the subjects they undertook, and these lectures soon proved to be a great success. No sooner, however, did the gentlemen of this Library Committee (or at least some of them who had the management in hand) perceive this, then they began to arrange a number of other evening

lectures, without any intimation to the gentlemen of the Oldham Photographic Society, who had already arranged a syllabus. For what reason is best known to themselves.

These latter lectures are, no doubt, what Mr. Mackie alludes to, as these same lectures were simply sixpenny readings—descriptive of commercial slides.

I deeply regret that the Oldham Photographic Society ever allowed their name to be used in connexion with an undertaking where stupid bungling has been so apparent.—I am, yours, &c.,

A MEMBER OF THE O. P. S.

TAYLOR'S (NOT DALLMEYER'S) NEW DIAPHRAGM SHUTTER.

To the Editor.

SIR.—In a recent issue you described a new diaphragm shutter patented by Messrs. Dallmeyer & Beauchamp. The patent is No. 5619, of 1888.

This invention is wholly mine, having been explained by me in February, 1888, to Mr. Dallmeyer, who then said it was no use, the Waterhouse stops being preferable.

I heard nothing more of the matter until I read the specification in your paper, from which you will observe the application is dated April 16, 1888.

I immediately wrote to Mr. Dallmeyer for an explanation, but no explanation is forthcoming.—I am, yours, &c.,

C. PURCELL TAYLOR, C.E.

3, Kenton-street, Russell-square, W.C., January 15, 1889.

[Has Mr. Purcell Taylor publicly shown or described the shutter anterior to the date of the application for the patent?—Ed.]

A SUGGESTION TO ADVERTISERS.

To the Editor.

SIR.—Photographic makers frequently note in their advertisements, "Catalogue sent post free on application, or on receipt of so many stamps."

That doubtless applies to England; but if they would add in their advertisements, "How many extra stamps to India," this would be useful both for photographers in India and advertisers at home.—I am, yours, &c., J. P. S.

India.

COPYING OIL PAINTINGS.

To the Editor.

SIR.—Pressure of work prevents me from replying this week to Mr. Dunmore and the unfounded remarks of "Free Lance," but I shall write in time for the next number of the JOURNAL.—I am, yours, &c.,

PICTON.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

REDUC.—It is the ordinary commercial neutral oxalate of potash that is used in the platinum process.

A. B.—There is no necessity to test the bromide of potassium if you purchase it from a respectable house.

G. H. S.—By $f/6$ or $f/8$ is meant that the working aperture or diaphragm of the lens is equal to so many times the focus of the lens. For example, $f/8$ means that it is worked with an aperture equalling one-eighth of the focus of the lens.

ALPHA.—There are several treatises on the manufacture of glass, any of which can be obtained through your local bookseller. Failing this, valuable information can be obtained, under the heading "Glass," in nearly all the better-class cyclopaedias.

B. O. B.—Lantern slides sent to exhibitions for competition are supposed to be the work, negative and transparency, of the exhibitor; but we do not think that any special objection would be made as to the originality of the negative. A slide taken from an engraving would not be likely to be accepted in competition.

C. A. WILSON complains that some emulsion he has made is very much slower than that with which commercial plates are prepared. He sends a couple of negatives which show a very good quality.—The fault appears to be due to insufficient cooking. A longer boiling will render the emulsion more sensitive.

W. CHATTON says he has seen permanganate of potash recommended for intensifying transparencies made by the carbon process, and asks the proper strength of solution to use. The strength is immaterial. The stronger it is the quicker, of course, is its action. About ten grains to an ounce of water is a good proportion.

OLD COLLEGE WORKER.—1. All the makers you name are good and you cannot go wrong with any of them. For negatives of lantern size select a lens not exceeding six inches in diameter.—2. If memory serves aright, the illustration is by the carbon process.—3. We have heard no more of Dr. Noire's new process.

ti. R. D.—To loosen the stopper, try the effect of applying a drop of paraffin oil at the junction of the stopper and the neck of the bottle and tapping with a hard bit of wood, then in a large piece of wood cut a hole sufficient to take to the top of the stopper, and give it a good wrench, the bottle being wrapped in cloth to prevent its cutting the hand in case of fracture.

T. R. ALLANSON writes: "I have just completed a new studio, thirty-four feet by twenty feet, full north light; would you kindly give me your opinion what colour would be the most suitable for the walls?—Any colour that is not too dark and is quiet will answer. A French grey or a light warm brown will do very well. What is to be avoided is any tint that will be trying to the eyes of the sitters."

D. R. C. says he has "invented an entirely new kind of instantaneous shutter which is much better than anything in the market," and asks if he can register it at Stationers' Hall in the same manner that photographs are made copyright.—An invention is not a subject for registration; it must be patented if you wish to secure a monopoly in its manufacture. A patent for four years will cost £4, or you can obtain protection for your invention for one year for 14.

G. R. writes as follows: "Messrs. — have taken a number of views of the scenery in our neighbourhood as well as most of the public buildings, and have made them copyright. These are now being sold by many of the stationers in the town. Is this fair, as it blocks the way from any one else taking the views?—Our correspondent is under a misapprehension; there is nothing to prevent him or any other person from taking similar views, and from exactly the same standpoint, if desired. The copyright is in the photographs and not in the subjects themselves."

J. P. S. (Bombay) writes: "A small (e.g. quarter-plate) negative is said to be, from its sharpness and other considerations, very useful for giving excellent and good-sized pictures by enlargement, instead of taking large direct pictures. Can an equally sharp and good negative be obtained with a full-plate (rapid rectilinear) lens and camera by using a quarter-plate carrier, and if so what arrangement of stop is best?—In reply: A full-plate lens will be quite as effective as a smaller one for use under the circumstances described. If the lens is good no stop will be required for the production of a very sharp quarter-plate negative."

A. STANESON asks if there is any better method of making the roof of a studio watertight than by putty and paint. He says his studio has been built many years, and, do what he will, it is always leaky.—There is no better plan than by the materials mentioned, if they are properly applied. Probably, as the studio is an old one, the putty has perished. In this case all the old putty should be clipped out and fresh applied. Many leaky roofs are caused by the instability of the sash bars, which yield by the force of the wind, and so cause the putty to crack away from the glass. The remedy in this case is to fit a stout iron bar transversely under the centre of the sash bars so as to give them greater rigidity.

LET requires: "Can the oxyhydrogen limelight be used for taking portraits at night? If so: 1. Is it necessary or desirable to use a screen between it and the sitter to diffuse the light?—2. Would there be any advantage in employing a condenser, such as is used in theatres?—3. Under ordinary circumstances what would be about the exposure necessary with rapid rectilinear lens, open aperture? Summarising these queries, we reply: No doubt the limelight can be employed for portraiture, but it must be screened by a large sheet or sheets of tissue paper. Both condensers and reflectors should be employed to throw all the light upon the screen, which will then enact the part of a luminous cloud that will light the face and figure with softness. One trial will determine the exposure requisite."

J. P. says: "I have a very fine single achromatic lens (meniscus, by Grubb). When using it for enlarging or reduction in the camera should the concave or convex side be toward the negative to be enlarged or reduced? If the concave, then of course it will be fixed in the copying camera in its normal condition, I presume; but if the convex side should be next the negative, how should the stops be placed? Should they be between the lens and the negative or between the lens and the sensitive surface? If the latter, is it sufficient merely to screw the lens into the camera from within, without changing it in its mount at all, the lens being flush with the outside of the camera front and the tube with the stops inside the camera?"—In reply: Here is a simple rule by which this matter will be readily understood. When the lens is employed for enlarging from a negative then must the convex surface be next to the negative, but if a reduced copy of the negative is required then must the convex surface be next to the sensitive surface. The stop must always be next to and at some distance from the concave surface of the lens.

NOVICE writes: "I have recently been using —'s instantaneous plates and —'s rapid shutter, but all the negatives yield prints like the enclosed—all black without any detail or half tone: why is this?"—The reason is that the negatives are very much under exposed. It is next to useless to attempt instantaneous views of London street scenes in such light as we have had lately. You must not imagine that by the use of the so-called "instantaneous plates" and extra rapid shutters you will be enabled to obtain good negatives under every condition of light.

PHOTOGRAPHIC CLUB.—January 23, 1889.—Subject, *Development*. On January 23 all lantern slides intended to be shown at the special lantern evening, on January 30, must be sent in.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Monthly technical meeting, January 22, 1889, at the Gallery, 5A, Pall Mall East, at eight p.m. Subject *Effect of the Green Band of the Spectrum on Bromide and Chloride Plates*, by Mr. Friese Greene.

MR. WILLIAM TYLAN sends us a slide protector for packing slides when on cycling excursions. He says he has had them in use for some time. This is *à propos* of our article on the subject on pp. 18 and 19 last week. It is a nicely made case with a flap at each end.

DINNER OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Mr. England writes us that "it is decided to have the Photographic Society's dinner at the Café Royal, and on the same evening as the Solar Club, and unite the two. Therefore the dinner will take place on the second Monday in February. Tickets can be obtained by writing to me."

ARTISTS AND THE PARIS EXHIBITION.—The *Daily News* correspondent telegraphs:—"English artists will be glad to hear of an announcement which was made to-day by the Minister of Public Instruction. It relates to the exhibition of pictures in the International Exhibition. Artists who intend to compete for admission will, it says, be granted an extension of time for sending in their works to the committee—namely, to the 15th February."

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION FIXTURES.—January 21, *On Making Backgrounds* (practical): Mons. M. Tuquet. February 4, Lantern exhibition—*A Visit to the Land of the Midnight Sun*: Professor Clowes, D.Sc. February 11, Smoking concert. February 18, *Photo-Micrography*: Messrs. W. N. Pratt, F.R.M.S., and F. W. Cave, F.R.M.S. March 4, *Experiments in Printing Processes*: Mr. W. J. Collings. March 18, *Magic of Science; a Night's Amusement with Photographic Chemistry*: Mr. J. C. Lancaster. March 25, Smoking concert.

THE PARIS INTERNATIONAL EXHIBITION.—In the interests of several intending exhibitors who desire to know details concerning this exhibition, we have applied to Mr. Trueman Wood for information. Mr. Wood says:—"The exhibitors of photographs are on the same footing as all other exhibitors, i.e., they have to pay 5s. per square foot of floor occupied if they have stands or show-cases, 2s. 6d. a square foot on wall or screen. All the space has been for some time disposed of. I was hoping—and have not yet given up all hope—that I might get a free space for an exhibition of amateur photographs. If anything of the sort is done you shall know."

ANNUAL DINNERS.—A party of over eighty, being the *employés* of Messrs. Watson & Sons, High Holborn, together with a few guests, dined together at the Holborn Restaurant on Saturday last. Mr. T. P. Watson, the head of the firm, presided. After the usual loyal toasts, Mr. Watson paid a tribute to the various heads of departments and also to the men, by whose excellence of management and workmanship the firm had been able to attain the high position it occupied, one evidence of which was the great number of medals received by them in competitive exhibitions both in this country and abroad. The meeting was of the most harmonious character, many toasts, speeches, recitations, and songs, being given.

The annual dinner of the North London Photographic Society took place on Tuesday last in Myddelton Hall, there being a good attendance. Mr. J. Traill Taylor presided, Mr. E. Clifton being Vice-chairman. Mr. E. Dunmore in responding to one of the toasts, that of "The Photographic Club," observed that when the original North London Association of twenty-five years ago broke up, many of its members allied themselves with the South London Society, and when it in turn ceased to exist its members joined the Club. The proceedings terminated, as usual, by the singing of "Annd Lang Syne," shortly before midnight.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1499. VOL. XXXVI.—JANUARY 25, 1889.

DEFECTS IN SENSITISED PAPER.

In returning to this subject, partially discussed by us a fortnight ago, we are impelled at the outset to take up one particular phase of the topic through a cause of complaint having come before us which clearly showed the existence of a want of knowledge in this direction. The primary complaint was that a certain series of negatives must have been badly executed, as prints recently made from them had not the brilliancy and sparkle of those produced a couple of years ago from the same set of negatives. *A priori*, there was here a strong case against the negatives until the results came to be investigated, when a little knowledge put a different complexion upon the matter. The whole cause lay in a different sample of albumenised paper from that used for the first batch having been employed in the recent prints. It is a fact not sufficiently known that at the present time albumenised papers can be obtained of far more varying characteristics than was once the case. Thus, we have in our possession as we write two samples of paper, equally glossy to the eye, yet one of which will, with a rather weak negative, give a rich and crisp print, while with the other nothing but flat, poor prints can be obtained, although with what might be termed a negative of average density prints of great excellence can be produced. Here, then, it is evident that a photographer working with the first kind for a length of time, and producing a class of negative that suited it, would at once say his paper was defective if he used some of the second kind. It will perhaps be sufficient if we thus draw attention to a quality capable of influencing results to such an extent as to lead to a paper being put aside as defective, though capable of producing the highest results. Whether one or the other of the two kinds is the better we will not now stay to inquire.

There is, however, to the variety of qualities possessed by albumenised papers a parallel in the variety of tones desired; and so marked is this, that a considerable amount of photographic instruction as regards printing will have to be rewritten. The old text-books all stated that a silver bath for albumenised paper ought to be kept acid; but after a time the practice of large printers showed that with an acid silver bath "purple" tones, which at one time were entirely in demand, were with difficulty obtained, and it was then pointed out that the silver printing bath must be neutral, or defective prints would be produced. It does not need to be pointed out to any one accustomed to examining the results of our leading photographers, or to frequenting photographic exhibitions, that some of the very finest work of the day is printed in tones the

very opposite of purple, tones of such sort that to obtain them a bath acidified with citric acid would be most suitable. The use of the burnisher, which increases the warmth of tone while adding to the transparency of the shadows, may have had something to do in working this revolution; for such is undoubtedly a correct term to use in this connexion. Whatever the cause may be, the fact remains that when sensitised paper which would once have been looked upon as perfect is tried for obtaining these rich, ruddy brown tones, it would be at once pronounced defective.

Paper is now prepared of such high gloss that other so-called defects show themselves, and have, to our knowledge, led to some samples being returned which really were of the very highest quality. Chief among these "defects" may be cited the presence of innumerable fine fissures in the surface of the finished print after mounting. The cause of this is, or ought to be, obvious, and is analogous to what occurs when an enamelled card is bent sharply. The enamel breaks, mainly in one or two deep cracks; in these defective albumenised paper prints the enamel, i.e., the coagulated albumen, breaks, but into a large number of cracks. The conditions governing that breaking are, first, that the surface of the print be perfectly dry, and, secondly, that the print has dried with a curl. The remedy is obvious; the wet prints must be treated so as to dry perfectly flat, or, which is better, they must be mounted before they have been once allowed to dry. If cracks show in the latter case the paper may be not unfairly pronounced defective.

The high gloss brings another defect in its train in the drying of the silver bath in "tears" upon its surface, and so causing patches of uneven colour on the finished print. There are several remedies for this defect, the chief of which is, perhaps, the reducing the strength of the silver bath so that the coagulation is not so instant and complete, partially drying the surface of the sheet, after it is drawn from the bath, by pressing dry blotting paper upon it, and, finally, always drawing the paper over a glass rod before pinning up to dry—a plan used by all large users of paper, but not sufficiently attended to by those who use smaller quantities. Possibly the difficulty and "bother" of fitting up the rod deters the latter; but this need be no obstacle, for if the edge of the dish which holds the solution be clean, and be not chipped or otherwise irregular, the same effect almost may be obtained by drawing the paper, as it leaves the bath, in such a manner that it catches this edge, where, till the whole sheet is removed, it will adhere during withdrawal, and most of the fluid upon its surface be scraped off as it were.

We will conclude our list of defects by an account of a series of them, derived from a professional photographer in a large way of business, but which might be equally applicable to the veriest tyro. In this instance the finished prints bore a variety of stains and marks, irregular in shape and in distribution, which caused a considerable amount of anxiety. It was, however, quickly decided that they were more like "hypo" stains than anything; but the puzzle was, How did they get there? Daily were the toning operations watched to discover whether any carelessness of handling took place when washing the prints before toning, but nothing of the sort could be seen.

After fruitless efforts at discovery, the cause was at last found out. The printer who was usually detached for fixing the prints was not very careful as to how his clothes touched the bench whereon the fixing trays were located, and it was proved that the defects were distinctly traceable to prints and paper which had in the earlier stages passed through his hands. To insist for the future that his printers must always wear a high apron during fixing operations led to complete future immunity from these defects, the accident proving once more the necessity of the utmost cleanliness in every operation in photography, from the most important to the most insignificant.

THE LATE J. R. SAWYER.

AN earnest worker and clear-headed man has been removed from amongst us. Mr. John Rober Sawyer died at Naples, on Monday, the 21st instant, in the sixty-first year of his age.

Mr. Sawyer had for a great number of years been inseparably associated with the Autotype Company, of which he was a partner, and of whose Works at Ealing he was Director. In that capacity he introduced many improvements in permanent photographic printing, and published much of a highly practical nature. The *Autotype Process*, of which we possess six editions, was an emanation from his brain and pen; *Autotype and Chromotype Notes and Queries*, which succeeded the manual just named, was edited by him; and more recently *The A B C Guide to Permanent Photography*, published in the summer of 1887, claims Mr. Sawyer as its author. His method of developing pigment pictures upon a flexible support is known and practised by every carbon printer, while his system of photogravure is quite fresh in all our memories.

For some time Mr. Sawyer's health had been bad, but it was only three weeks ago that he was compelled to give up work and try the effect of a residence in the more genial climate of Naples. We learn from his partner, Mr. W. S. Bird, that on the 18th instant he was in a fairly cheerful frame of mind, on which date he wrote him a note, but his symptoms became rapidly worse, and the heart refused to continue action. His eldest son at once started for Italy, but arrived too late to do more than pay the last duties to the dead.

An "advanced" man in all that pertains to social life, Mr. Sawyer was a supporter of the Cremation Society, and desired that his body should after death be resolved into its elements by fire, which it was decided should be carried into effect at Milan, which possesses the most perfect crematorium in Europe.

Mr. H. H. SCULLER recently described before the Philadelphia Photographic Society what may be truly termed the largest camera in the world—the Lick telescope—as arranged for photographic work. As we have described, at intervals, the progress of the great instrument as it approached completion, it will not now need details to be given to enable our readers to understand the main points of construction. It will be remembered that an extra disc of glass survived in the process of manufacture, and was purchased for the purpose of being ground to such curves as would enable it to form a photographic auxiliary, and that it is now in use. When applied to the ordinary objective as a corrector for photography, the "camera" has to be

shortened ten feet, or, in other words, the focus is diminished to that extent, and thus permits the dark slide for 20 x 20 plates to be placed *in situ* in front of the eyepiece without disturbing it; and all starry objects coming to the same focus in one instrument, there is no need to perform the operation of focussing. Large as are the images produced by an instrument of such long focus it is yet desirable at times to amplify them and to carry the operation out; the enlargement is made at one operation with this instrument by placing a lens of two inches diameter and twelve in focus in the place of the dark slide. This considerably increases the size of the image, which is received in a small camera placed nearer the eyepiece. It is only comparatively recently that this great camera has been put to work, but already its first fruits have reached this country in the form of photographs of the moon superior to anything hitherto achieved.

At the Annual Meeting of the Royal Meteorological Society, last week, the President (Dr. W. Marcey) gave an address on fog, a subject always of interest to photographers from more points than one. However, it was "London fog" that was specially alluded to on this occasion. Adopting Professor Tyndall's theory, that each particle of condensed vapour is coated with coal smoke, Dr. Marcey explained that it was a well-known fact in meteorology that cold air on the summit of hills, being heavier than that below, slid down the slopes, so that the lower portions of the hillsides were really colder than the plains beyond. London is surrounded with hills, and on them the air was colder than in the town, with its burning gas, coal fires, and furnaces. He then pointed out the difference between London fog and the fog or cloud on a mountain top. In the case of the former, carbonic acid, he said, was abundantly found in the fog itself, chiefly from coal smoke; while fog or clouds on mountains were far away from this source of contamination. The address was a most interesting one to photographers.

SPEAKING of London fogs. It may be mentioned that they are frequently very local and sometimes very shallow, even where they are the densest. A London fog may be very thick indeed a few feet from the ground, while the atmosphere but a little distance above may be perfectly clear and bright. It is no unusual circumstance, for example, for one of those dense, smoky fogs, for which the metropolis is so renowned, to prevail in, say, St. Paul's Churchyard, while at the summit of the Cathedral, or even only halfway up, a cloudless sky may be seen, with the sun shining brilliantly on the fog below. It is a curious sight, and one worth the ascent to witness.

In the County Council Elections portraits of many of the candidates have figured conspicuously on their advertisements. The majority of the blocks from which they were printed have been produced photographically, not direct however, but from sketches made from photographs. These are copied in the camera, and from the negatives thus obtained typographic blocks are made in the ordinary manner. The majority of the portraits are very poor productions, being about on a par with many of those which are issued by the police authorities of persons "wanted." At the next general parliamentary election we strongly suspect that photographic processes will be more extensively utilised than on any former occasion. In several past elections it has been customary with some candidates to circulate their portraits, almost broadcast, amongst the constituency as a means of enhancing their popularity. The portraits issued on these occasions have, for the most part, been very different productions from the majority of those alluded to on the addresses of the aspirants for the new body. In most instances either collotypes, Woodburytypes, or, in some cases, silver prints have been circulated.

It is much to be regretted that those who have employed photography to illustrate subjects of lasting interest, have not had the examples printed by some one or other of the permanent processes. Or, if this were not done in the first instance, had the pictures reproduced by some method by which they would be lasting. We recently saw some illustrations to a pathological work which had been printed in silver some few years ago, many of which had faded so badly as to be

now of no value for the purpose intended. As some of the cases illustrated were said to be unique, it follows that the fugitiveness of the prints may prove a serious loss to the medical profession at some future period. The photographs in many scientific works which are fading would amply repay for reproduction in any of the processes by which they would be permanent—provided, of course, that the work be taken in hand before the fading has gone too far.

A short time back we pointed out how some charming effects in the lantern might be obtained with frost and snow pictures—or, indeed, with many others—by covering them with tinted glasses. A difficulty may often be experienced in small towns in obtaining glass of the desired tint and of the right density. This may be overcome by taking advantage of some of the coal-tar colours. They are very transparent, and many of them are freely soluble in alcohol. If a little of the dye be dissolved in collodion or negative varnish, and then be applied to plain glass, it will answer quite as well as coloured glass itself. By this means any tint may be obtained, which is not always the case with tinted glass; and by increasing or diminishing the proportion of the dye the density may be varied at will.

SATURATED SOLUTIONS.

AMATEURS who compound their chemicals from saturated solutions too frequently overlook an important factor in the case, namely, temperature—taking it for granted that “saturated” means a definite quantity. It is scarcely necessary to point out, to the majority of our readers, that this is a fallacy. A saturated solution at a temperature of, say, 65° is often of a widely different strength to what it would be at, say, 55°. Notably is this the case with some of the substances employed in photography—alum, or the sulphate of iron, for example. If a saturated solution of the latter salt be made with water at 65°, and then be subjected to a reduced temperature, such as we had a week or so back, a considerable quantity of the sulphate will crystallise out, and so render the solution weaker. The same will happen, though to a less extent, with oxalate of potash.

Now it is easy to see, if a ferrous-oxalate developer be made with such solutions, that it will not have the same developing energy as one containing the normal quantity of the salts. Hence, many inexperienced workers are led, from seeing the image abnormally long in making its appearance, to suspect under exposure. We know this matter has been a source of trouble, of late, with two or three amateurs in enlarging on bromide paper, and probably has been with many others. Although the pictures were fully exposed, the slow appearance of the image, which was rendered still slower by the coldness of the developer, they were assumed to be under exposed, and this ended in many failures, and, in one case, to a condemnation of the paper itself. It was assumed that sheets of different sensitiveness had been put up in the same packet, because similar results to those secured some little time previously, with the same negative and exposure, could not be obtained; whereas the trouble really arose from the much weaker developer employed to bring out the image. The discrepancy in colour often met with at this season of the year may sometimes be traced to the same cause. The solubility of alum is still more influenced by temperature than is the sulphate of iron. Clearing solutions are usually made with a “saturated” solution of alum mixed with an acid. It may be mentioned that in some instances, when so compounded, the solution may contain as much as double the amount of alum that it does in others.

ECHOES.

So many are the different forms of “flash lamps” now in the market, and so popular has become the use of magnesium by their means for portraiture, that it is difficult to believe it is little more than twelve months since the subject of the “flash light” was brought before the Glasgow Photographic Society for the first time in this kingdom by Mr. T. N. Armstrong, yet such is the case. Yet, as remarked by that gentleman in his more recent communication to the same Society,

published last week, very little effort has been made to systematise this application of artificial lighting so as to render it commercially useful for portrait purposes; and I quite agree with him also in his opinion that some of the contrivances introduced are little better than “ridiculous toys.”

His efforts therefore, in conjunction with a fellow member of the Glasgow Society, to reduce the employment of the flash light to something more of a certainty, even if they do not end in attaining “unerring precision,” must be characterised as praiseworthy, and deserving of the thanks of the profession. But it is unfortunate that in the brief printed report of the meeting at which his paper was read, although accompanied by the full text of the latter, it is impossible to convey to the outside reader the same full information on the subject that was, I have no doubt, given to those present. Reading for myself, I must confess that I but imperfectly comprehend the details of the lamp described, which is perhaps not to be expected without an actual inspection of the affair, and that in one respect, at least, it seems to me not to invite general adoption except in large establishments, where considerable recourse is intended to be had to that form of light, if even there.

The employment of the limelight as an auxiliary, however efficient it may prove in actual use, will scarcely be hailed as a simplification; on the contrary it will, I venture to say, be voted a complication by the vast majority of the readers of the JOURNAL. The working of the limelight, I am fully aware, has been very greatly improved and simplified of late years, but especially by the introduction at a cheap rate and in convenient form of the condensed gases; and, thanks to the present popularity of the lantern, its principles are now more perfectly understood, and almost every one is now more or less familiar, theoretically at least, with the rules to be observed in order to secure safety. Yet I am convinced that it is yet only the comparative few who are, *practically*, sufficiently well acquainted with its use, and so placed with regard to obtaining a convenient supply of gas, to look upon its introduction into the studio as an unmixed benefit.

Those few regular users of the limelight who have by constant practice attained a perfect familiarity with its working are too prone, encouraged by a fortunate immunity from accident, to express a confidence in it that almost amounts to contempt for its dangers in less competent or careful hands. I know more than one such practised “hand” who metaphorically smiles at the suggestion of danger when he himself is working, but who is particularly careful to prevent any one else from interfering with his arrangements, and very chary of accepting outside assistance of any sort, thus acknowledging that the safety presupposes the possession of an amount of intelligence and carefulness that he does not credit to ordinary mortals. But when Mr. Armstrong says he considers “there is far more danger to be apprehended from a common oil lamp than from a limelight jet at any time,” he seems to me to be going further than most limelight operators, and will scarcely, I fancy, carry general opinion with him.

That the oxyhydrogen light may be beneficially introduced into the studio without any great cost or inconvenience in some of our large cities I do not doubt, but, as I have suggested, the use that is made of it will have to be considerable in order to make it worth while. In out-of-the-way places the trouble and expense of renewing the gas supply—I do not refer to the cost of the gas, but the carriage and time wasted—will prevent many, even large workers, from adopting it; while in short-handed establishments the extra work involved is scarcely calculated to promote safety.

In another column last week I find a description of a new lamp “to be used for photographing by magnesium light,” for which a patent has been obtained. I will not describe it as a “ridiculous toy,” but, as far as I can see from the specification, it presents some points which, on the surface, have not a very practical look. For instance, the bottom of the lamp consists of “a thick piece of ground glass,” and the magnesium powder, mixed with chlorate of potash gunpowder, or any other combustible, is for use “laid in a train on the upper surface of the ground glass bottom,” and “the duration of the exposure is regulated by the length of the train.” Now, I should like to ask, What is likely to be the average “life” of a lamp with a ground glass bottom over which a serpentine stream of intense combustion is constantly—so long at least as it lasts—meandering?

Not long I imagine. I remember once exhibiting the gun-cotton flash light to a small audience, employing an earthenware plate upon which to make the flash, and the unanimous opinion expressed was that it would prove a rather expensive light "if you have to use a fresh plate every time," for the plate succumbed to the heat; and if earthenware, how much more "thick ground glass," especially when the heat "drags its slow length along" a narrow path. If it were a new method of dividing glass by means of heat it would be comprehensible.

Then, again, the duration of the exposure depends upon the length of the train, so no doubt it will do; but how is that length to be calculated, or rather how is a uniform duration of exposure to be assured with a given number of inches of train? I opine that the quantity of material will operate materially in affecting the duration of combustion, to say nothing of the intensity of illumination, and I am inclined to think that any "system" of exposure based upon such frail data would prove misleading in the extreme.

One other matter strikes me, namely, the mention of gunpowder. If by "gunpowder" is meant the "villainous mixture of saltpetre," it is well for the sake of the atmosphere of the studio and the olfactory nerves of the sitter that the lamp is intended to be "smoke tight." But what about cleaning the lamp and the actinic value of the light, even if that operation is most carefully performed after each exposure? The white fumes of oxide of magnesium would not matter so much, though even they arrest some light, but I do not imagine the cloud of imperfectly consumed carbon could be thus lightly regarded; and setting quite on one side the "fouling" propensities of ordinary gunpowder, it seems to me that a very great deal of magnesium would be burnt to waste. It is possible, however, that "smokeless" powder is meant; if so, why not state so explicitly, even though it be in the specification of a patent?

I thought I had finished, but find I must refer to yet another point. It is claimed that the lamp "can be suspended in such a manner that the light falls on the sitter from the same directions as in daylight portraiture." We are told further on that the area of the front surface should not be made smaller than twenty-one inches by twelve, so that presumably those are the approximate dimensions of the "skylight," whose effects it is intended to imitate. Truly, "taking one consideration with another," this must be a fearfully and wonderfully made piece of apparatus if it answers its inventor's aspirations.

In his paper on *Collodio-Bromide Emulsion*, read before the Society of Amateur Photographers of New York, Mr. F. C. Beach alludes to the difficulty arising in contact printing upon sensitive collodion films from their extreme tenderness, and the consequent liability to damage from pressure or friction against the negative. This is no merely imaginary trouble; indeed, I think sufficient stress is scarcely laid upon it either by Mr. Beach or previous writers. Actual friction is not necessary, for the mere pressure—and that in a very moderate degree—suffices to produce innumerable minute pinholes or perforations in extremely delicate films unprotected by any gummy or varnish-like preservative, such as those prepared from a "washed" emulsion. In the case of unwashed emulsions, where a preservative is employed, the dried film generally possesses greater hardness or resisting power, either produced by the direct indurating effect of the substance employed upon the collodion, or more commonly arising from the fact that its pores are filled and its surface covered with a comparatively tough substance that partially protects it from slight injury. But even then the greatest care is needful to avoid rubbing the two surfaces together, however gently.

It has been suggested to interpose a mask of thin paper between the negative and plate, so as to separate the two surfaces to an infinitesimal degree, and this, under proper precaution, proves an effective remedy even in the case of lantern slides, though no doubt many operators would look askance at any such suggestion as tending to degrade the sharpness of the resulting image. I do not think there is much real cause for alarm, but in lieu of that method I would suggest the employment of specially constructed frames instead of the ordinary printing frame usually employed, one such being now, I believe, in the market. This should be more of the character of the single dark slide, with a backboard hinged to the frame instead of being detached, as in the case of the printing frame for paper

proofs, from which the transparency frame differs in not requiring a decided backboard to permit of the progress of printing being examined. The attachment of the backboard to the frame gets rid of one chief cause of rubbing the films together, as contact is made by a direct downward pressure without any chance of side movement in fastening the springs. If the negative and plate be made to drop into a rebated cell of the exact size, the risk of shifting is altogether removed, or if the negative be larger than the plate a mat of card-board, with an opening the dimensions of the plate, can be inserted to hold the latter safely in position, and the danger is then reduced to that arising from simple pressure. This may be removed or reduced to a minimum by a proper arrangement of springs, which, as in the dark slide, will be fixed to the inner side of the hinged back. The extremities of a single bow spring, such as ordinarily employed in the dark slide, by bearing upon two points removed from the centre of the plate, will, by spreading the pressure, lessen the risk of bending the glass and causing it to bear too heavily on the negative. But if four separate little springs bearing upon the corners or edges of the plate—or, what is perhaps simpler, two bow springs attached by the same screw to the centre of the back and crossed at right angles—be employed, the pressure will be applied at the least dangerous points, and even in the case of uneven glass will scarcely exert any injurious influence on the material portions of the plate. There is much room for improvement in the appliances for transparency contact printing.

There is a somewhat remarkable description in last week's French correspondence of a vignetting mask exhibited before the French Society. It is described as a zinc plate perforated in the centre, and is intended to "render great service in producing photographic busts," whatever they may be. But the noticeable fact is that "the oval hole is at the same time pressed upwards by means of a die." The bodily lifting of the "hole" from the sheet of zinc is a novel mechanical feat, and reminds one of the Hibernian's description of how to make a cannon by "taking a long hole and pouring brass round it."

A novel lens exhibited at the same meeting is also fully entitled to the description of remarkable. It is intended, we are informed, "to take part in the forthcoming struggle for fame, as it is entered in the competition for optics;" but what most concerns me is that instead of being of transparent crown and flint, like ordinary lenses, it is "cut" (*sic*) "out of blue and yellow glass." This is indeed an innovation, for if the colours are only pronounced enough we have both the visual and chemical rays cut off to the not very manifest advantage of either ease in focussing or rapidity of exposure. The idea was received as "good and novel." The latter I can quite believe, but we have to wait for time to show whether or not it is of use in practice.

And—oh, fie!—the members being "under the influence of the holidays," very little business was done. JUNIUS.

FURTHER PROGRESS IN SPECTROSCOPIC PHOTOGRAPHY.

IN the month of June of last year I wrote a short paper on the solar photographic spectrum of Mr. George Higgs, of Liverpool, as I had just had the pleasure of comparing it with Professor Rowland's grand spectrum in the library of the Royal Astronomical Society, and I could not help expressing my surprise and delight at the perfection of the results obtained at Liverpool. This first spectrum of Mr. Higgs extended only from W.L. 3860.8 to 4404.3, including the regions around G, h, and H, but he has since continued his labours, and the negatives now embrace the whole spectrum, from the extreme violet to a point considerably beyond D, with the exception of a certain portion near F. The print from the negative, which extends from W.L. 5080.0 to 6064.5, including b, E, and D, is less distinct than the more refrangible portion of the spectrum, as might well be expected from the extra difficulties that necessarily present themselves as we approach the red end of the spectrum. But it is not my intention to dwell, at present, either on the value of the negatives or on the nature of the prints taken directly from the negatives, but I wish to draw special attention to the enlargements from these

negatives, three of which I have had the privilege of examining and comparing with other photographs and drawings. The most striking feature of these enlargements, at first sight, is the extreme clearness with which every line stands out on the bright background, nothing hazy or obscure, the whole a perfect marvel of distinctness and sharpness of definition. All must admire the fine solar spectrum made with an interference grating by Professor L. M. Rutherford; and yet viewing this grand work, and then turning to the enlargements of Mr. Higgs, is like looking at the delicate outlines of a fine public edifice first through a November fog, and then in the brilliant sunshine of a clear spring morning. It must be borne well in mind that I am now referring, not to the original negatives, but to the enlargements on about the same scale made, one by Mr. Oscar G. Mason, and the other by Mr. Higgs, using an original method of his own. Before I saw the pictures of Mr. Higgs I was struck with the beauty of Mr. Mason's print, and although I still admire the latter, I now know that it is possible to possess something much more perfect. If attention be paid solely to the stronger lines the difference is less apparent, but when we turn to the fainter markings, there can be little doubt that the above illustration is no exaggeration.

Many of my readers will probably have examined the three exhaustive drawings of the visible spectrum, made in 1884, at Winchester, by Professor Huxley Smyth, with a fine Rowland grating 85 by 50, the surface being ruled at the rate of 14,438 lines to the inch. A tabular comparison of the results obtained by Mr. Higgs with the eye observations of Angström and Smyth, and the photographs of Rutherford and Vogel, will give the most satisfactory idea of the success of the work. I will take, for instance, the fine lines on the less refrangible side of the G group.

Angström.	Huxley Smyth.			Rutherford.	Vogel.	Higgs.
	I. Winchester.	II. Winchester.	III. Winchester.			
W.L. 4313.6	Double 0	Double 0	Double 0	Single 0	Double 1 Faint line	Double 1 Faint line
4314.5	Double	Double	Treble	Fainter on one side	Double	Double
	1 Faint line	3	2	1	2	3
4316.4	Do.	Do.	Do.	Do.	Do.	Do.
	3 Faint lines	3	4	2	5	5
4318.0	Do.	Do.	Do.	Do.	Do.	Do.
	3 Faint lines	1	4	1	3	5
4320.1	Do.	Do.	Do.	Do.	Do.	Do.

The only instance in which a line appears in any of the above spectra, and there is not a corresponding one in the print of Mr. Higgs, is at 4314.5, but here the treble line with two lines following in the III. Winchester are probably identical with the double line and the three following lines of Higgs.

I should mention that the photographs of Rutherford and Higgs have been examined without the assistance of any lens. Probably the exquisite definition of the enlargements of Mr. Higgs would render the comparison still more striking if optical power was used in the examination.

This wonderful distinctness in the enlargements, which makes the prints almost, if not quite, as valuable as the original negatives, is due in great measure to the method adopted by Mr. Higgs for getting rid of the granular structure of the metallic silver in the process of copying. The method, which is probably original, or at least suggested itself independently to Mr. Higgs, consists in a mechanical movement of the plate parallel to the lines, or in the use of a cylindrical lens, convex if placed in front of the enlarging lens, or concave if behind it. The results obtained by this new method are a great advance on anything I have as yet had the pleasure of examining, and I feel sure that many who are engaged in similar researches will be very grateful to Mr. Higgs for generously making known a discovery which in his hands has already proved so eminently successful. The negatives are prismatic pictures, but, as diffraction spectra are likely to possess a much greater scientific value, Mr. Higgs is now preparing to repeat his work with a large Rowland grating. When the diffraction negatives are completed, and a fresh series of enlargements produced by the newly invented

method, we shall then be supplied with a solar spectrum as perfect as the dispersive power of the instrument employed is capable of producing.

S. J. PERRY.

A SIMPLE FORMULA FOR FINDING THE EFFECTIVE APERTURE OF A RECTILINEAR, EURYSCOPE, PORTRAIT COMBINATION, OR THE LIKE.

Is a photographic lens, where the diaphragm is placed between the lenses, the usual method of finding the ratio of focus to aperture, by dividing the equivalent focus of the combination by the actual diameter of the diaphragm, gives only an approximate result, for this reason, that the actual aperture of the diaphragm is not always the effective aperture of the combination. As the speed of the lens depends on this ratio, it is important that the effective or true working aperture of the combination should be known.

The exact relation of focus to aperture for parallel rays is expressed by the formula—

$$\frac{pa}{p-d} = \frac{f}{n}, \text{ where,}$$

p = principal focus of front lens or combination of lenses in front of the diaphragm.

a = diameter of aperture in diaphragm.

d = distance between front lens and diaphragm.

f = equivalent focus of the entire lens.

A = effective or working aperture of the entire lens.

$$n = \frac{f}{A}$$

$$\text{Then } n = \frac{f(p-d)}{pa}, \text{ and } a = \frac{f(p-d)}{pn}.$$

EXAMPLE I.

$$p = 0.4, a = .005, d = \frac{1}{2}, f = 5\frac{1}{2}, n = \frac{5\frac{1}{2} (0.4 - \frac{1}{2})}{0.4 \times .005} = \frac{51.75}{9.1675} = 5.645.$$

This lens is therefore working at $\frac{5.75}{5.645}$, or a shade less than U.S. 2.

By ordinary method, $\frac{5.75}{.005} = 5.00$, which is .315 too great.

EXAMPLE II.

With the same lens a stop is required to give it a working aperture of U.S. 16, or $\frac{f}{16}$.

$$\text{Then } n = 16, a = \frac{5\frac{1}{2} (0.4 - \frac{1}{2})}{0.4 \times 16} = \frac{51.75}{152} = .34.$$

By ordinary method $\frac{5\frac{1}{2}}{16} = .340$, which is .019 too great.

EDWARD M. NELSON.

"PLATINO-URANOTYPE" AND "MERCURO-URANOTYPE," TWO NEW URANIUM PRINTING PROCESSES.

[A Communication made to the Sheffield Photographic Society.]

THE two methods of obtaining positive prints, which I have the honour of presenting to your notice to-night, are, I believe, novel; and before I proceed with the subject of my paper, I beg to say a word or two of explanation.

Last winter (1887), when there was very little chance of obtaining shots with my camera, I amused myself by trying various processes of printing, amongst others the exceedingly old one of printing with salts of uranium.

As you all doubtless know, in this old process paper is simply coated with a strong solution of uranic nitrate, and is then dried. It is then placed behind a negative in the printing frame, and a faint image, full of detail, printed on it—direct sunlight being best for this purpose. This image is then developed by floating the print, face downwards, on one of the following baths:—

1. A weak solution of gold trichloride.
2. A solution of ferricyanide of potassium.
3. A silver bath.

The print is fixed by a rinse in a very dilute solution of hydrochloric acid, followed by a thorough wash in ordinary water. With the gold bath, a vigorous violet image due to metallic gold results; with the ferricyanide bath, an image of a burnt sienna colour is obtained; and lastly, with the silver bath, a grey image.

I was much struck with the softness of the images and the amount of detail given by these methods, but at once recognised the coarseness of the tones obtainable being the reason that the process was laid on one side as merely an interesting fact.

I tried a platinum bath as a substitute for those I have mentioned, with the natural result that no visible reduction of the latter took place. I thought no more concerning the subject until November last, when reading about the reactions involved in the various iron printing processes, I was struck by the remarkable analogy which exists in the behaviour of the ferrous and uranous salts with solutions of potassium, ferricyanide, and of salts of gold and silver. Not unnaturally I conceived the idea that this analogous behaviour might extend to the salts of platinum. Now the ferrous salts, such as ferrous oxalate, although they will reduce auric chloride to the metallic state, will not, without the assistance of a further reducing agent, such as neutral oxalate of potassium, reduce platinum from its salts. It was the discovery of this fact that enabled Mr. Willis to produce and patent his beautiful "Platinotype" process.

I presumed, then, that an assistant to the reducing power of uranous nitrate was all that was required to render possible a new process of platinotype on an entirely novel foundation. Starting on this basis, I tried sensitising paper with solutions of uranium nitrate and potassium platinous chloride. The paper was exposed behind a negative and a faint grey image printed by a few minutes' exposure to direct sunlight. This was then developed in a hot, slightly alkaline solution, composed of hydroquinone, formic acid, and ammonium carbonate. I obtained a slight reduction of platinum by these means. Further experiments showed me that printing should be stopped as soon as any trace of the image becomes visible. With prints given this much shorter exposure, I thought I had solved the problem, for prints thus treated developed with the greatest beauty; but after they were washed and dried I was disappointed to find that the image was grey and flat on the surface, having sunk into the paper, as was shown by the fact that on viewing the print as a transparency the image was full of vigour. This I attributed to the strong and hot developer attacking the sizing of the paper, and I am now convinced that such was the case. Now if into a test tube you pour some of this hot solution, and into this a few drops of platinum solution, an instant reduction of the latter takes place. From this it is easy to see that the reactions involved are not so much a question of the reducing power of uranous salts on those of platinum as one of uranic salts preventing or protecting the platinum salt from becoming reduced by an otherwise sufficiently powerful reducing agent, and that the action of light on the uranic salt, reducing the same to the uranous state, serves the purpose of removing a barrier to the action of this reducing agent or developer.

With this theory as a guide, the problem became much simplified, since a choice of developers becomes very easy by test tube trials. A cold solution in the first place obviously would be desirable, and the following seems to be suitable:—First make a saturated solution of neutral oxalate of potash, and dissolve dry ferrous oxalate in this to saturation. By the use of this cold development I got over my main difficulties, for I have, as you will see later, obtained platinum prints in half tones, and it is to prints thus obtained that I have given the name of "Platino-Uranotype."

It will be needless to call your attention to the fact that, like Artemus Ward's tale, "they are far from purflick," but they will serve the purpose of affording proof of my success so far as the rough chemical problem is concerned. The refinement and perfection of the process can only be achieved by repeated and patient trial, in order to ascertain the best proportions of the sensitising solutions, &c., and my object in bringing the matter before your notice at this very early stage is in the hope that far more competent hands than my own may be started in this direction. The process is very simple, for the operations involved are merely:—

1. Coating the paper.
2. Exposing same in printing frame.
3. Development (which takes only five to ten seconds).
4. Fixing in HCl (one and a half per cent. solution).
5. Rinsing in water, drying, and mounting.

In my most recent experiments I have substituted the uranium chloride for the nitrate in the sensitising solution, and I am inclined to think that better results are to be obtained from its use. As in Mr. Willis's processes, chlorate of potash may be added in minute quantities to the sensitising solution to increase contrasts.

As far as my necessarily limited knowledge at present goes, the following seems good proportions for the sensitising solutions:—

A.	
Saturated solution of uranium chloride.	
B.	
Potassic platinous chloride.....	60 grains.
Water, distilled	1½ ounce.

Ninety minims each of A and B are spread over a well-sized sheet of paper 26 x 20 inches.

Now for the most perfect form of platinotype (by any process) to be obtained, it is not difficult to see that the platinum should not form a part of the sensitising solution, but should be deposited on an image already formed, by an action similar to that of toning silver prints with gold, and for this reason no platinum in the "paper" or "printing-out" process can ever give the detail of a silver print. I have experimented with a view to a modification of the "Platino-Uranotype" process with but partial success, and it is through these experiments that I arrived at what, so far as I can ascertain, is a second novel process—"Mercurio-Uranotype." This is the title which I have given to this second process, which may turn out to be useful for rapid proofing of negatives, if for nothing else, for the tone is not very objectionable, and if preferred may be modified. Paper is coated with one or other of our uranium solutions, to which has been added some saturated solution of mercuric bichloride (say one part mercury solution for every eight of the uranium solution). A sheet of paper is coated with about one hundred and seventy minims of this solution and dried in the dark. It is then printed behind a negative until it attains full strength, which will take only a few minutes; it may then be floated on solutions of gold or platinum to obtain a more pleasing tone, and next placed in water acidulated with HCl, or the toning omitted and the print treated as if it were Pizzighelli paper. Thus it will be seen that this process is one of the simplest known.

In conclusion, then, may I venture to say that if more attention were directed to the salts of uranium many latent and valuable properties would in all probability be discovered; their reactions are very powerful and should be more generally known than they are at present. I believe much remains to be discovered in this direction.

As to the "Platino-Uranotype" process, the rough prints I have here will afford proof of my success in obtaining pictures in platinum black by novel means; and I may tell you that throughout my experiments with this process I checked results by treating prints on plain uranium paper in the same manner as the others, in order to make certain that the appearances observed were wholly due to the presence of platinum salts.

ALLEYNE REYNOLDS.

PHOTOGRAPHS TAKEN WITH THE EYE, AND THE EFFECT OF A BROMIDE PLATE IN A VACUUM AND UNDER PRESSURE.

[A Communication to the London and Provincial Photographic Association.]

By way of preface to the subject I am about to bring before you to-night, may I ask if you have ever seen anything with your eyes shut? And when I say with your eyes shut, do not mistake me and run away with the notion that I am in any way referring to any imaginary mental vision one can conjure up in the dark. For instance, look at an object that is fairly illuminated steadily for a few seconds, then suddenly close your eyes and a similar object can be seen. I do not attempt to explain this, though it is evidently governed by some law; and it leads me at last, after no end of failures, to the discovery which is one of the subjects of my paper to-night, namely, that you can obtain a photograph with the human eye if you have a light strong enough and a plate sensitive enough. After no end of failures, I obtained an impression with the aid of an electric arc lamp, 2000 candle power, which I have at my place, 92, Piccadilly, for taking photographs. I looked at the arc light for fifteen seconds, then switched the light off and exposed a very quick plate (a plate coated in different layers, which makes it much more sensitive) and held it to my eye for a minute or more. On developing it I found a spot, which pleased me very much. If you put the spot under a powerful microscope you can see the image of the arc. I have obtained marks with the magnesium flash light, but they are not so good as with the electric arc; in fact, there is nothing definite about them.

I have my flash light here, so if any of you would like to try the experiment I shall be very pleased to watch the proceedings; for I begin to value my eyes more than I did at first, because after one experiment I did at Piccadilly I had a black spot hovering about the retina for some days. With Mr. Debenham's advice, and that of others, I have come to the conclusion that it is dangerous; and the black spot did not go off until I put a piece of red glass before the arc light and looked at it for two minutes, which seemed to counterbalance the effect. I shall not try it many more times, for, after all, sight is very precious. I have only chanced one eye always, but it may affect the other, so I intend to be careful.

I may say here just one or two things with regard to the eye. It is by it we alone can judge, not only of its own perfection, but also of the comparative value of any given optical combination. It is endowed with considerable freedom of motion; and no doubt we shall have to go to the eye for many optical hints. I may here say the retina is a transparent substance composed of nerve fibres spread out into a thin layer, and corresponding to the ground glass of the camera. The retina receives the picture from the object in front, and being connected with the optic nerve behind, the picture is conveyed to the brain. I believe if one could analyse them there are salts in the retina corresponding to those used in photography, though probably of a much more sensitive nature; and the electric magnetic effect of light conducts to the brain, where there is always an alkali and acid to develop, and the atom deposit in the cells can be called at will to answer our memory. Perhaps I am going a little too far, both for myself and others who may think in a similar way, also for those who do not think in the same way; but there is no harm in giving you my thoughts, as it seems to me we like dabbling in ideas that are a perpetual mystery.

But now to offer some suggestions with regard to the picture produced by the eye. Can it be reflected from the retina, from the cornea, or from the back surface of the lens? Is there a kind of phosphorescence which can affect a photographic plate? Is it some kind of electric phenomena, and our latent image a galvanic action? Of course, these suggestions are very wild; for I must confess, although I discovered the effect, I cannot explain it, and the more I try to do so the more ignorant I feel. It may lead to something important as time rolls on. Photography is now making huge strides; its history becomes a clueless labyrinth of confusion and uncertainty; it has vigorous health and plenty of practical and mental ingenuity always at hand, which affords ample proof of the earnestness with which experimental investigators work. Experimenters should work out their internal nature, with the aid of experiments, of things contained in the varied world around them, then they will have something original to tell us, and be continually adding atoms to the progress of our fascinating art. I know, for my own part, I have formed a love and veneration for photography—with all its worry, disappointments, &c.—which has almost the nature of a passion; every act of seeing leads to consideration, consideration to reflection, reflection to combination, and combination to ideas which ought to be worked out with method and system, then we shall be sure to discover something quite new and original, especially if we work earnestly and patiently.

I must here confess that a mere statement of conclusions without the experimental evidence is of no use. I know I have gathered much knowledge from the classes that I attended at the Polytechnic and the Firkbeck Institutions. These helped me to appreciate the lectures and discourses at the Royal Institution, which I have attended the last two years, both in the afternoon and evening. I have to thank many friends for giving me passes to hear the Friday evening discourses, which are unique, varied, and leave plenty of scientific food for any one to digest.

Now with all this there are three important indispensable things we must be able to command, viz., time, money, and knowledge. Well, let us take the first. I wrote to your worthy secretary that if I waited for a convenient time to give this paper, I should never have the pleasure of interesting you in the way I hope I am doing. The same thing occurs with the use of money. If you want a thing and cannot afford it (well, if you wait until it is convenient, you will never get it all). I know it's very wrong, but I buy things and get as much credit as possible, and, strange to say, all are usually most accommodating. This little incident occurred last year to me: I know a hard-working clever mechanic at Bath, who, sometime ago, suggested this kind of pump, so I said make me one (of course I saw something in his suggestion), and I hope it won't cost more than 10*s*. He said it should not. I paid him and kept those that were richer waiting. But listen what was the result. He made the pump, got a medal for it at Falmouth, also numerous letters from mining agents, and no doubt, it has increased his trade, so this has done him a good turn, and the richer people I kept waiting ought to be very much obliged to me; and now I understand he can improve on this one. But what has it done for me? Ah! there is no knowing; you would not have had the latter part of this paper—and there is no knowing what more it may do.

Then, again, take only a few of the instruments. This spectro-scope with the Grubb lens inside (which is unique) was no end of bother to get right. Practical experience combined with a little scientific knowledge must be possessed by those who experiment with the simplest instrument. I must make an open confession to you, I cannot carry on these experiments with the system and method I

should like, so I must leave that for others who have more time and more apparatus at their disposal; but I can occasionally bring forward results which give a great field for experimentalists, though I must confess one thing—if any one had gone through with every possible care and patience Becquerel's experiments, combining method and system in every step and after all obtained nothing, I don't envy him the trouble, for after spending 60*l*. and no end of time I could only obtain two colours—but mind you, I must say this, it has led me to other experiments, possibly more important ones, so I have not lost by it. In due time I shall bring my experiments in connexion with orthochromatic photography before one of the societies. This I have thoroughly worked in a systematic and methodical way, and I am determined to carry on these experiments with a perfect method as long as I live. Capt. Abney has begun in the right way. I hope he will forgive me for mentioning his name, I only wish we had a few more like him, although not always agreeing with him, for I object to his theory of the latent image. You must not think that I do not admire and appreciate his last important communication to us, although one could wish he would take into consideration the colour which the film absorbs; also the colour of the deposit of the developer he uses. I shall always agitate until we photographers know more about the latent image than we do at present. I remember reading about Ruskin saying, "a milkmaid did not know how to make milk." Now that cap fitted me, and ever since I have been determined to know what it is we use and how to use it; and through making that determination I have been led to notice the *how* and *why* of everything except such *whys* and *hows* as these: *Why* is electricity in the clouds? and *how* is electricity formed in the clouds? Well, I'll leave you to discover.

Now to the effect of a bromide plate in a vacuum and under pressure. I must first relate my experiment. I get this air pump and an air-tight glass box such as the one I have here. After getting as good a vacuum as possible, expose half the plate to the spectrum (why I always use the spectrum is, that I may notice something in connexion with the colours), taking care to cover the other half of the plate up during the exposure. Now let in the air and expose the other half exactly the same time, of course not forgetting to cover up the half that has been exposed. You will find, on developing, the half that was exposed in the vacuum has more deposit upon it. Now I repeat the experiment, only having pressure instead of a vacuum, and, strange to say, it leaves more deposit where the exposure has been in pressure, which is very remarkable. Now I expose one in a vacuum, and instead of normal air, as I did before, I used pressure, and, strange to say, pressure has more deposit. This is very curious; I should have thought the vacuum would have had more deposit, or at least been acted on most.

I can only account for it in this way: In pressure you have heat, which accelerates; and in vacuum you have cold, which retards. Here are the results. I can at present only say this—you have the results, but not the experiments, worked out properly. I intend to do so. Here is a gauge which I intend to have fitted to my pump to enable me to give you more accurate details as to measurements, &c. In the meantime, I wish some of you would try the same experiments, and let me know the results, as I am under the impression these experiments are very important. There is another experiment I have made: filling my glass box with oxygen supplied from Brin's cylinder, and exposing a plate in it: afterwards repeating the experiment, only I used hydrogen instead of oxygen. Which do you think had the most deposit with the same exposure? Why, hydrogen. I also tried chlorine gas, but nearly got suffocated, so I cannot give you the result, and can only suggest this—I should like some one else to try this experiment.

FINESE GREENE.

PHOTOGRAPHY IN RECENT NOVELS.

II.

THE cry is, "Still they come!" My researches at Mudie's—carried on in the most philosophic spirit, as if I were engaged in deciphering the latest cuneiform inscription—seem to show that most of our novelists have recently been engaged in a profound study of the black art.

Some use it only incidentally, though with striking effect; while in other cases—as in the book of which I am going to give some account in this article—it forms the staple of the story. It is evident that the bibliographer of photography, Mr. Jerome Harrison, will have to form a new class in his lists for "photographic novels." All this shows the increasing popularity of photography, and these additions to our literature ought to be a source of pleasure to all who are interested in the art-science.

In *The Romance of a Shop*,* by Amy Levy, the story is told of four sisters whose father dies suddenly, leaving them with no resources but a few hundred pounds. The first chapter finds them in the conservatory attached to their parental home.

"The interior of the great glass structure would have presented a surprise to the stranger expectant of palms and orchids. It was fitted up as a photographer's studio.

"Several cameras, each of a different size, stood about the room. In one corner was a great screen of white-painted canvas; there were blinds to the roof adapted for a shutting or excluding the light, and paste-pots, bottles, printing frames, photographs in various stages of finish—a nondescript heap of litter—were scattered about the place from end to end."

Photography, it seems, has been the amusement of the young girls, and they determine to now make it their business, instead of accepting the proffered charity of their friends. During the discussion on this question we are told that—

"Gertrude plays nervously with a copy of *THE BRITISH JOURNAL OF PHOTOGRAPHY* which she held,"

and declares that she has a

"Plan to propose to you all. There is one thing, at least, that we can all do."

"We can all make photographs, except Fanny," said Phyllis, in a doubtful voice.

"Exactly!" cried Gertrude, growing excited, and walking across to the middle of the room; "we can make photographs! We have had this studio, with every proper arrangement for light and other things, so that we are not mere amateurs. Why not turn to account the only thing we can do, and start as professional photographers? We should all keep together. It would be a risk, but if we failed we should be very little worse off than before. I know what Lucy thinks of it already. What have you others to say to it?"

"Oh, Gertrude, need it come to that—to open a shop?" cried Fanny, aghast.

"Fanny, you are behind the age," said Lucy, hastily. "Don't you know that it is quite distinguished to keep a shop? That poets sell wall-papers, and first-class honour men sell lamps? That Girtton students make bonnets, and are thought none the worse of for doing so? We have thought out a good many of the details," continued Lucy. "It would not absorb all our capital, we have so many 'properties' already. We thought of buying some nice little business, such as are advertised every week in *THE BRITISH JOURNAL*. Gertrude and I would do the work, and you, Fanny, if you would, should be our housekeeper."

"And I," cried Phyllis, her great eyes shining, "I would walk up and down outside, like that man in the High-street, who tells me every day what a beautiful picture I should make."

"Our photographs would be so good, and our manners so charming, that our fame would travel from one end of the earth to the other!" added Lucy, with a sudden abandonment of her grave and didactic manner.

When the plan is submitted to the consideration of friends, some encourage, while others discourage it. A soft-hearted youth named Fred, declares that—

"I'll come every day of the week to be photographed, if I may, and so shall all the fellows at our office!"

But a strong-minded aunt opposes the plan, which is, however, carried into execution, the girls wisely securing the assistance of a certain

"Mr. Russell, the friend of their father. He carried on a large and world-famed business as a photographer in the North of England, to the disgust of a family that had starved respectably on scholarship for several generations."

A studio and rooms are taken at "20n, Baker-street," for though "There are a great many photographers in Baker-street already,"

yet it is held that

"It is the right thing for people of the same trade to congregate together. They combine, as it were, to make a centre, which comes to be the emporium of their particular wares."

Here the girls establish themselves.

"Over the street door was fixed a large black board, on which was painted in gold letters, G. & L. LONIGAN—THE PHOTOGRAPHIC STUDIO; and in the doorway was displayed a show-case, whose most conspicuous feature was a cabinet portrait of 'Fred,' looking, with an air of mingled archness and shamefacedness, through one of his own elaborate lattices of Virginia iron."

"It was necessary, of course, to buy some additional stock-in-trade, and the Mr. Russell undertook to procure for them at the lowest possible rates, a thing, on his own behalf, a large burnishing machine. The girls had hitherto been accustomed to have their prints retouched for them by the Stereoscopic Company."

* One vol. T. F. Unwin, 1888.

Some of the first work the girls get to do is to photograph studies of drapery for artists. But they are called in

"By a mere chance. It was the housekeeper who came, and we happened to be the first photographer's shop she passed,"

to photograph a dead lady, the wife of a Lord Watergate. Dismal as the task is, Gertrude accomplishes it very well.

"They are some of the best work you have ever done, Gerty," cried Phyllis, peering over her sister's shoulder. Gertrude looked thoughtfully at the prints in her hand. They represented a woman lying dead or asleep, with her hair spread out on the pillow.

"Yes," she said slowly, "they have succeeded better than I expected. Of course the light was not all that could be wished."

For young ladies with such determination to succeed, nothing but success was possible. Yet the first year sees a diminution of their little capital.

Presently, however, things improve.

"The business, as businesses will, had taken a turn for the better, and the two members of the partnership had their hands full. Rumours of the photographic studio had somehow got abroad, and various branches of the public were waking up to an interest in it.

"People who had theories about woman's work; people whose friends had theories; people who were curious and fond of novelty; individuals from each of these sections began to find their way to Upper Baker-street, Gertrude, as we know, had refused, at an early stage of their career, to be interviewed by the *Waterloo Place Gazette*; but, later on, some unauthorised person wrote a little account of the Lonigans' studio in one of the society papers, of which, if the taste was questionable, the results were not to be questioned at all."

Slide-making for Lord Watergate's lectures at the Royal Institution was another source of profit. But, of course, just as the thing was beginning to pay, these very heroic young ladies must go and get married! Two of them secure rich husbands—one being the husband of the dead lady who was photographed; the youngest, alas! "goes to the bad," or very nearly so, and is only rescued to die of consumption. But Lucy, who marries a poor artist, continues to practice her profession.

"The photography, however, has not been crowded out by domestic duties; and no infant with pretensions to fashion omits to present itself before Mrs. Jermyn's lens. Lucy has succumbed to the modern practice of specialising, and only the other day carried off a medal for photographs of young children from an industrial exhibition. . . .

"The photographic studio is let to an enterprising young photographer who has enlarged and beautified it beyond recognition."

And so the story ends, and a very pleasant little story it is. It affords a rather striking proof of the recent "craze" on the part of amateurs to blossom forth as full-fledged professionals; but it is well written, and our lady readers will, doubtless, find it especially interesting.

TALBOT ARCHER.

PHOTOGRAPHING THE NEBULÆ.

[Address given by Mr. A. A. Common, F.R.S., at the Camera Club. Mr. J. Trail Taylor in the chair.]

The subject on which I have to say some words to-night is the photographing of nebule. That is a branch of astronomical photography that one may say is quite recent. The history of astronomical photography itself is practically that of photography. The discovery, or the invention of the daguerreotype had hardly been described before it was applied to the delineation of the moon's surface. Bond, of Harvard College in America, made in 1841, if I am right, with the fifteen-inch refractor at Harvard College, assisted by Mr. Webley, an expert photographer, photographs of the moon. These were discontinued for a time, because the driving clock, which has been the bugbear of astro-photographers, prevented the work being done. With better driving clocks they were able to get better results, and views were taken of stars. Excellent photographs were made as good as those of the present day, with a single exception. The daguerreotype plate had to be exposed for a great length of time, and the want of sensitiveness crippled further efforts in that direction, and for a long time little was done. With the invention of the collodion process, astronomical photography took a new departure, and De la Rue in England, and a lot of other men whose names will be familiar to you, worked with the collodion process and produced very fine results. But it seemed as if the end of the capabilities of the collodion process was very soon arrived at. Pictures of the moon were taken, and pictures of stars down to the ninth and tenth magnitudes were obtained with the limited exposure that could then be given to the wet plate. The sun was photographed; in fact, the sun was one of the first objects which was photographed with success, but it was very soon found that the limit of the application of photography to celestial work was small, for they were circumscribed or fixed by the length of time that the collodion plate would remain moist and in a proper state. Great expectations were naturally formed when the application of photography

to celestial delineation was first undertaken, as might be expected, and those hopes were put rather too high; and when success was not obtained the revelation of feeling came, and astronomical photography suffered a relapse. It remained in that state for many years; in fact, had it not been for the discovery of the gelatine plate, which quite altered the aspect of the case, there is no doubt that photography would have been of little assistance to astronomy. But with the advent of the dry plate the whole position of matters was changed. As you know, one can expose for an indefinite time with a dry plate, and with vastly increased sensitiveness. Sir John Herschel who was an expert photographer himself, in the course of a correspondence that extended over many years, concerning the making of the four-foot reflector for the southern hemisphere, gave it as his deliberate opinion that photography would never enable us to delineate a nebula. I had occasion to refer to a memoir which was published for private circulation giving this correspondence, and he stated in this that photography might be used to get the bright stars, and might be used for the purpose of forming a background on which the artist could delineate the nebula; but another man, who wrote some very charming books on astronomy, gave it as his opinion as early as 1845 or 1846; in fact, he was speaking of the daguerreotype, and he says:—"Nor is it impossible that the planets, Mars, Venus, Jupiter, and Saturn, might be delineated in this way and objects discovered which could not be discerned by means of the telescope. It might not perhaps be considered beyond the bounds of possibility to expect that even distant nebulae might be fixed." Here was a man twenty years before Sir John Herschel spoke, who said a great deal more than Sir John Herschel did, and he said what has turned out to be a great deal of truth therein, for the distant nebulae which he thought might be taken have been taken since—thanks to the dry plate. With the introduction of the dry plate the whole of the capabilities of photography for astronomical research were altered, and it was not long before efforts were made to obtain photographs of the nebulae. One of the first men to do this was Dr. Draper, in America, who, by exposing a dry plate for a very long time, obtained what was then a successful photograph of the Orion nebula, one of the brightest in the heavens. Some of the nebulae in the heavens, of which there are three or four large examples in the northern hemisphere—the Orion nebula, the great nebula of Andromeda, and one or two of less importance as regards their size—are objects you cannot classify or describe, except as being a large, irregular mass of cloud. One can become acquainted with the general shape and recognise them in that way; but you cannot say what they are. Herschel classified them partly by their light and partly by their shape; but the smallness in nebulae is only a relative term here; the known nebulae as they increase or decrease in brightness seem to have different shapes, and when we leave the class comprising the larger nebulae, we get into the classes of nebulae in which the shape is not a cloud but a line; we get into classes of nebulae where the shape is that of a ring; and in the planetary nebulae where the appearance is that of a disc. Perhaps the better way of getting an idea of what a nebula is will be to see it on a photograph. Mr. Draper's work was perhaps the first. I had made attempts to photograph the nebulae because it was a subject I took up in 1874 or 1875, rather with a view to seeing if something more could not be done by means of such a powerful thing as photography. Mr. Draper was the first man who successfully photographed the nebulae, and since then the thing has been a series of successes, and we have got on now to such things as would have been considered marvellous only a few years ago.

I now show you some slides of the comet, taken by Dr. Gill at the Cape with an ordinary lens and camera attached to his equatorial. You cannot fail to notice the numerous quantity of small stars shown. In the old daguerreotype days only one or two of the largest would have been shown, and even with collodion they would have been considerably less in number; in fact, this photograph first brought home to me what power photography could give for delineating the heavens.

To come back to the photographing of the nebulae, there are one or two points of importance to dwell upon when we consider the importance of photographs of the nebulae in contradistinction to drawings. It is very easy to draw an object that has well-defined apertures, where the lines between the light and the shadow are extremely well defined, but to draw Orion where the lights gradually merge into shadows, it is impossible to get a good picture. The power of the observer's eye changes, and the longer he is in the dark the more he sees, and there is always a tendency to make more of the fainter points to the detriment of the brighter points, and to delineate bright stars with a total absence of nebulae near them, owing to the fact that the nebula, which is undoubtedly round certain stars, has not its effect upon the eye through the brightness of the star mass. Consequently, we get with the best intention in the world a conventional representation of a drawing. It can only be read in connexion with a drawing made under similar circumstances with the same hand and the same light. Consequently, one is prepared to see what one does see. In a very remarkable book, published by the now Director of the Lick Observatory, Professor Holden, on the nebula of Orion, there are the strangest shapes put down to represent one defined object that it is possible for the human mind to conceive. It does not matter whether they are upside down or inside out, they are all the same, and have no resemblance whatever one with another. Therefore, as representatives of the nebula they come to have any value. To make a comparison between such an amorphous object as a nebula, and make it clear to you, I will

ask that a few of the next slides should be put on. The next slide is Orion, from a drawing. Every one knows the three bright stars in the belt. The nebula is here [indicating], and it is just faintly indicated by a little brightness. This photograph was taken in 1881 or 1882 with a very small lens indeed, and it embraces a very large part of the sky. We will now take the next slide. [This is a drawing of the same object. It has been variously delineated by men during the last 200 years. This was about the earliest form. If you can bear this slide in mind for a moment while some more slides come on, and then compare it with one of the photographs, you will find, in some respects, there are some very remarkable things. Here is Shroeter's Bridge, this peculiar ship's prow business. Then there are the four stars forming the trapezium. Now we come to the advantage of photographs. I shall be glad if you will carry in mind the difference between the drawing and the photograph as illustrating the point I want to make—viz., the greater value of the photograph. This is one of two or three photographs which represent the different exposures of the nebula, my object being to get contour lines as showing the points of the nebulous mass which more nearly agree in intensity, but here we have absolutely no indication of the nebula. Here is a longer exposure [slide], on the principle that I should like to see carried out with regard to photographing the nebulae; exposures of varying lengths, so as to measure the different luminosities and be able to draw a contour map, and that is the best way to determine if there is any change of intensity. The next slide shows us more of the nebulae, this one the whole shape and form. If we can consider that between this and the last one there are several gradations, we can easily imagine that we can get many contour lines. And you can see that this and this portion are equal in intensity, a point which it is impossible to be sure of by any hand-drawing. We need not make separate negatives to get the contour lines, for if I take a photograph fully developed, showing every detail, I can make from that original negative which was fully exposed, with varying exposures, other copies which show the bright parts in their proper orders. While I am on this point, which I wish to impress upon you—that is, the enormous importance of photographs over the hand-drawings—I want to show you this other example. This is the second large nebula that we see in the northern hemisphere; that is, the nebula in Andromeda. This is a very large nebula indeed, and can be seen about this time of the year almost like a comet. There is a bright mass here with some outlying spots. If you get that in the right light you can easily conceive the centre position as a sun, and other nebulous masses revolving around it. Fancy this ring here [indicating] Saturn if you like, with a bright mass of condensation and a mass of nebulae all around it, and parts which may eventually coalesce and form a separate part. This was taken by Mr. Roberts with about two hours' exposure this year; bear that in mind for a moment. You may consider that an absolute representation true to nature of the appearance of the nebula; bear that in mind and turn to the next one, which shows the same nebula as drawn by Truebelow, a man whose capacity for drawing these things was unequalled at the time, and I question whether any person with ordinary means or extraordinary means can show so much as is shown there. Instead of showing anything like a bright mass with any indication of a spiral character, we have here only an odd-shaped character of "3." The general shape gives the impression that it is a circular moving mass of nebulae, whereas the next one does not. Supposing that a man had drawn this as carefully as this is drawn, and wished to compare the drawing of another man, which might vary in several points—that is, the other man might make a drawing which is more nearly approaching the photograph—are we to be able to say that any change had taken place between the first and the second drawing? Certainly not! We cannot with our knowledge as to how drawings do differ. But if this photograph is compared with a photograph which is taken later on with the same exposure and the same plates, they must be sensitive to the different parts of the spectrum, then we have a certain criterion as to whether they have changed or not. There is another photograph I will show you—the photograph of some nebulous nucleus of the Andromeda nebula. That part is largely extended here [indicating], and, overpowered by the great light, shows a distinct nucleus. That was the centre of the brighter portion, and it was just about here [indicating] where the nova occurred, which suddenly burst out a few years ago in such a remarkable way. I happened to have taken this photograph the year before, and I was able to say, without any hesitation, that there was not the slightest indication of a star there at that time. I should like to show you a slide taken five years ago. This is [slide] the spiral nebula which has been lately photographed by M. Gothard. Touching the spiral nebulae, of which there are many in the heavens, Lord Rosse found so many that he became infatuated with the idea that all these nebulae which were clumped together were spiral nebulae, and he did draw the nebulae, but broken away here [indicating] and there [indicating], and did not form a true spiral. He was led in his drawing to represent that as a mass of nebulous masses all sweeping away with proper motions toward the centre. This is a very faint thing, and was taken five years ago with a comparatively short exposure; but with the ten-inch telescope M. Gothard, in Hungary, has been able to show this in a most wonderful way. Every little patch here [indicating] comes out in a most wonderful manner, showing the character of the nebula, which is certainly not spiral. To hark back to the drawing, you will bear in mind Bond's picture. This is Lord Rosse's picture of the nebula of Orion, as made by a series of competent draughtsmen with the

large reflector at Parsonstown, of six feet diameter. Here they were hampered with more light but with a larger field. They had not only more light in the telescope, but owing to the greater focal length they had a smaller view, and consequently the view was reduced in angular measurement, and they could dwell longer on particular parts. This part [indicating] is only poorly shown in Bond's. It is pronounced here, and the whole thing becomes one luminous mass of light of equal intensity, and no one with a telescope would recognise that as the Orion nebula. There is one more photograph in this connexion [shown]. There is a little mass of light here which gives the impression of an hour-glass. This is the drawing of the object [shown], and you can compare it with the photograph, which makes more pronounced the objection I have to any drawings. This is such a delicate object that I was obliged to put this round to enable me to find it. It is a little plate I took of the nebula in 1873, which is represented in Herschel's drawing as a triangular nebula, and you can see its bright star with a little circular tail running away from it like the nebula discovered by the Bros. Henri. In photographing these feeble-lighted nebulae very long exposures have to be made, and in order to get the image falling on the same part of the plate consistently and persistently, it is necessary to have a good driving clock capable of working accurately, from half an hour up to even four hours, in order to get the best results. With regard to the question as to the telescope and the aperture and focal length and proportion of aperture to focal length it would be absurd to dwell too long on that here. But there is no doubt that whatever the perfection of the photographic process may be, however sensitive we may get the plates, the advantage will be always with the biggest aperture, because you can reduce the time of exposure; and consequently reduce the difficulty you have to suffer from through bad driving and other defects, and particularly bad weather to the smallest possible amount. With regard to the sensitive plate used, the grains of silver that are in the best photographs are of real size and do affect the image more or less. The image when it is magnified is a series of very large dots put in, and as the dots are of constant size, it affects the beauty of the picture, just in proportion to the size upon which the original negative is taken. Consequently, that points for the best results to the long focus where you could get an original image as large as possible, and increase the number of dots which go to form it. What the exposure will be I do not know; that is a question. With the best knowledge in the world you may come to a wrong conclusion. For a long time I thought the balance of advantages was in favour of the long telescope, but the gentleman in Hungary with a ten-inch reflector has taken such beautiful photographs of different objects, such as spiral nebulae, that I should have thought it was impossible to be taken with a small aperture. He has proved that ten inches is not the limitation downwards to which you can go for a really good photograph. Just now, it may be said, there are a great number of very large telescopes, all capable of taking very good photographs, but there is no determined effort made to systematically photograph the nebulae of the heavens. The sidereal heavens have been done for and settled by the Conference in Paris, which is, by united action, going to take them; but as to photographs of the nebulae—and there are many thousands all ready to be photographed—the Conference at Paris last year determined to leave this and other questions in the hands of M. Janssen, President of the Academy of Science in Paris and myself, with a view of forming a Committee, and if any men can do anything to increase our knowledge of what can be done in any way as to choice of plates or manner of development, it would be of the first advantage to us astronomical photographers to know. I think I have said enough about nebula photography, but before I finish I should like to show you one or two photographs as illustrating how celestial photography in itself has been modified by the invention of bromide plates. It is to that, and that only, which we owe the great advances that have been made; and I have one or two slides which I shall pass upon the screen, and speak upon as briefly as I can. This is a photograph of Jupiter [exhibited] taken in 1879, when that very remarkable red spot was on. You see the red ball across the equatorial and the spot at the side. You will see the spots I spoke of come prominently before you, because you can all see the original images; and you can see the great granulations. If we could get a finer deposit of silver, or could decrease the relative scale of the image, we should get a much finer grain; and you will see how that is shown in the next slide, which represents a photograph of Saturn. I thought that at the time, when the work of the Bros. Henri came over from Paris, that it was one of the finest examples, and so it is to the present day, of stellar photography. Owing to the sensitiveness of the plates, the Bros. Henri were enabled to enlarge the original image, and so get what I have suggested—that is, increase the scale of the image compared to the dots, and you will see there is a great deal more sharpness of the dots. The next picture is the only picture where the collodion has a distinct advantage over the gelatine plate, and there is no doubt that for this purpose the collodion is better than the gelatine plate. In the first place, because we have an enormous amount of light, and the exposure has to be reduced to one-thousandth part of a second to get this effect. Any person conversant with the sun will know the remarkable sun spots which occur, and the peculiar aspect of the spots. We have some very fine photographs of the moon, and this is one of the finest I have ever seen except the Lick one. The moon is a thankless thing to photograph. It makes a fine picture, but a useless picture, for I do not think our knowledge of the moon has been advanced one jot by the finest

photographs which have been taken. The Bros. Henri have tried to apply that method of enlargement to the moon as they have to Saturn, but they are not so good as Saturn. De la Rue took the moon, and he pretty well exhausted it, and the early pictures taken by him in the early days of the collodion process are nearly as good as those taken by the gelatine process of the present time. The next picture is not a celestial one at all, but it illustrates rather a peculiar thing. In 1881 I exposed a plate to the moonlight in order to see what the accumulative effect of the moonlight was, and I got in an hour and a half or two hours' exposure, in a fairly bright moon, this picture of the house opposite. You can distinguish the lace of the curtains in the windows on the other side of the road. That strongly impressed me with the power of photography, as to its cumulative effect, in getting objects you cannot see. Unless you used the telescope you could not see them. You could not see the lace of the curtains on the other side of the road, yet they were seen by a small telescope. I want to emphasise my remarks about the comparison of photography and hand-drawing rather forcibly here. This [picture] is an enlargement from one of the maps, the best series of maps of stars that were ever done; that is Arglander's maps of the southern heavens. When I first received copies of the Bros. Henri's work I immediately sought out on Arglander's map similar portions of the sky in order to find out how the photographic magnitude varied with the estimated magnitude. If you will turn to the next picture you will see how the photograph comes out. Here [indicating] is one star, and here [indicating] is another; but instead of two or three, just look at the enormous number of stars in comparison with those on Arglander's map, and look how beautifully round and regular they show. You can see at once by casual comparison the great superiority of the photographic maps over the hand ones. This [indicating] represents about the scale, shape, and size, and about the magnitude that is proposed to be taken by the Paris Conference; so if you get a map on this scale, call this a degree from here to here [indicating] and divide it into sixty seconds, you will see with what degree of accuracy you can locate the position of any stars. They represent, practically, immeasurable dots, even on such a large scale as they are magnified now. Here are a couple of photographs I want to show you to give you some idea of the telescope used for the particular purpose. This [exhibited] is a representation of Mr. Roberts's telescope. He has done some remarkably good work in England, and I am indebted for some of his photographs to-night; and some of his latest nebulous photographs are surprising. He has an ordinary refractor telescope. [Described working of same.] I hope, gentlemen, I have not wearied you too much in this long discourse.

[The discussion will appear in our next.]

AN IMPROVED CAMERA SLIDE.

Messrs. Ross & Co. have shown us a camera and dark slide, the latter of which is remarkable for portability and efficiency. It has the usual draws for exposure, but the frame does not hinge as in the ordinary form of double slide, having simply an opening to admit the plates with their separating division.

One end of this division is provided with a gutter on each side, into which the plates push easily, and are by a light spring thrown forward under guiding points at the opposite end. Their position is now higher than it should be to register in the frame, but when they are inserted their edges bear in grooves that bring them absolutely into position. It is immaterial which way the division is turned, as the spring catch which keeps it securely in the frame is placed centrally at the opposite end to the opening. It is surprising how quickly plates may be put in or changed, there being no clips, as in folding backs, to stick or to worry the finger nails. The absence of joints leaves no entrance for light, and from the solid nature of the make there is no fear of warping, which has so often caused vexatious spoiling of films.

The contrivance is such that it is no larger than necessary to hold the plates, so that it is small and light, allowing of its being used with a special camera of very reduced dimensions and weight. This camera further possesses many good qualities. It is easily and rapidly set up, is extremely rigid, and, when closed, unusually square and free from projections. The whole is made in Ross & Co.'s best style and finish.

DEVELOPMENT BY SEPARATE SOLUTIONS.

[ABRIDGMENT.]

[A Communication to the Society of Amateur Photographers of New York.]

The following is the formula I now use:—

Solution No. 1.	
Pyrogallie acid.....	1 ounce.
Sulphite of soda (crystals)	4 ounces.
Oxalic acid	20 grains.
Distilled water	1 quart.
Solution No. 2.	
Sal soda (crystals).....	2 ounces.
Sulphite of soda (crystals)	2 "
Water	1 quart.

I have two dishes: one for enough of No. 1 to cover the plates, and one

of the same dimensions for No. 2. Soaking for half a minute in No. 1 and then developing in No. 2 proceeds regularly right along until all the plates are developed.

But I must caution the beginner to always have some old developer of the previous day at hand to start with, by adding to the No. 2 solution, else the first plate or two will lack vigour. As the development proceeds, and in case of a large batch I find the solution of No. 2 to act a little slow, or with more contrast than I wish, I pour off a little and add fresh solution. In this way I have developed thirty to forty negatives of all sizes, with one assistant, of a very uniform intensity, in less than half an hour. The plates used were Carbutt's and Cramer's. I do not see any advantage in this method to amateurs who have only a few plates to develop at a time, and can watch each one carefully; but to the professional photographer who works with pretty uniform conditions of light, and gets somewhere close to the proper exposure, it offers the most regular, cleanly, and rapid method of development I know of. In addition, it is very economical, as not over one-third the amount of pyro is used as by the regular method of developing in one solution. Each plate absorbs sufficient pyro to produce the proper result, and hardness is avoided. For cases of extreme over exposure, where "doctoring" is necessary, this method will not do, and a powerfully restrained developer in the usual style is necessary.

But I am indebted to an inquiry of a gentleman, for it induced me to try hydroquinone (which I had abandoned on account of its tendency to harsh results when development was prolonged) in the same manner, and I must say that I was surprised at the result. It gives me the best class of quick-printing negatives I have yet been able to obtain, and especially is it good for very rapid plates that have a tendency to fog. I use it now almost exactly as I have described for pyro—in fact substitute, in the formula above given, hydroquinone for pyro (leaving out the oxalic acid) and you have a developer giving better results than any formula yet proposed for hydroquinone. All tendency to extreme hardness is avoided by the method of first soaking in the hydroquinone solution and then developing in the soda solution, and the action is also much more rapid than with the old formulae. The dish in which the plates are developed (No. 2) must be kept rocking (with both the pyro and hydroquinone developers) until the image begins to assume strength, to prevent uneven development. In the first soaking (No. 1) this is not necessary. I have fully determined to adopt this method of development with hydroquinone in our establishment.

It will be observed that I have omitted both bromide of potassium and sulphate of magnesium, as they are unnecessary, because the weather now is cold enough, and the plates I am using do not seem liable to frill, and I believe in simple formulae. I have also tried the addition of phosphate of soda, as recommended by Mr. Gilder, an amateur of Baltimore, but fail to see any difference in the result. It may be there is virtue in it, but I have not the time to give a careful test. I am opposed *a priori* to complicating formula with apparently inert substances, though perhaps I may be mistaken in this case.

I think this method with hydroquinone is of importance to the profession, as it is, as I have before stated clearly, regular in results, rapid in development, and economical, as both the pyro and hydroquinone solutions will keep until used up. The alkali solution also keeps well.

D. BACHMACH, jun.

THE CHAMPION PHOTOGRAPHIC EXHIBITION.

THE medal awards of the Fine Art Society for the best pictures in the exhibition now open at 148, New Bond-street, were made on Wednesday, by a jury comprising the names of Professor Herkomer, A.R.A., R.I.; G. H. Boughton, A.R.A.; John MacWhirter, A.R.A., and others. In the department of professional photography the following are the awards:—
A. Architecture: *Silver Medal*, J. Bracebridge Hilditch (St. Paul's Cathedral). B. The Figure: *Silver Medal*, C. C. Cameron (Portrait of C. F. Watts); *Bronze Medal*, W. Crooke (A Sikh). C. Landscape: *Silver Medal*, R. W. Robinson (Snow, Hoar-frost, and Mist); *Bronze Medal*, Green Brothers (Grasmere and Rydal). D. Marine: *Silver Medal*, H. Symonds (Yachts). E. Interiors: *Silver Medal*, Richard Keene (Hardwick Hall). F. Genre: *Silver Medal*, J. H. B. Wellington (Figure Studies); *Bronze Medal*, G. T. Jones (Frame of Animals). G. Instantaneous: *Silver Medal*, F. M. Sutcliffe (Water Rate). This last picture also secured for its producer the Society's *Gold Medal* for the best professional work in the exhibition.

The medal offered for amateur work, by an outside firm, had not been determined at the time of our leaving.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 741.—"Improvements in the Production of Films Sensitive to Light and of Materials for Assisting or Continuing the Effect of Light on Photographic Films." A. F. V. SCHWARTZ and F. H. MERRILL.—*Dated January 15, 1889.*

No. 742.—"Improvements in Photographic Shutters." J. SWIFT.—*Dated January 15, 1889.*

No. 838.—"Improved Bath with Circular Flow of Water for Washing Photographic Pictures." W. ROOKE.—*Dated January 16, 1889.*

No. 861.—"Improvements in Cameras and Dark Slides for the same." W. I. CHADWICK.—*Dated January 17, 1889.*

No. 939.—"Improvements in or relating to Cameras." A. SMITH.—*Dated January 18, 1889.*

No. 972.—"Improvements in Instantaneous Shutters." E. J. P. FELLEW and C. PRITCHARD.—*Dated January 18, 1889.*

PATENT COMPLETED.

IMPROVEMENTS IN THE PRODUCTION OF PICTURES AND DESIGNS ON CHINA, EARTHENWARE, AND GLASS.

No. 1751. JEAN BAPTISTE GERMKUIL BONNAUD, 39, Strand Green-road, Finsbury Park, Middlesex.—*February 6, 1888.*

THE object of this invention is to produce plain or coloured pictures and designs on china, earthenware, and glass, at a considerably less cost than painting by hand, as at present. According to this invention, I take a sheet of glass and, after having thoroughly cleaned the same, I, for the purpose of sensitising it, coat it with a solution of organic matter—that which I prefer is composed of about one hundred cubic centimetres of water, to which I add about twenty grammes of treacle or other like substance, and from about five to twenty grammes of bichromate of potash (according to the state of the atmosphere) and about ten grammes of borate of soda. The glass (thus prepared), after having been left to dry, is placed on a positive photographic print, engraving, or other suitable picture or design (rendered transparent by suitable means, such as waxing, for example, unless such photographic print or other picture or design is on glass, which I prefer), which it is desired to reproduce, with the sensitised surface next the print, and after having exposed the same to the action of the light according to the usual manner of printing from a negative for a sufficient length of time (sufficient for the light to traverse the whole of the picture), the luminous rays will have acted on the sensitised glass so as to allow of the development in the succeeding process (by degrees) of the picture by dusting on powdered metallic colours as follows.

I commence by dusting on the coloured powder to represent the general shade of the design or picture to be produced, and then I proceed in the same manner with all the necessary tones of colour; this done I fix the colours by means of a fatty composition, thus placing these colours in the same condition as those which are put on by hand in the ordinary way.

This composition consists of:—

Essence of lavender	about 100 cubic centimetres.
Fatty essence of Venice	10 grammes.
Powdered resin	5 "

This picture, which by the ordinary processes would be lost after half an hour, may be kept by this treatment for a day or two before completing. After complete desiccation this composition presents a slightly tacky coating which retains the powdered colours, or, to print my picture entirely, I dust on with a dusting brush the large surfaces, and I complete the small surfaces and the details with a small paint brush in flat tints, using with the colours the above-named fatty solutions. This finished, it is evident that on turning it over a fine painting with all the light and shade, in fact, with all the tones, is entirely completed and ready to be transferred on to the porcelain or other similar material to be decorated at one operation. The transfer from the provisional support can be effected a few minutes after the colouring, whether such colouring has been effected by dusting only or by dusting and painting combined.

In order to effect this transfer, I coat the picture with a fatty composition of collodion, so that no cracking may take place by the desiccation; the following is the composition I employ:—

Collodion at two per cent.	about 100 cubic centimetres.
Fatty essence of Venice	10 grammes.
Powdered resin	5 "

The picture, thus possessing a provisional support, I put in a bath of tepid water, where I leave it until the organic matter is entirely dissolved, after which I plunge it in a bath containing about ten per cent. of caustic potash, then wash it in clean water and place it in another bath of water containing ten per cent. of borax and five per cent. of sugar, when the collodion film, with the complete picture on it, will leave the glass, and I am thus enabled to transfer it to the china or other like material as desired, which china or other like material has been previously placed in the bath ready to receive the film when it has left the glass, and when this is fired in the ordinary way an absolutely permanent design or picture coloured or toned as aforesaid is produced.

I thus obtain a picture with all the colours which will melt with one firing and give a very fine picture.

I would remark in conclusion that I am the inventor of a previous process for which Letters Patent were granted on my behalf to Emile Andreoli, dated the 30th day of August, 1880, and numbered 3511, for "An Improved Process for Ornamenting Fictile Wares, Glass, and Metallic Surfaces," consisting of two distinct operations, viz., one for the colours and another for the impression of the shades of these colours. This process gave very beautiful results in some cases, but was defective inasmuch as it was found to be impracticable, especially with complicated subjects, on account of being obliged to transfer a photograph on to a painted "silhouette," and thus mode of proceeding necessitated much work, as the "silhouette" painted on the object to be decorated had to be mathematically correct and correctly registered on to the picture, which was impossible on curved surfaces; moreover the second coat of colour only covered the first coat already fired, and, consequently they would not mix in the second firing, but by my present invention I dispense entirely with the use of a "silhouette" process, and thereby avoid the difficulties of register, and the single firing makes a complete union of the colours.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—1. The process of producing on a provisional support a complete

picture or design in colours or tones with all the light and shade, so that the same may be transferred to the china or other like material at one operation, substantially as herein described. 2. In combination with this process the employment of fatty bodies throughout, substantially as herein described. 3. The process of producing pictures and designs in colours or tones on china, earthenware, and glass, substantially as herein described.

Our Editorial Table.

FALLOWFIELD'S PLATE-SUNK MOUNTS.

How greatly a photograph is enhanced by being well mounted every one is aware. Even a photograph somewhat indifferent in itself may be made to look well when attached to an elegant card. Mr. Jonathan Fallowfield is evidently well aware of the value of a good mount, if we are to judge from samples we have received from his firm. These samples are contained in an album and attached thereto for easy reference. Each is impressed in the centre with an India tint, adapted to suit prints of every dimension, from quarter size to 15 x 12, or larger, and a sunk plate mark is impressed in each mount. They are elegant and useful.

VIEWS IN BELGIUM.

The London Stereoscopic Company.

These comprise a series of eight views taken in Belgium by an amateur, from whose negatives they have been reproduced in collotype by the London Stereoscopic Company. The size is whole-plate, and the subjects comprise views of the Palais de Justice and the St. Gudule Cathedral, Brussels; the Notre Dame Cathedral of Antwerp; old houses on the Quai at Ghent; view on the Canal, Bruges, in which its famous belfry is shown; view of Dinant, and others. The set is accompanied by a sheet containing a printed description of each picture—just such a description as suffices to impart an idea of its leading features. The whole is encased in stiff covers, from which we learn that the set sells at 3s., or four francs. They are certain to be in large demand by tourists and others who desire to possess interesting pictorial mementoes of places concerning which every one has read.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 28	North Middlesex Club	The Iron Room, Strand Green.
" 29	Bolton Club	The Studio, Chancery-lane, Bolton.
" 30	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 31	Halifax Photographic Club	Mechanics Hall.
" 31	Liverpool Amateur	Royal Institution, Colquitt-street.
" 31	Oldham	The Lyceum, Union-st., Oldham.
" 31	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

LAST Tuesday night, at a meeting of the above Society, held at 5A, Pall Mall East, London, Mr. T. Sebastian Davis presided.

Mr. FRIESE GREENE, by means of the limelight and a direct vision prism, projected a spectrum upon a screen some four feet from the slit, and exposed to it a plate coated with a film of bromide of silver covered with a film of chloride of silver with excess of nitrate. In about an hour part of the yellow and all the blue and violet rays had darkened the plate, but a broad space in the green had not darkened. He said that green light was, therefore, good for the development of such plates, and he added some remarks about orthochromatic photography.

Mr. LYONEL CLARK had not been able to understand the latter remarks; although they were stated to bear upon orthochromatism, photography in natural colours seemed to have been meant.

Mr. W. BEDFORD said that the best chemical sensitizers in orthochromatic photography were those which absorbed the rays of the spectrum to which it was desired to make the film sensitive. If any plate would photograph the three colours—red, green, and blue—properly, the problem of orthochromatic photography would be solved; so said Captain Abney. Yellow would then be included, as a matter of course.

Mr. W. H. HARRISON said that Lord Rayleigh had experimentally proved that a suitable admixture of the pure red and green rays of the spectrum would produce a bright yellow light.

Mr. BEDFORD did not consider the pure colours of the spectrum to be absolutely necessary in experiments on orthochromatic photography, especially when a yellow screen was used. Red mixed with blue would then give the best results on an ordinary plate, because the screen used with the other plate would cut off most of the blue; this was why orthochromatic plates photographed some apparent reds worse than did ordinary plates. Captain Abney often used pigment colours in his experiments. A film transmitting red rays only would absorb those of the other part of the spectrum and be sensitive thereto, in accordance with the hypothesis for which Dr. Vogel had contended for years.

Mr. GREENE then exhibited two red glasses bought as ruby glass at a shop, and said that one was safe for developing and the other unsafe; he asked the members present to guess which glass could be trusted.

A large majority of the members declared in favour of one of the glasses, and when it was tested by the spectrum it was found that by far the most unsafe had been selected; when it was then broken and a double thickness of it used it was found to be more safe than the single piece of better glass.

Mr. GREENE next exhibited a system of three optical lanterns, one of which cast a portrait of a head constantly on the screen, whilst the other two, with their apertures more or less covered, threw images of the same head, but with different expressions of countenance upon the more permanent image. The machinery did not work very well for want of accurate adjustment, but enough was done to occasionally throw life-like motions of the features upon the screen. Mr. Greene said that he intended to abolish the costly machinery before them, as the same results could be obtained by simpler means.

Mr. GEORGE DAVISON said that with a simple oil lantern he had shown a boy climbing a ladder and then coming down again; he did not see why the same principle should not be applied to double lanterns.

Mr. HARRISON asked whether, on that zoetrope principle, he could make a face slowly open and close its eyes and show the muscles of the face slowly moving, as Mr. Greene had done now and then that evening.

Mr. DAVISON was uncertain.

Mr. GREENE only looked upon the instrument as a step to something better. He hoped to use it with the new graphophone of Edison, so that the person should appear to talk as he did in life and with the same play of features to each sound. He had found that the taking of five portraits per second of the person to be so represented would be sufficient to furnish pictures to be used in the instrument; of course the sitter must rapidly change the expression of his countenance. Mr. Greene then exhibited one of the old-fashioned tinfoil phonographs at work.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

On Thursday night, January 17, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. J. Traill Taylor presided. There was a large attendance.

Mr. A. HADDON exhibited a specimen of absorptive cotton wool recommended by Mr. A. L. Henderson for filtering and other photographic purposes; he pointed out that, unlike ordinary cotton wool, it sank immediately when placed on the surface of water, consequently, if placed in the tube of a funnel, it would require no previous wetting with water before beginning to filter a solution. He supposed that steps had been taken to remove the natural resin of the original cotton. He added that Mr. Henderson had also suggested that magnesium powder should be incorporated with cylindrical lengths of celloid, so that definite lengths could be cut off and allowed to burn slowly for photographic purposes; in certain cases such a plan might be better than that of using the flash light.

Mr. EDGAR CLIFTON then read a circular of the Oxygen Light Company, describing a new light. He had seen the light, which seemed to be kept up by something resembling the blow-through jet with the lime suspended above it so as to throw the rays downwards.

Mr. HADDON said that, if he remembered rightly, some two years ago Mr. Warnerke introduced a light on that principle.

Mr. FRIESE GREENE then read a paper on *Photographs taken with the Eye, and the Effect of a Bromide Plate in a Vacuum and under Pressure* [see page 54]. He then exposed one of his eyes for one minute not far from a long and vivid flash of the magnesium light. Then in the dark he held his eye near a piece of sensitive bromide emulsion paper on which Mr. Debenham had marked a circle in pencil, after asking permission. The paper was then developed and an image of the pupil of the eye came out strongly on the paper, a little outside the ring, which, Mr. Greene remarked, he could not see in the dark.

Mr. A. COWAN said that there was no doubt as to the fact of the eye having thus produced a photographic effect.

Mr. GREENE then put a sensitive bromide plate in an air-tight vessel with plate glass sides and furnished with a stopcock. He exposed half of it to the rays of the spectrum under the normal pressure of the atmosphere and afterwards the other half to the same light and for the same time in a moderately good vacuum; the latter half, in the same developer, gave a more intense image than the former; hence, he argued, the sensitiveness of such plates varies with changes in barometric pressure.

Mr. W. E. DEBENHAM was of opinion that the result might possibly be explained by the hypothesis that the vacuum removed a trace of retarding bromine set free by the action of light, and that Mr. Greene's statement that such plates were more sensitive in hydrogen than in oxygen might possibly be accounted for in the same way.

The CHAIRMAN thought that the phenomena of persistence of vision had something to do with the effects shown in the eye experiment, and that the light which reached the retina might, therefore, be given off again; the eye was a lens, and it was simply a case of conjugate foci. Once he was adjusting a diodescope, an invention of Bloxam for ascertaining the true time by observing the sun, he afterwards discovered that the intense light had produced an insensitive spot on the retina of one of his eyes; three or four years elapsed before the sensitiveness of that part of the retina returned. He mentioned this to Mr. Wenham, who said that he had had somewhat the same experience, but that the complete sensitiveness of his retina never returned. It was dangerous to play pranks with the eye. One plan of knowing how a picture would look when printed from a particular negative was to look through the negative at a bright light like that of the sun, then turn the gaze to a white wall; a positive picture would then be seen on the wall.

Mr. DEBENHAM did not think that persistence of vision had anything to do with phosphorescent effects on the retina. If it were merely a case of conjugate foci the outer focus should have been as far off as the original source of light.

The CHAIRMAN replied that the eye was adjustable to a certain extent, and that might have shortened the focus; it was analogous to the effect produced by a rack and pinion.

Mr. HADDOX believed that the focus of the eye for parallel rays was about three-quarters of an inch, and that to produce the effect exhibited by Mr. Greene it would have to adjust to about three-eighths of an inch; he did not think that the eye could adjust itself to that extent. The exposure in such experiments might, perhaps, be reduced by applying to the eye a solution of stramonium or of belladonna, which would dilate the pupil and enable it to take in more light. A German had stated that in the retina of the eye is much visual purple which is bleached by the action of light, so that actual pictures are printed thereupon. Professor Gangee repeated the experiments; he kept a rabbit in a dark room with its eyes bandaged, then unbandaged one of its eyes so that it should look at a brightly illuminated window; the head of the rabbit was then instantly chopped off and the eye examined by yellow light; the retina bore a fine image of the window. It was once popularly thought that the eyes of murdered persons preserved an image of the murderer, but Professor Gangee proved that the other eye of the rabbit was sensitive after death, consequently, that a previous image would be obliterated by later ones. The relief afforded by a shady lane on a bright day was due to the shade allowing the restoration of the visual purple. In persistence of vision the same image is usually repeated again and again.

The CHAIRMAN said that the brightness of the light would make the pupil contract so as to act like a small stop, which would give greater latitude in a case of conjugate foci which he had suggested.

Mr. DUBENHAM thought that there was less danger with magnesium light than with the electric light, so wished that Mr. Greene would repeat the experiment whilst some of those present sat with their backs to the light, their eyes closed, and their hands over their eyes; then in the dark they should quickly turn round and ascertain if they could see any phosphorescence in Mr. Greene's eye.

Several members objected to this because of the lateness of the hour.

Mr. J. H. R. WELLINGTON, in relation to Mr. Greene's statement that red light had restored his eyesight, said that Professor Dewar had performed an experiment in which red light had obliterated the luminosity of a phosphorescent tablet.

Mr. DUBENHAM said that red light would diminish one kind of phosphorescence and set up another kind of its own.

Mr. WELLINGTON had tried it and found that the red extinguished all phosphorescence.

Mr. W. H. HARRISON thought the meeting should not close without photographers being cautioned against repeating Mr. Greene's experiments in any shape or form. Some workers in electricity had been rendered totally blind by looking too much at strong lights; the evil done was not known at the time, but developed very slowly in the course of months.

Mr. F. A. HADDOX, Hon. Secretary, hoped that Mr. Greene's eyes were not seriously injured; time alone could show. He moved that the meeting should give him a hearty vote of thanks for his interesting paper. "Finesse jolly great fellow."

This was passed with acclamation.

Mr. GREENE thanked them for the close attention with which they had followed his remarks, and was glad to see the interest in them exhibited by the good practical men before him; he hoped to bring other experiments before that Association. He had learnt much from Mr. Haddox's remarks, and did not agree with him in all; but would not enter into controversy with him, as that would make him feel Finesse all over. As to the effect of small stops, he had noticed when looking through the smallest aperture of Wollaston's line splitter that very near as well as distant objects appeared sharply defined. In the experiments of that evening he did not object to Mr. Dubenham having done the ring on the paper.

CAMERA CLUB.

On Thursday, January 17, Mr. A. PARULES gave an address on Photo-micrography. Sir George R. Prescott occupied the chair.

Previous to the lecture a new camera by Messrs. Watson & Co. was shown and described.

The lecturer dealt with the practical portions of photo-microscopic work in detail, and pointed out the great advantage accruing to any microscopist who worked his science photographically.

Messrs. Nelson, Smith, Beck, Evans, Davies, Hocken Hepburn, and others, added to the discussion.

Mr. Fringle illustrated his lecture with a number of fine prints, and a goodly collection of apparatus by Messrs. Baker, Beck, and Watson, was lent for the occasion.

On Thursday, January 21, Mr. Graham Halfour will read a paper on *Figure in Landscape and Genre*.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

At the meeting of the Photographic Section of the above Club, held at the Public Hall, Croydon, on Friday last, January 12, Mr. Kenneth McKean presiding, an exhibition of one hundred slides by the Wollastonytype process was given. The slides were made by Mr. George Smith, and were much admired. Numerous slides made by members of the Club followed.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

A LARGE number of members of the above Association held their usual fortnightly meeting on Monday evening, January 21, the President (Mr. Henry Sandy, I.D.R. Edin.) presiding.

Four new members were elected.

MR. M. TUCKER gave a practical demonstration on *Endymion's*. First, he illustrated the use and abuse of the background as applied to photography, showing, by means of a quantity of diagrams, in what relation the background should be to the subject, and vice versa. After which he proceeded to sketch, and afterwards fill in, a landscape view selected by the company, explaining as he proceeded the different methods of treating the colours as to mixing and applying. The progress of the work was watched with interest, the time

occupied being about sixty minutes, the lecturer having succeeded in bringing out a very effective landscape.

During the evening Mr. T. Carnell exhibited some prints taken by the flash light, Mr. A. Middlebrooks had some very fine transparencies made by the transferotype process, and Mr. R. S. Arncliffe had on view some very fine enlargements on bromide paper.

A vote of thanks brought the evening to a close.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

At the meeting of the above Society, held on the 17th instant, Mr. George Hankart occupied the chair.

Two members were elected.

The accounts for the past year were presented by the Hon. Treasurer, Mr. W. Sculthorp, showing a balance in hand of over 11*l.* and several unpaid subscriptions yet to come in.

Votes of thanks were passed to the President, Treasurer, Committee, and Hon. Secretary for their past services.

The election of officers was then proceeded with, resulting in the following gentlemen being elected for the ensuing year, viz.:—*President*: Mr. George Hankart.—*Vice President*: Mr. S. S. Partridge.—*Committee*: Messrs. W. Sculthorp, W. T. Tucker, J. Weatherhead, and A. W. Wilson.—*Treasurer*: Mr. W. Sculthorp.—*Hon. Secretary*: Mr. H. Pickering.

It was decided, after discussion, that the lantern slide competition for the silver and bronze medals of the Society take place at the next regular meeting of the Society, on Wednesday, February 13, the slides to be delivered to the Hon. Secretary twenty-four hours before the exhibition.

It was also decided that the general competition for the silver and bronze medals of the Society for outdoor work take place on Wednesday, March 13, prints to be delivered to the Hon. Secretary twenty-four hours before the time stated for competition; and arrangements have been made for the prints to be on view at the Old Town Hall during the afternoon and evening of the date stated.

A few experiments in flash-light photography were then conducted by the Hon. Secretary, resulting in a well-exposed negative of the President, with Veeer's magnesium burner.

The meeting then adjourned until February 13.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE fourth monthly meeting of the Session 1888-9 was held in Lamb's Hotel, Dundee, on Thursday, January 10, at eight p.m.,—Mr. John Robertson, President, in the chair.

Two new members were elected and one nomination for membership received.

The desirability of acquiring rooms for the Society having been brought under notice at a recent meeting, a committee was appointed to look out for suitable premises and report. This report was ordered by the December meeting to be printed and circulated amongst the members along with voting cards. Only about half of the members voted, and, as the question involved a considerable outlay annually, it was moved and seconded that the report be left on the table.

Messrs. Sturrock and Macdonald gave a demonstration of lantern slide making by the wet process. A first-class slide was produced by reduction from a 7½ × 5 negative, a powerful Argand burner being the illuminant, an exposure of five minutes being sufficient. Another successful slide was then made by contact. The prepared plate was laid on the floor between two pieces of stick, such as two matches, slightly thicker than the glass, the negative resting on these, though not touching the plate, was near enough to give a sharp slide. Two inches of magnesium ribbon burned about four feet from the negative gave a sufficient exposure.

Correspondence.

Correspondents should never write on both sides of the paper.

DALLMEYER'S PATENT DIAPHRAGM SHUTTER.

To the Editor.

SIR,—The title and contents of the letter you publish in your issue of the 18th instant, from Mr. C. Purcell Taylor, are entirely false except in that I treated his communication to me personally in the significant manner that I have a quantity of his other correspondence.

Mr. Taylor was employed by me from the commencement of February to July 9, in last year, 1888, when he left me suddenly.

I have worked for some years past, both independently and in conjunction with Mr. Francis Beauchamp, mechanical engineer, on the subject of instantaneous, diaphragmatic, and other shutters, most of the mechanical details having been carried out at Mr. Beauchamp's own works.

In connexion with this shutter preliminary patents were taken out, No. 5303, April 22, 1887, and No. 8711, June 16, 1887; these are practically incorporated with some improvements in patent No. 5619, April 16, 1888. Every detail in this letter was completed before I even knew of the existence of your correspondent. My factory "time-book" shows that on January 25, 1888 (just previous to Mr. Taylor's engagement), a large example of this form was in working, being a facsimile of the model completed before the end of 1887 at Mr. Beauchamp's works, my main endeavour at this time being to reduce the weight and bulk of the regulator. During the last month or two that your correspondent was in my employ he has himself on many occasions endeavoured to explain this identical instrument to inquirers at my office!

There are several persons to whom I showed the final form in confidence before the end of 1887 who could, I feel sure, corroborate my state-

ment were it necessary. However, I have stated undeniable facts in their order with dates, and may add that the patent agent employed for patent No. 5619 had the particulars and drawings in hand in January, 1888.

Your correspondent knew nothing of the principle or construction of photographic shutters except what was explained to him and shown him here, and his statement is as feebly ludicrous as it is, on the other hand, scandalous.—I am, yours, &c.,
THOS. R. DALLMEYER.
25, Newman-street, W.

To the Editor.

SIR,—Having seen in your JOURNAL of January 18, 1889, a letter titled "Taylor's (not Dallmeyer's) new Diaphragm Shutter," No. 5619, April 16, 1888, patented by Messrs. Dallmeyer and Beauchamp, will you kindly allow me space to state that I have now in my possession the first one that was made of the above-named invention in its rough state? It was made by me in the latter part of 1887, and was tried by Mr. Dallmeyer and myself at that time. We decided to make a well-finished one for the then forthcoming exhibition at the Crystal Palace. I have also correspondence concerning the same; this was long before Mr. Taylor was heard of in Mr. Dallmeyer's employ. In fact Mr. Dallmeyer and myself have been engaged from time to time discovering and making various improvements in shutters for the last five years, some of which we have patented and some we have not.

This is the first I have heard of Mr. Purcell Taylor being an inventor; I understood he was a clerk to Mr. Dallmeyer. He is a stranger to me, having only seen him when I have called on the firm.

In conclusion, I am bound to say that it is the most impudent allegation that I have ever heard or read of.—I am, yours, &c.,

High Cross, Tottenham, January 19, 1889.

FRANCIS BEAUCHAMP.

THE FLASH LAMP.

To the Editor.

SIR,—Referring to some remarks respecting the use of Argand burners for flash light, contained in an article headed *The Commercial Aspect of the Flash Light*, and which appears in your last issue of the JOURNAL, the author, Mr. T. N. Armstrong, says,—

"They all" (flash light apparatus and lamps of various makers), "however, start from the point which we, as an Association, were the first to discuss, viz., the blowing of the magnesium powder into some flame or other, and so produce a flash of intense actinic light. In several instances I notice that attempts have been made to claim patent rights for such lamps, and quite recently I read in the columns of a photographic paper that a certain maker had actually prohibited others from employing an Argand burner for the purpose of yielding this light. All I can say is, before I brought the public acquainted with the magnesium flash light I had experimented with an Argand burner, and gave over using it because I knew of a better means of getting the flash."

In reply, as patentee of the Argand flash lamp apparatus, and as one of some experience in artificial light photography—having been for years experimenting with various photographic lights, among which are included Moult's photogen, lexograph, P. M. Law's gas light, magnesium ribbon, magnesium burnt in oxygen, magnesium ribbon combined with limelight, magnesium and sand dropped through flames of gas, Gardie's and other similar magnesio-potash flash light mixtures—I would say that the writer of the article is wrong if he thinks that he or his Society were the first to introduce the flash light, for it is a fact—not generally known, perhaps—that this magnesium light was introduced some twenty years ago by Mr. J. Traill Taylor, and was then soon dropped, owing to the non-existence of rapid gelatine plates and to the great cost of magnesium at that time. Then, again, flash light was introduced many years ago in the process of dropping magnesium powder mixed with sand through gas flames, the rapidity of the flash being regulated by the quantity of sand used; then, still more recently, the process was revived about two years since by Herr Gardie's introduction of his flash light mixture. To these two latter systems, combined with the remarkable reduction in price of magnesium, I owe my idea and encouragement to construct and introduce my flash light apparatus; indeed, I had worked out and was commercially using for everyday work a flash light process months before the subject was discussed or introduced by the person or Society referred to.

With respect to the validity of my patent for Argand flash lamps, I venture to say that although the writer of the paper may have used and discarded an Argand burner, such use (even if employed in the same way as in my apparatus), without publication, would not in any way affect my patent. No doubt the burner was not used as in my apparatus, or its employment would never have been discarded, for surely the ejecting of a twelve or fifteen-grain charge of magnesium *horizontally* through a single flat flame of a sixteenth of an inch in thickness cannot possibly give such immediate and complete combustion as when the same charge is directed and shot *vertically upwards* from the centre of the base of an Argand gas flame of more than twelve inches in length; to say nothing of the great advantage gained when my apparatus, fitted with three burners, is used, each burner giving a flame of twelve inches in length; so that in this apparatus the fifteen grains of powder are divided amongst the three flames, and burnt simultaneously; thus, the charge has to run the gauntlet of thirty-six inches of solid flame. It cannot, therefore, be argued that a single flat flame less than an eighth of an inch in thickness can

possibly ignite the charge so perfectly or rapidly as is the case in my lamp. Without doubt, the Argand burner, altered, adapted, and arranged as in my apparatus, is certainly my own invention; and of my own knowledge, and of others learned in patent law, my patent is a valid one. I therefore shall certainly protect myself from any infringement.

With reference to the remainder of the article, wherein its author describes as new the use of limelight and magnesium light combined, I can say that I used lime and magnesium ribbon light together some four years ago, and again more recently, early last year, when I used my flash lamp and limelight combined. Certainly its use with magnesium is an advantage in brightening up the picture, but I found the limelight too expensive and dangerous for everyday commercial use. I now employ a row of fifteen or twenty gas jets and an extra couple of gas brackets, and so get all the benefit of the limelight, both for focussing and for brightening high lights, and at less cost, trouble, and danger also. There is no need to employ skilled labour to manage and work the limelight.

Trusting, sir, you will pardon my trespassing on so much of your space.—I am, yours, &c.,
A. JAMES.

1, Buckingham Palace-road, London, S.W., January 23, 1889.

HYDROQUINONE.

To the Editor.

SIR,—You very kindly inserted our letter, in which we endeavoured to draw your attention to the fact that your favourable comment on a new form of a lemon-coloured and permanent hydroquinone were irreconcilable with the facts that pure hydroquinone neither must be lemon-coloured, nor can it be permanent. You then added the editorial remark, that what you examined was hydroquinone, and was neutral.

Allow us to reply that, however much what you examined may have been neutral, it could not, from your very description, have been hydroquinone, but a composition of hydroquinone *plus* sulphurous acid, as it was found to be on chemical examination abroad.

To our constituents, Messrs. Schering, of Berlin, it is of importance, and so it is to chemistry generally, that designations for definite chemical products should not be applied to ulterior deviations, which any expert may produce more cheaply and as easily himself.

Requesting of your usual courtesy to find space for these lines in your next issue,—We are, yours, &c.,
A. & M. ZIMMERMANN.
6 and 7, Cross-lane, St. Mary-at-Hill, London, January 22, 1889.

[There is no doubt that Messrs. Zimmermann are strictly correct as regards the nomenclature of the chemical in question, and that the lemon-coloured product cannot be *pure hydroquinone*, any more than (*apropos* of another developing agent) sulphate of iron and ammonia is entitled to rank as ferrous sulphate.—ED.]

OWNERSHIP OF NEGATIVE.

To the Editor.

SIR,—In reference to the case of Pollard *versus* Photographic Company, I should be glad if this case were inquired into by photographers generally, as, having read the whole of the correspondence upon this subject, I am at a loss to understand how a decision adverse to the Company should have been given by an English judge. The only reason I can assign for it is that the true facts of the case have not been stated, and if the case, as represented by Mr. Bax's letter, had been placed by counsel before the judge, I feel confident the judgment would have been given in favour of the defendants.

Would it not be advisable for customers, at the time of sitting, to say whether they objected to being exhibited or not? In any case photographers should know the exact state of the law upon this subject.—I am, yours, &c.,
JOHN HARTE.

64, Kingswood-road, New Brompton, Kent, January 21, 1889.

SHAKESPEARE AND PHOTOGRAPHY.

To the Editor.

SIR,—Can any of your readers inform me as to the whereabouts of the following quotation, said to be from Shakespeare?—

"The glorious sun
Stays in his course and plays the Alchymist."

When we consider that Fabricius, one of the earliest noticers of the darkening effect of light on *tuna cornea*, or horn silver, only published his work on the metals in the year 1559, it must speak most highly for the observant mind of Shakespeare that he had learnt and gauged the significance of this fact.

I met with the above quotation on the cover of the *Photographic Magazine* published in 1864, and containing four specimen prints, which to this day are in a perfect state of preservation. We only possess in the library a single copy, that of June 1864, but if any of your readers should happen to have copies they are willing to dispose of, will they kindly notice that a "kind home" is ready for them in our book-cases, where they will be kept with due and becoming honour?—I am, yours, &c.,
Camera Club.
LYONEL CLARK, Hon. Librarian.

IVES'S ETHER SATURATOR.

To the Editor.

SIR.—Mr. G. R. Baker, in the 1889 ALMANAC, speaking of the Ives's ether saturator, says, "The application of soap after screwing up being a messy affair," &c. The instructions published by the American manufacturers call for the application of soap to the screw thread before screwing up, which is a very different and more effective operation. Mr. Baker also speaks of "retardation of pressure" through the folds of a "roll of flannel or lint." All Ives's saturators of American manufacture have a clear open passage through them—the old style through the centre of the roll, and the new style in the form of a zig-zag channel in the upper side of the roll; if properly made there is no perceptible retardation of pressure.—I am, yours, &c.,

FRED E. IVE.

Philadelphia, Pa., January 5, 1889.

COPYING PAINTINGS.

To the Editor.

SIR.—In the JOURNAL of the 11th instant, Mr. Dunmore wrote, "Pictor," in his last communication, states a truism, "that common sense is not technical knowledge." He gives this as a correct quotation of my exact words. This is astonishing—he must have been quoting from memory, and the subject had got "mixed," as I am sure Mr. Dunmore would not intentionally pervert the meaning of an opponent. I really made no such statement, and wrote no such sentence, nor anything that could be construed into such a meaning; it is diametrically the opposite of what I did state. Here follows precisely what I wrote, parts of which I now italicise: "Mr. Dunmore preaches up the value of common sense. On that point all sensible people will agree with him; it is an essential auxiliary, but it is not a substitute for technical knowledge; it will not enable a man to paint a picture or produce a photograph." Having thus set up the above imaginary sentence, he valiantly proceeds to knock it down in the following words: "But technical knowledge is in a great measure compound of common sense, and, so far as its application to this discussion is concerned, it is very certain that, without common sense, technical knowledge would be of little avail, but this he inferentially ignores." He then triumphantly concludes with "So much for his argument." The student of mental science may make what he can out of the above funny discussion with himself by the champion of common sense.

In his original article, Mr. Dunmore advocated the application of "glycerine and water or beer, leaving it moist while copying; either plan tends to equalise the surface and get rid of inequalities that would show as lighter or darker patches on the negative."

In his first attack "Free Lance" wrote, "Now it is all very well for the expert to paint the surface with beer, or stout, or glycerine, or linseed oil, or poppy oil, or anything that suits his purpose," and thus sanctioned the application, by the expert, of such dangerous articles as beer, stout, or glycerine, or anything that suits his purpose, on "oil paintings brought to be copied." But who is to decide who is an expert? Could you find one per thousand among the ordinary rank and file of photographers? Such eminent firms as Braun of Bernach, Dixon & Son, and a few others are, in these matters, experts of the first rank themselves, or they have first-class experts at their service when wanted, but they are the exceptions. "Free Lance" would not allow the "inexperienced" photographer to apply Mr. Dunmore's glycerine and beer, but he allowed him free use of the sponge and water, and expressed no dissent from Mr. Dunmore's plan of leaving it moist while copying, which a merely damp sponge would not do, and he said nothing about drying it off immediately after. When the dangerous character of this advice was pointed out he tried to shift his ground, and wrote that he meant "that all the inexperienced should attempt was to remove surface dirt by a sponge dampened with distilled water." But when a picture is sent to be photographed it is not sent in a dirty state—as regards surface dirt—for the photographer to clean it; that is not his business. Then the sponge and water application to "oil paintings brought to be copied" could be for no other purpose than that described by Mr. Dunmore and tacitly endorsed by "Free Lance."

His method of reply reminds me of the lawyer's instructions to counsel before going into court. "We have no case—abuse the plaintiff's attorney." I refuted him on every point worth notice, until at last, in desperation, he manufactured another of his perversions of what I stated, as to the relative merits or demerits of stout, water, and the Italian albumen varnish, which has stood the test of over six hundred years (as I could very easily prove), and which "Free Lance" terms "his modified egg-nog!" On the strength of his own misstatement, he asserted that I was "self-convicted of incompetence or want of veracity;" his own *ipse dixit* he seems to think quite sufficient to prove it. The question is one neither as to my competency nor veracity, but rather as to the sanity of the writer who could so foolishly assert "the thing that is not." I did not reply to *querques*, or say, in his own style, "that is a false statement," as that might have reduced me to his own level; but I reprinted the exact words which I did use in regard to stout and water, which proved how cunningly he had garbled and perverted their meaning. I pitied him and let him down gently, but I refuted him utterly by the inextinguishable light of truth. Yet he asserted in his last article, and in the face of the reader, that I

made "no attempt to disprove the charge of want of veracity or of competence." The mere statement of this glaring fact is sufficient to make his offence recoil with redoubled force upon his own head.

I have no knowledge of the personality of "Free Lance," but, from his writings, I believe that he is an able and experienced practical photographer. If this had been a purely photographic question, I should never have thought of contending either with him or with Mr. Dunmore. From the manner in which he has written himself down during this controversy, I am quite convinced that he has no knowledge whatever of oil painting as a fine art. He concludes with another misstatement about oils; but as his previous paragraph on oils was a mere tissue of ignorant assertions on a subject which he does not understand, I need not stoop to discuss it further with a writer who has deliberately perverted my sentences in the most disingenuous spirit throughout; to do so would be as useful as attempting to fill an empty barrel with water after it has had the bottom knocked out of it.

Mr. Dunmore says, "Glycerine and water is the mixture advocated." I accept his statement, but Mr. Hirst, "Free Lance," and I must have misunderstood him, as we all referred to glycerine *per se*; I understood him to mean glycerine, water, or beer. However, I think glycerine and water mixed would be more dangerous, in one way, than glycerine and water separately, for this reason, that water being much more fluid than any glycerine that I ever handled (some of it having been as glutinous as treacle), it would facilitate the passage of the glycerine to sub-pictorial regions, between the paint and the canvas, which it would never reach in its undiluted state. Water-colour paintings and oil paintings are things of a totally different nature. What would be a life-saving prescription for one man would be rank poison for another. Glycerine and water will take to paper "as a duck takes to water;" oil paintings will have none of them. In revenge—if they can get the slightest chance—they will sneak into the canvas underneath, through every crack and fissure, undermine the painting, destroy the very ground it stands on, and smash it up.

The value of moist water colours for rapid sketching from nature is beyond dispute, but I object to the employment of glycerine in their preparation. Artists' colourmen may find it convenient to use it, but it is not necessary; the colours prepared with it may *superficially* appear dry, but they are never thoroughly dry, and they have not stood the test of time. More than a quarter of a century ago I commenced an extensive range of experiments, conducted under counsel from the highest living authorities, on the manufacture and preparation of artists' colours, varnishes, oils, grounds, &c., simply for the purpose of acquiring sound practical knowledge of the materials of which pictures are constructed. These subjects have been included in the daily work of my life ever since. I prepared my own moist colours with a very little pure honey, taken from the comb by myself, thinned down with rain water and filtered. For valuable finished work most of the best artists use only cake colours of the finest quality; photographic colourists should do the same. Damp is the greatest enemy of all pictures, photographs included.

It was my privilege to attend the valuable lectures recently delivered at the Society of Arts by Captain Abney, on *Light and Colour*. In the last of the course he said, in reference to the official scientific investigations by himself and his colleague "on the permanency of water colours:" "By the process of exhaustion we arrived at the fact that it requires both moisture and air to cause the fading of these pigments. A great many are bleached entirely, thus proving if you have ozone and moisture together you get a bleaching without the presence of light at all. Here are some papers which were exposed to moist ozone before the lecture for about ten minutes. Indigo—bottom part was damped, top part left dry; the first half has faded, the other part has not. In carmine, too, you will see that where it has been damped the colour has entirely gone, the dry part is much less changed, &c. We come then to the conclusion that oxygen and moisture are sufficient for the fading of water-colour pigments, and that it is not absolutely necessary that there should be light present in order that the fading may take place." Moral—avoid glycerine and damp.—I am, yours, &c.,

PICTOR.

"HELIOPYRE."

To the Editor.

SIR.—As maker of the powder called "heliopyre," used by Mr. H. Paterson at the Glasgow Calico Hall with great success, I beg to state that no chlorate of potash was used in its manufacture, and that it would not explode with friction, percussion, or electricity. The accident mentioned in Mr. Armstrong's paper arose, not from the explosive nature of the powder, but from the stupidity of the lamp assistant throwing a lighted match behind him into a tin of powder which had the lid off.—I am, yours, &c.,

J. C. HUNTER.

99, Great Western-road, Glasgow, January 21, 1889.

Messrs. Mawson & Swan entertained, on the evening of the 16th instant, the whole of the employees of their Mosley-street and Low Fell establishments to dinner at Mr. Joel's Sale Room, where ninety sat down to a well-spread table. A vote of thanks being passed to the members of the firm, a very enjoyable night was spent, the various departments contributing to make up an interesting programme, consisting of glee, songs, recitations, &c. The evening concluded with a few enjoyable dances.

Exchange Column.

- Leicester's cycle clip for grass mat or background.—Address, W. W. Evers, Wath, Nottingham.
- Exchange 2s Dallmeyer lens for 10x8 outdoor camera with three double backs.—Address, 11, Southgate, 1, West Front, Southampton.
- Wanted to exchange, portable developing tent, print washer, and toning trays, for detective quarter-plate camera without lens.—Address, C. W. Harris, Fern Bank, South.
- Wanted, 3s Dallmeyer's, also 13x11 or 12x10 Ross' rapid symmetrical, in exchange for 2s Dallmeyer's and 10x8 rapid symmetrical. Difference in cash adjusted.—Address, J. Mallins, 14, Commercial-road, Pinlloe.

Answers to Correspondents.

- A. LEVY (Paris) will be written to privately.
- A.—Apply to F. W. Hart, Kingsland-green, London.
- E. L. W.—If the Squire lens is in good condition it is not dear at the price mentioned.
- H. KENNE.—By reducing the proportion of the meta-bisulphite the development will be hastened.
- O. E.—The various lenses named are so much alike that any one may be selected from them at random.
- W.—All we know concerning the present state of the French Exhibition was published in our last number.
- LUX.—Try bookbinder's paste. Your difficulty with glue and such-like cements would be overcome if you first roughened the surface of the glass.
- ANTHONY'S INTERNATIONAL ANNUAL.—To several querists we reply that this is a summer annual. The second number will not be issued till July next.
- K. F.—The method usually employed for separating a gelatine film from glass is to immerse the plate in water which has been very strongly acidulated with hydrofluoric acid.
- J. BODDINGTON.—The stock solution is the one in which the silver forms an insoluble, and it is to one ounce of this that the other ingredients mentioned must be added.
- AMATEUR.—A cabinet portrait lens of about eight or nine inches equivalent focus will be required. Stipulate with the dealer that you have it on trial, in case the focus may not suit your studio.
- LANCASHIRE.—1. Apply to W. I. Chadwick, the Hon. Secretary of the Manchester Photographic Society.—2. They are said to be more permanent.—3. Quite possible. There are numerous makers.
- J. INOUE (Belfast).—We have to thank Mr. Brown for a pamphlet (a reprint from the *Philosophical Magazine* for December) *On Figures Produced by Electric Action on Photographic Dry Plates*. It is beautifully illustrated.
- G. B. M.—A good reducer for an intense negative is to place it in a solution composed of three grains of red prussiate of potash dissolved in an ounce of a five per cent. solution of hyposulphite of soda. Use it as soon as convenient after preparation.
- W. T. SHEPPARD.—The only effect of employing a lens of such a focus on a quarter-plate would be that the nearest point of the focal range would be removed farther away. Of course a smaller angle of view will also be embraced on the plate, otherwise it will answer quite well, and, with full aperture, work with sufficient rapidity to be employed with an instantaneous shutter.
- F. C. (York).—Since receiving your letter we have tried lamps having various numbers of wicks, and although we obtained the greatest amount of light with a four-wick, yet the great heat engendered and care required in regulating the flame so as to prevent smoking render it doubtful if a three-wick lamp will not prove to be, on the whole, more useful, unless in the hands of an expert.
- REMOUE.—The discolouration of the bromide prints was probably brought about by the presence of some of the developer remaining in the prints when they were placed in the fixing solution, which contained free ammonia, and so caused a precipitate of oxide of iron. If, however, the cause cannot be traced to this source then there must have been something wrong with the fixing solution.
- Z. Z. Z.—1. The lenses named are quite rectilinear.—2. The narrower angled lens will serve admirably for general work; the former will do all that can be done by the one alluded to in this query, provided it be worked with a similar diaphragm, the focus in both cases being alike.—3. The marginal definition is good.—4. We believe you will not experience any trouble with the Customs authorities.

BOLTON PHOTOGRAPHIC SOCIETY'S EXHIBITION.—Conditions for Professional Competition.—A gold centre silver medal will be awarded by the judges for what they may consider the best series of six portraits; size, style, and process optional. Also, a silver medal for the landscape or marine view which they may consider the best; size, style, and process optional. All pictures to be sent in carriage paid, without any indication on packages, pictures, &c., as to who they are from. Inside, in envelopes supplied, must be the following:—In envelope No. 1, the competition sheet and P.O. Order only, signed with a motto or number. In envelope No. 2, must be the full name and address of the person sending; and also his number and motto. This envelope will not be opened until after the judges' award. Accompanying the competition sheet, P.O. Order for 2s. 6d. for each class, to cover cost of hanging and packing. Pictures must be addressed, "R. H. Abbott, Mechanics' Institute, Bolton," and must arrive not later than Monday, February 4. No picture which has previously taken a prize is eligible.

PHOTOGRAPHIC CLUB.—The next meeting of this Club will be held in the Masonic Hall, Anderson's Hotel, as a special lantern night, with music. No ordinary business on this occasion.

We have received several excellent photographs of both the exterior and interior of the Photographic Gallery of Sen. Stabilimento G. Brogi, Firenze, Napoli, Italia. The studio and its surroundings are characterised by great elegance.

SEIZURE OF INDECENT PHOTOGRAPHS IN MANCHESTER.—*The prisoners fined.*—At the Manchester City Police-court on Wednesday, John Leather (of the firm of Leather, Sadler, & Holmes, mount manufacturers and photographic dealers), William Tomlinson, William Bracegirdle, and Frederick Chambers, surrendered to their bail on the charge of having, on or about the 29th December, transmitted through the Post-office a packet containing indecent photographs. They were further charged with manufacturing, obtaining, and procuring indecent photographs for the purpose of afterwards publishing and distributing them. Mr. Cobbett, in opening the case, said that on or about the 29th of December an official who was employed at the Manchester Post-office, whose duty it was to examine postal packets, had his attention directed to a particular parcel, and, under the powers of the Post-office Protection Act, he examined it with some particularity. From what he observed he made a report to his superiors in the office, and, after making inquiries, the Post-office officials in London put themselves in communication with the Public Prosecutor. The packet which was sent through the post contained six photographs, and when the Bench had seen them they would have no doubt that to transmit them through the post constituted an offence under the Act. The Public Prosecutor, when he was made acquainted with the facts, placed himself in communication with the police in Manchester, and the matter was placed in the hands of Chief Detective-Inspector Caminada, who applied for a warrant to authorise him to search the premises of Messrs. Leather, Sadler, & Holmes, and seize and destroy any photographs which he might find there. On the 15th instant Mr. Caminada searched the premises and found there two or two and a half dozen photographs, some of them exactly the same as the photographs which had been handed in to the Bench, and six negatives, all of which were more or less indecent. Subsequently, in consequence of statements which were made to him, Caminada or another officer went to Chambers's dwelling-house, and there found about six photographs similar to those which the Bench had seen. Chambers formerly worked for Leather, Sadler, & Holmes. As the name of this firm had been mentioned, it was only just to say that Mr. Sadler and Mr. Holmes had no cognisance whatever that their partner Leather or their workman Tomlinson were dealing in these prints. Taking into account that the number of negatives did not exceed seven, and that the total number of photographs, so far as they knew, was not more than thirty, the police had every reason to believe that no extensive trade had been carried on in these prints. Therefore, the prosecution proposed that Leather, Tomlinson, and Chambers should be each fined the maximum penalty of 10*l.* and costs for transmitting the prints through the Post-office, and that they should indemnify the prosecution for the costs of the case. The other charge would be withdrawn. As far as Bracegirdle was concerned, it was his hand which addressed the postal packet, but there was not much reason to suppose that he knew what the packet contained, or, if he did, that he was anything more than a very humble subordinate. Under these circumstances, he was disposed to withdraw the charge against this young man. Bracegirdle was then discharged, and left the dock. Mr. Hockin, for the defence, said Leather had instructed him to say that neither Mr. Holmes nor Mr. Sadler was aware of the existence of these photographs, and had neither lot nor part in the matter at all. It was also perfectly true that Bracegirdle did not know the contents of the packet which he addressed. He merely wrote the address on the authority of Tomlinson, his superior. This was one of those cases about which the least said is the soonest mended. Leather had been a very foolish man. All he wished to say was that he had not dealt in these photographs for commercial purposes, but had been foolish enough, on going on his journeys, to carry a few about with him. He extremely regretted the position in which he was placed, and desired to express his sense of the courtesy which had been shown to him by the prosecution. Tomlinson had been in the employ of the firm for two or three years, and, so far as the partners knew, was a man of respectability. There was no doubt he had implicated himself in this case under the order of his superior, Mr. Leather. That being so, the Bench might make a distinction between Leather and Tomlinson. Chambers was exactly in the same position, and Leather wished the Bench to know that he accepted to the utmost the full responsibility for all that had been done by both of them. Mr. Headlam, the stipendiary, in giving the decision of the Bench, said the prosecution had dealt very leniently with the prisoners in not sending the case for trial. The photographs were the worst he had seen. Leather was the principal culprit in the matter. He was not only polluting the public with these photographs, but was bringing a reproach upon his firm. He (Mr. Headlam) was glad to say that the firm said, he believed with perfect truth, that they knew nothing about the photographs. Leather was fined 10*l.* and 10*l.* costs, Tomlinson and Chambers each 10*l.* and 2*l.* 10*s.* costs. We understand that, in consequence of the above, the partnership has been dissolved. Mr. Leather is not now in the firm, which will in future be carried on under the designation of Holmes, Sadler, & Holmes, the last-mentioned gentleman being the brother of Mr. Holmes.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1500. VOL. XXXVI.—FEBRUARY 1, 1889.

FACILITIES FOR PHOTOGRAPHING ALTITUDES.

So much has of late been said and written concerning photographing the heavenly bodies (or by whatever other name the stars may be designated) by the agency of ordinary cameras and other everyday non-astronomical appliances, that it is well to allude to a difficulty which the photographer may encounter at the very outset, and suggest means whereby that difficulty may be overcome.

When a camera stand is planted firmly on the ground the camera has usually sufficient movement in altitude to permit of its axis being directed a few degrees above the horizon, in virtue of which a building of moderate height, or a lofty mountain, may readily be brought into the focussing screen, but it is not easy to direct it to a greater altitude without incurring the danger of its toppling over.

Different, however, is the case when the object to be photographed is, say, the constellation of Orion, or any other celestial object, equally high, or even higher up in the heavens. To attempt the direction of the camera to such an altitude would be to bring it outside of the base of support and thus ensure its fall. True, much can be done by shortening one of the legs of the stand, a feat now easily accomplished when the stand possesses sliding adjustable legs, but scarcely enough for the object in question.

For the easy and effective obtaining of the end now sought for two methods may be employed, by either of which the greatest stability is ensured.

The first of these is one which we have more than once had occasion to bring under the notice of our readers in connexion with the photography of clouds, or the upper portion of a high building, but which will here bear repetition in connexion with alereal photography. The camera is erected upon an ordinary camera stand in the usual way, the legs being well spread out to insure stability, one of the legs is now grasped by the hand and pulled right through between the two others standing opposite. This limb now occupies a position diametrically opposite to what it previously did, the effect being that the camera is still in the centre of the base of support as before, and therefore absolutely steady, while the head of the camera stand, and consequently the camera itself, now stands at such a slope as easily to embrace an object at a great altitude. The angle of slope is not a hard-and-fast one, but may be varied to suit any particular requirement by the judicious adjustment of the legs. *Appropos*, this method is also useful for pointing the camera downwards, as in the case of a deep ravine or other object situated much below the standpoint. We have used it

with great success in obtaining a street scene from an upper window.

The other method consists in having a hinged board, the lower half of which is fixed to the tripod head by the ordinary screw, the upper having two straps of brass fixed to its sides in such a manner that it may be raised to any desired angle, being kept rigid by means of thumbscrews, in the edge of the lower board, which pass through a longitudinal slot in the brass bars, very much the same as the bars now in common use for effecting the awing or rigid erection of the folding cameras in ordinary use. To the upper of the two boards, which are joined by the hinge, the camera is firmly attached to prevent slipping when pointed upwards at a great inclination.

We can strongly recommend the latter appliance to every photographer, on account of the multifarious uses to which it is capable of being applied. Is it desirable, in making a transparency, that the camera be pointed upwards in order to clear the roof of an obstructing building, and thus secure the uniform light of the sky in the negative? this hinged base-board supplies the means of doing so in a most perfect manner. By it also we can grasp any fleeting cloud floating high up in the sky, nay, even the ceiling of a building on the one hand, or the objects on the floor on the other, may equally well be secured, for a range is thus obtained from the zenith to the nadir.

STANDARD CHARACTERISTICS IN NEGATIVES.

When the gelatino-bromide process was in its infancy, the standard of excellence sought for in a negative was that of the wet plate character, because, with it, every one was then familiar. It was on this account that the ferrous-oxalate developer found so much favour at that period. For the same reason it is that this developer is still used almost exclusively in many parts abroad, for in some places pyrogallie acid has up to the present time failed to oust it from the field. However, the wet plate standard is now less frequently referred to than formerly in England. Here one of the principal reasons why pyrogallol is so much preferred is the greater latitude permissible in the exposure. This is no mean advantage in our ever-varying light—a condition that does not prevail in the majority of the countries where the iron developer is still in vogue.

Hydroquinone, as a developing agent, is slowly and steadily gaining ground, and the type of negative it produces is

that of the wet plate character. Whether hydroquinone will eventually take the place of pyrogallie acid with the majority of photographers in this country we need not here discuss. Pyro has obtained such a firm hold upon most workers that we surmise it will be some time before any other developer will supersede it for general work. It is easy, however, to see, where the ferrous oxalate is still in use, that hydroquinone stands a far better chance of general adoption than it does here, because of the great similarity in the character of the resulting negative, coupled with the increased control there is over an ill-timed exposure.

In wet collodion negatives and iron-developed gelatine ones, the printing quality is dependent upon the density of the image itself, and as its tint may be considered a neutral one, colour is scarcely a factor in the case. In the case of a pyro-developed negative, on the contrary, its non-actinic colour gives it a proportionately greater printing density, consequently a thin negative by this developer—so far as actual opacity is concerned—will yield far more vigorous prints than will an iron-developed one of corresponding intensity.

The real excellence of a negative, by whatever process it may be produced, must be judged by the prints it will yield. It is not the prettiest negative that will always produce the best prints. Now it cannot be denied that iron-developed negatives are generally prettier to look at than are the majority of those obtained with pyro, and the same may be said with regard to those made with hydroquinone; yet do they print any better? We have heard some who have used hydroquinone complain that negatives by this developer, which, to judge by appearance, were all that could be desired, give but poor, flat, and disappointing prints, very different indeed from what the negative, at first sight, would lead one to expect. This is clearly owing to the more actinic character of the image—as compared with pyro—and with which they are the more familiar. In order to secure the same printing qualities with hydroquinone as with pyro, the negative must be made visually more intense, notwithstanding that the shadows may be much more transparent.

Let us glance at the characteristics of the two classes of negatives—the pyro-developed dry plate and the wet collodion negative; and with the latter, to some extent, may be coupled that by the ferrous oxalate and the hydroquinone with gelatine. In a perfect wet plate negative, the extreme shadows are nothing more than bare glass, the high lights being of very considerable opacity. The bare glass referred to in a wet plate negative is very different from what is generally understood as “bare glass” in a gelatine one, inasmuch as when placed on a sheet of white paper neither tint nor stain are visible. Now, starting with clear glass for the shadows and great density for the lights, a wide range of tones is secured, and this by reason of the actual opacity of the image. With pyro-developed gelatine negatives we commence with our deepest shadows, more or less, veiled—for it is seldom that they do not show a decided tint, and a yellow one too, when the plate is laid on white paper—and end with only a moderate degree of actual opacity. Notwithstanding this, there may be a great range of tones, but these are due to the colour of the image rather than to its density. Now the question is, Which of these types of negatives yield the best results?

Some affirm that it is impossible to obtain the same results in printing when the shadows are stained, however slightly, as when they are unobscured glass. On the other hand, others assert that equally as good results may be obtained with veiled

shadows as with clear ones, provided the image be correspondingly dense.

A practical answer to the question is this:—The majority of pyro-developed negatives have a certain amount of stain on the shadows, yet do they yield prints which, according to present taste, are all that is desired? For some purposes, however, absolutely clear glass in the shadows is a greater essential than actual density in the lights; and it is for this reason that wet collodion has so long held its own for negatives in some of the photo-mechanical processes. For these purposes it is possible that the collodion may eventually find a strong rival in gelatine and hydroquinone.

We are sorry to have to announce the death of M. Boissonnas, the eminent photographer of Geneva, in the prime of life. He had been suffering from rheumatism for some time, but not seriously. In the collodion days of photography Mr. Boissonnas achieved a world-wide reputation by his instantaneous portraiture, largely of children, obtaining expression which was the admiration of all artists. His reputation in this direction was sustained to the last. He was a man of a genial, kind, good-hearted disposition, ever ready to lend a helping hand, or do a good turn to his brother photographers, whether professional or amateur. The early volumes of this JOURNAL bear testimony to our estimation of his work.

Mr. Bewley, of Dublin, was, on Tuesday evening last, literally blown to pieces by the bursting of a bottle of compressed gas. He compressed it himself, and while it is thought that the cylinder contained both oxygen and hydrogen, nothing definite will be known until the inquest.

From correspondence in another column it will be seen that active arrangements are now being made for the Annual Camera Club Conference, which is fixed to take place at the Society of Arts, on March 26 and 27. Papers on a variety of topics will be read, and an exhibition of apparatus will take place as heretofore in the library. Full particulars will be announced later.

It is surprising that a town of the great population of Brighton should up to the present time have been content to be without a photographic society. However, one has just been started under good auspices, and with the talent in that region it will doubtless become a flourishing institution.

INDIAN ink of good quality is very expensive, but, fortunately a little goes a great way, otherwise the manufacturers of carbon tissue would find it necessary to get higher prices for their material. Recently, however, a writer to the *Chemical News* has described a method of making a new substance, which to his inartistic eye seemed to be Indian ink when it was applied to paper. He simply steeped camphor for about a day in strong sulphuric acid, heated it, and evaporated off the superfluous acid and unaltered camphor. The result was a rich black, that suspended in water remained there an indefinite time.

At the meeting of the Royal Astronomical Society, at which Mr. Isaac Roberts's most recent very beautiful photographs were exhibited, a considerable amount of discussion took place upon the question whether certain of the appearances seen might not be due to ghosts or effects other than genuine images. Judging by the report in the *English Mechanic*, the speakers were scarcely abreast of the practical knowledge possessed by practised photographers non-astronomical. We do not presume for a moment to suggest that the plates presented any but representations of nebulae—it is the discussion to which our remarks apply. Thus, though some aspects of the ghost question were scientifically and correctly treated, no mention was made of the fact that the portion of the plate receiving an image of a bright object became a radiating centre, light being broken up

from it in all directions and becoming reflected at the back of the plate on to the film again.

PROFESSIONAL portrait photographers are only too familiar with this class of reflection, too painfully frequent near the white collars or wristbands of men with black coats. Similarly, there can be no doubt that in the face itself such reflections act to the injury of the more delicate tones; but as this cannot be directly exhibited—a flare cannot be shown with the explanation that it is owing to a certain light object scattering light—it is lost sight of, and either never observed or its cause not recognised. Much of this effect, which is to be seen in all kinds of places besides portraits of gentlemen—skies and landscapes in particular, to quote a well-known instance—is obviated by the use of a thickly coated plate; a fact recognised by several plate makers, of whom some supply none but plates of considerable opacity, while others, again, send out both kinds.

We are inclined to believe that on this very account the new celluloid dry plates, if no drawbacks in practice occur in their use, will have a remarkable future. Of course, we are justified in expecting a similar effect in paper negatives, whether for transferring or not, and we do get it. Celluloid stands on different ground: the new future may see large changes in this direction. It is not to be supposed, however, that either paper or celluloid will get rid of all effects of what may be correctly termed fog, local or widely spread, arising from the presence of a bright image. Many causes go to bring about these effects.

PROFESSOR PICKERING, for the purpose of avoiding reflections from the back of the plate in certain recent photo-astronomical investigations, is reported to have used a backing of lampblack and shellac. We are at a loss to see the advantage of this compound, unless that the plates might be handled without fear of injury to the backing; otherwise, in practice, we should consider that a more desirable method would be the glycerine and gum arabic medium for holding the lampblack. True, the index of refraction of shellac more nearly approaches that of crown glass than does that of the gum, but glycerine has a lower index; and the gum might be slightly tempered with glycerine, and while rendered, with its contained pigment, more easy of removal in the after operations, and made also to exactly assimilate in refractive index to the particular sample of glass employed. We refer now, of course, to exact scientific work and its possible needs; for all ordinary photography we do not desire to add or take away from the instructions already published.

COMETARY ghosts, or, as photographers more frequently put it, halation, is not the only theoretical or practical enemy the photo-astronomer has to provide against; irregular reduction from certain unobserved centres of action being most essential to avoid, or detect if present. In the recent work of Professor Pickering, in enumerating nebulae photographed in a given part of the heavens, and comparing them with those in pre-existing catalogues, infinite pains were taken to provide against such error. The work of examining the plates was entrusted to Messrs. Fleming. Each plate was laid on an inclined plane, similar to a retouching desk used in photography, and by means of a strong magnifying glass thoroughly studied. Whenever a marking in the negatives appeared to resemble a nebula, the co-ordinates of it were accurately noted, but great care was taken to make sure that the marking was not due to a piece of dust, or a defect in the film. It was noted that some of the markings in the plates represented objects not noted in the catalogue, while, again, the catalogue gave stars that were not photographed.

ECHOES.

As Mr. Blackmore's paper on the ferrous-oxalate developer, read before the West London Photographic Society, mention is made of the deterioration of the solution of potassium oxalate in keeping, the formation of a deposit being stated to be one of the symptoms. I scarcely think there is any warrant for supposing that oxalate of potassium in solution is anything but stable, though certainly when dissolved in water containing lime salts a deposit will be formed at

once, but when this has subsided or been removed by filtration I fancy the solution may be accepted as one that will keep "indefinitely."

The two processes sketched by Mr. Alleyne Reynolds under the names of platino and mercurio-uranotype are interesting as chemical variations of processes in actual practical use, but beyond that scarcely present any features to recommend them. Neither in quality of results, nor in probable permanence, do they seem likely to rival platinotype proper, and it is very questionable whether even in point of price anything would be gained, even supposing other things were satisfactory. A similar process was mentioned, by the way, some seven or eight years ago, if I recollect rightly, by Surgeon-major Ranking, uranium being the metal reduced to form the image.

After lying dormant for at least three years we find the method of "development by separate solutions" cropping up again, this time in America. The main point in Mr. D. Bachrach, jun.'s, paper, published last week, lies in his reference to the application of the principle to the hydroquinone developer, and I hope to see this phase of the question further investigated, for the process of using separate solutions is a very pretty and useful one, if we could only get out of old grooves.

One of the advantages claimed for it when first introduced was the reduced liability to pyro stain; this in the case of hydroquinone will, perhaps, prove a less prominent benefit, but the latter agent will lend itself admirably to the process, and enable a considerable economy to be effected in the use of the more expensive constituents of the developer, while at the same time avoiding all suspicion of want of uniformity in the effects produced by repeated employment of the same solution.

Obviously in using the same solution—be it one of hydroquinone, pyro, or ferrous oxalate—for repeated or successive developments, each plate is necessarily subjected to somewhat different treatment from its predecessor, owing to the bromine liberated from the sensitive film during the process of development. In fact, at every succeeding application the developer becomes more and more restrained, and theoretically each successive plate should, therefore, receive a proportionately longer exposure, especially if the quantity of solution be small.

When, however, the hydroquinone (or pyro) is applied alone to the film no such change occurs, for no chemical action is set up. All that happens is that the sensitive film absorbs a certain quantity of the developing agent, which is sufficient for the purpose required when the subsequent application of alkali is made, and the unabsorbed solution remains pure and uncontaminated for use with fresh films.

In ordinary development but a minute proportion of the pyro or hydroquinone contained in the solution is actually employed to form the image, the remainder simply suffering oxidation and discolouration, and helping to mar the purity of the gradation of the negative. The "two solution" method should therefore recommend itself to all.

I should be glad to learn where the absorptive cotton mentioned by Mr. A. L. Henderson at the last meeting of the London and Provincial Photographic Association can now be obtained, for it has many uses in connexion with photography. Some ten years ago, Mr. Warnerke introduced a similar, or probably the very same, article at one of the London Societies, and it was then, if I recollect rightly, said to be of Russian origin, and to be produced by submitting the raw cotton to the action of superheated steam. Mr. Warnerke specially recommended it, I think, for making pyroxyline, for which it seems well adapted. I obtained a small sample at that time, but a few years later I was entirely unable to hear of it anywhere when I wanted to try it for filtering gelatine emulsion.

Mr. Henderson's suggestion of celluloid and magnesium "torches" for artificial light photography is a good one, but I expect some means would have to be adopted for giving a porous and easily combustible character to the preparation. Celluloid in the solid form, even in comparatively thin sheets, is, as a rule, very difficult of combustion, though it varies very greatly in different samples. Still that difficulty is not insurmountable, and for "time"—i.e. not "flash"—exposures would provide the illumination in a convenient and neat form.

Since I referred to the mixture of gunpowder and magnesium last week, I have performed an experiment which gives promising results. This consists in treating sawdust with nitro-sulphuric acid, forming "smokeless powder" in fact, and after thoroughly washing and

drying, mixing the result with a certain proportion of powdered magnesium. The mixture "flashes" most successfully, and should be perfectly safe. The only question is whether the two substances would remain sufficiently uniformly mixed if kept in bulk to give reliable exposures. JUNIUS.

AMERICAN MEN AND MATTERS.

MANY new photographic societies are being formed throughout the United States.

THE New Orleans Camera Club have adopted a novel method to attract winter tourists and settlers to Louisiana. They have made views of the most attractive scenery in their country, and have placed them at the disposal of the City Immigration Society.

AT a recent meeting of the Society of Amateur Photographers held at New York, so entertaining and instructive (it is said) was Dr. J. J. Higgins while exhibiting and describing his detective camera, that the meeting did not adjourn until midnight.

A POSTAL photographic club has been started at Chester, Va., with Mr. Thomas Manning as President and Dr. Max Mueller (Westchester, Pa.) Secretary.

PHOTOGRAPHIC aid is being had recourse to by Professor W. H. Pickering for the detection of nebulae. The clearer sky of America gives astronomers an advantage over their English brethren in this interesting branch of research.

A USEFUL means of clearing blue prints is advocated by Mr. F. H. Latimer, of Michigan. It is his belief that when preparing the paper commercially an inferior quality of ammonio-citrate of iron is employed, which gives a print of a dirty green colour. This he materially improved by converting it into a fine blue in the following way:—After the prints have been washed, he immerses them in a solution of oxalic acid of the strength of one to thirty, when in three or four minutes the prints will have attained the desired colour, after which they are again washed.

PHOTOGRAPHY has lately lost one of its devotees by the death of Dr. Maurice N. Miller, of New York, a well-known photo-microscopist and member of the Photographic Section of the American Institute.

AT a meeting of the Photographic Section of the American Institute, Mr. J. B. Gardner said that it was quite an everyday occurrence to produce a photographic line block—from the exposing of the plate to its being in the hands of the pressmen—in the short space of two hours. It is done by the following means:—From the negative a print is made on plain paper, a pen-and-ink artist next sketches the outlines and then, by means of bichloride of mercury, destroys the photographic impression, which leaves a line picture in black and white. From this a negative is taken, which passes into the hands of the etcher and electrotyper, and from thence to the printing press.

IT is very gratifying to know that the late Mr. Edward Anthony was so thoroughly recognised as being a universal friend among the photographic fraternity, that resolutions of sympathy have been passed at the meetings of all the various American photographic societies.

A TRANSATLANTIC editor states that a photographer in Boston has recently devised a set of gummed tickets to be pasted on the edge of lantern slides, so that their names can be read whilst they are in their storage box. This certainly is a good idea, but although seemingly new in America it has been in regular use in England for upwards of twenty years.

THE valuable collections of prints illustrating photo-mechanical printing belonging to the late Mr. J. W. Osborne have been pre-

sented to the United States National Museum at Washington and the Boston Art Museum.

THE *American Journal of Photography* observes that prints are very often overwashed in the desire to free them from the last traces of hypo. Prolonged washing gives the prints a pale look. A chemical precipitate can be washed free from foreign impurities with twelve times its bulk of water, the water being applied in small quantities and at short intervals. Bright, beautiful prints will repay any risk of fading from insufficient washing.

MR. RAU, of Philadelphia, has successfully taken some flash light photographs of a theatrical stage, and although some of the characters were in positions which were difficult to maintain, still the results produced are said to be excellent.

THE Scovill Manufacturing Company are no longer the publishers of the *Photographic Times*, as it is now to be issued by the Photographic Times Publishing Association; and the photographic department of the former Company has been purchased by the Scovill & Adama Company, with W. Irving Adams, of the Scovill Manufacturing Company, as President.

IT must be gratifying to the editor of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC to find that the editor of the *American Annual of Photography* pays him the compliment, both in the present and past year's issue, of reproducing more than one page of the matter of the Old World Annual, but without acknowledgment however.

INSTANTANEOUS WORK.

XII.

IN my last I pointed out a very common error which nearly every beginner in photography falls into when photographing such scenes as moving or running water. The belief is that because, as in the case of a fountain where the sprays and jets of water are in rapid motion, that such require an almost instantaneous exposure. The same belief extends to waterfalls, while the fact is, that such are not subjects for very fast exposures at all.

I remember one day, when being at the Bracklin Falls, of meeting in with a number of amateurs who were out as an association, and of course they soon busied themselves in the selection of the best spot from whence to take the picture. On the occasion in question some kind member of the association had promised a prize for the best picture taken that day, so a good deal of mystery and concealment of ideas, &c., regarding exposure, were practised by those competing for the prize. I could soon tell those who would not secure the coveted honour by seeing them taking the picture with their shutters. To get a good view of this waterfall it is necessary to go down into a deep cauldron into which the water rushes, or else to rig up the camera among some thick bushes on the bank opposite. Even in the best of summer days the light here is always more or less cut off by the surrounding trees and high banks, and to attempt to take such a picture by a rapid shutter exposure was sheer nonsense, yet because the water was moving a very large proportion of those visiting the locality that day actually did so. I had taken the Falls on several occasions and knew pretty well what to give, and could therefore see at once how miserably those had failed who used their shutters, but no doubt when they came to develop the plates would be blamed. In water effects the great charm is softness, and, as is well known to experienced workers, that at least one of the most important factors in the securing of the same is to give the plate a full exposure with a liberal stop, and when the development stage is reached to "caanny with the pyro;" but of development more later on.

Confined waterfalls, running streams, fountains, and such-like, should never be taken instantaneously.

Of late years the craze for instantaneous work has been so great that very many clever mechanics have spent much thought and ingenuity in so constructing a camera that will enable them to secure pictures without attracting the attention of those who are being taken, or even by those in the immediate neighbourhood when the little operation is going on; the result of this being that what is termed "detective cameras" are now made by a great many of the leading photographic apparatus makers.

To secure secrecy of action, perhaps there is nothing better yet in the form of detective camera than the original "Stirn," or, as some choose to call it, the breastplate camera. Such is easily concealed under the waistcoat, and the lens being pushed through the button-hole it is almost impossible to know when such is being used, or is in the hands of a "chiel amang ye taking notes."

In the majority of cases, however, manufacturers have struck out on different lines and put together some extremely clever sets of apparatus, most of which assume the shape of an oblong box, the necessary knobs and attachments for the firing of the shutter, &c., being easily worked by merely pressing with the finger some little protuberance on the outside of the box. Doubtless the desire to secure pictures of a larger size and more artistic shape than that obtainable with the breastplate camera has had much to do in the way of causing manufacturers to adopt the oblong box as the best means of eluding suspicion, but I am far from thinking that this black box arrangement is the best means of obtaining the desired result. In respect of secrecy and rapidity of action, the original form of "Stirn" is, in my opinion, much to be preferred, for the British public are, as a rule, not slow in casting suspicious eyes when a swell is seen strolling up and down a fashionable thoroughfare with a tall satin hat on his head, and a black or yellow oblong box slung over his shoulder. Such is not an overdrawn picture, kind reader, for the writer actually witnessed such in Glasgow the other day in one of our most fashionable streets (Sauchiehall-street). I knew at once it was a detective camera of the very latest pattern, and at first could scarcely believe my eyes. As to secrecy, there certainly was none about the swell I saw, and so I said to myself, can it be an advertisement? A few days afterwards I found out that one of the Glasgow dealers had seen the same strange gent, and, very funny-like, came to the same conclusion as I did, that after all it was an advertisement.

In the hands of a clever manipulator doubtless some nice little pictures are now and again obtained, and very often some downright good fun is to be had by using such little instruments, especially when the chief actors in the drama had no idea whatever that they were being taken; but to my mind, in a measure, all these so-called detective cameras partake more or less of the character of a scientific toy, and, in some cases, a very expensive one to boot. I wonder what is the actual percentage of good results obtained, even by clever manipulation, when using such with shutter exposures and held by hand. I don't say I have not seen some delightful little pictures obtained by such, for I certainly have been shown some wonderful results in the way of bathing scenes, &c., which were obtained by Mr. Oliver, of Glasgow; but it is not every one that can work the little instrument from beginning to end like he can. Neither do I say I have used all the different forms of detective cameras which are on the market, but I believe I have had most of them some time or other through my hands, and, therefore, pretty well able to judge of their merits; and, after all, what does it come to? Simply a camera so concealed so as not to let any one know that such is being used.

I remember one day being shown by a Glasgow amateur what is, after all, perhaps quite as good an arrangement as any, and which will work quite as well as the rest of the high-priced boxes offered to the public. This consisted merely of an ordinary quarter-plate camera, with three double backs, and a small Kershaw shutter. To convert such into a detective camera was very easily done.

From somewhere in the regions of the garret an old hand bag was ferreted out, which just nicely held the little camera. To keep the same in a fixed position in the bag a hole was bored through the bottom, through which the tripod screw was put, making the same tight by the aid of half a thread bobbin. This kept the camera fixed in the bag. Right opposite the lens, in the side of the bag, was cut a U-shaped aperture, and the whole thing was complete. Being asked to accompany my friend to try it, and so see how it worked, we quietly strolled to one of our busy parks, and, looking out for a good spot, sat quietly down on one which just nicely overlooked a path up and down which passers-by were continually moving. In ten minutes we had spent our six plates and went home. I was quite surprised at the success. We developed four good negatives. To use the camera we had to open the bag and touch the shutter, but I found the opening of this old bag to be rather an advantage than any deduction from its usefulness, for it was a very natural thing indeed for any one to open a bag and look into it for something. Such never attracted the least attention of those being photographed, and who had not the slightest suspicion of what was going on. Of course it is not so easy to manipulate as some would like, but for a makeshift outfit it works wonderfully well, and since then my friend informs me that he can get good results when holding the bag on his breast and looking down into it as if he had forgotten something on leaving home.

I know another gentleman who gets impressions with an old cigar

box slightly altered, and which he wraps in brown paper, and ties same up with a string to elude suspicion. He has shown me some of his results; but, all told, I like the old bag arrangement best.

Unfortunately, in this climate we are seldom favoured with such intensely bright light as is to be found in America and other countries, and this is the one great drawback to the use of these so-called detective cameras. Now and again a fully exposed plate is got here, but, as a rule, nearly all are under exposed, and, in the case of street scenes, some very much so. Perhaps there is hardly any place which offers such chances for a little amusement with what I prefer to call hidden camera work as on board a large passenger steamer. Here no end of impressions may be got, and but little difficulty experienced, in ensconcing oneself in a position where not the least suspicion is aroused of what you are after.

T. N. ARMSTRONG.

PHOTO-MECHANICAL JOTTINGS.—II.

THERE are various ways of making photo-transfers, viz., upon paper direct, and upon zinc, for subsequent re-transfer to stone. The direct method is that most generally used, and for rough, ordinary work answers very well; but where fine work is wanted with absolute register, scale, and size, then the zinc method must be used.

Line transfers may be pulled from collotype plates, rivaling in sharpness and scale those pulled from zinc. But they require so much longer time preparing than the zinc plates, that they are very seldom used for the purpose.

There are several ways of preparing the paper for the direct methods, each of which has its advocates. The paper may be coated with gelatine, chrome alum—a trace—and potassium bichromate, or with arrowroot and bichromate, thus making the paper sensitive with one operation. Paper so prepared is, after exposure, inked up dry and developed in hot water.

Another way is to coat the paper with plain gelatine, dry, then to sensitise by immersion in an aqueous solution of potassium bichromate, soaking the exposed print in cold water before inking up.

The ordinary transfer papers sold for carbon work, sensitised and developed in the same way, yield very good transfers.

Winstone, Shoe-lane, London, sells Husnik's transfer paper, which is sensitised in potassium bichromate dissolved in a mixture of water and methylated spirits of wine. This paper is inked up dry and developed in cold water. This paper is made by first coating with gelatine and chrome alum, drying, then floating upon albumen, which requires the methylated spirit to coagulate it and prevent its removal during sensitising.

Hank post paper is usually recommended for photo-litho work, but it is too thin. The best paper is good wove, not laid, paper, from twenty-five to forty pounds per ream.

Inking up the Prints.—The old plan of inking up the prints involves the use of a litho-press in the dark room, and is at its best a clumsy and wasteful way of doing the work. The easiest and best way is to use a board like the back of a printing frame, one portion to be, say, 12×3, and the other 12×15, hinged together; the hinges to be sunk in the wood so that when the board is laid on the table it will lie quite flat. To use this board raise the board in the middle, insert the edge of transfer in the joint, and the pressure at the hinges will hold it tight. Now on a clean inking slab thin a little photo-litho transfer ink with turpentine, charge a glue and trawler roller, then ink up the print, rolling from the hinges only, continuing the rolling until the turpentine has evaporated, when there should be a thin, even coat of ink, through which the image can be faintly seen. One of the points upon which a beginner stumbles is the inking up of dry transfers—the usual plan being to crowd on as much ink as possible, the consequence being that the print smears in development.

In inking up a wet transfer place a piece of thick blotting paper on the board. Place the wet transfer upon it face up, fix in the joint, blot the surface with either blotting paper or a soft cloth. Then having charged the glue roller with thin ink, roll the print one way only until the whites clear, leaving the lines forming the image standing out firm and black. A gentle rub with a pldget of cotton wool well charged with water will remove any scum left on whites, and the transfer is hung up to dry.

Photo-litho transfers should be dried at as low a temperature as is possible, else the gelatine coat will be made brittle, and the ink made too dry to give a solid transfer. For photo-litho transfers on zinc thinner metal is used than for etching, as better contact is obtained over large surfaces, as well as being easier to handle.

The zinc must be well polished with very fine emery cloth and turpentine, then immersed in a weak bath of nitric acid, alum, and

water—ten drops of nitric, ten grains of alum, to a pint of water. This is put into a tray, the zinc immersed, and the tray rocked until the polished surface of zinc gives way to a fine matt. The plate is now removed and well washed, the scum being removed by rubbing gently with a pledget of cotton wool. The plate is now put into a whirler and coated with albumen, then whirled, coated again, whirled again, then dried over a small spirit stove. The albumen is composed of white of one egg; water, eight ounces; saturated solution bichromate potash, one ounce. Beat up the egg, add the water, mix, then add the bichromate solution. This mixture must be well filtered before use.

To get good prints on zinc a whirler must be used. A film of albumen on zinc, well whirled, requires less than one-quarter the exposure of a film not whirled. Unwhirled films are uneven, one portion of plate having no film, and another portion having a film too thick, through which the light, not having penetrated, washes off in development.

Inking up after exposure is effected with a glue roller, charged with thin ink, care being taken to get a very thin, even coat of ink all over the plate. From these prints upon zinc the transfers are pulled on litho-transfer paper and then re-transferred to stone. The transfer to stone is best entrusted to a skilled lithographer, especially by beginners, as careless or ignorant transferring will spoil the very best photo-transfer.

Do not try photo-litho or any of the photo-mechanical processes with makeshift appliances, but get proper tools first, then the work will be easy and pleasant, and the results good.

W. T. WILKINSON.

THE DEVELOPMENT OF GELATINO-BROMIDE LANTERN PLATES.

[A Communication to the Manchester Photographic Society.]

THE time seems to have come when lantern slides can be made on gelatino-bromide dry plates which shall compare favourably with wet collodion or collodio-bromide transparencies, and shall be almost as certain in their preparation. For some time those who have occasionally tried their hands at transparency making on gelatine plates (and what amateur photographer has not?) must have felt that it was only a question of a developer, and, given that, success must be attained. Ferrous oxalate has, as our lantern exhibitions have shown, produced transparencies which have left nothing to be desired either in the matter of colour, of transparent shadows, or clear high lights; but when we have seen these selected specimens on the screen, the experienced among us have been apt to ask how many failures there have been before these casual successes have been scored. To obtain a good ferrous-oxalate transparency, I think exposure must be absolutely correct and the developer must be in exact sympathy with the exposure; the result is then as good as need be. But this happy state of affairs rarely happens—certainly, if I may suppose my own experience to be that of others, not once in twelve times. The use of sulphite of soda, or meta-bisulphite of potash with a pyro developer, joined, perhaps, to improved manufacture of plates, has made all the difference between certainty and uncertainty, and one may now calculate on getting ten or eleven good transparencies out of every dozen plates. Exposure within reasonable limits is not of such great importance, little more being necessary than to see that it is long enough.

Although I shall not be able to show on the screen any examples of transparencies from the same negative produced by three methods, I purpose showing a few developed by ferrous oxalate, and the same by pyro or hydroquinone. I shall also show some examples of wet collodion transparencies, and copies from the same negatives on gelatine developed with pyro or hydroquinone. Before showing these in contrast, I may say that I think collodion still carries off the palm; but gelatine follows so closely behind, that did we not see the two in actual contrast I doubt if we could tell one from the other. Collodion does produce, in my opinion, shadows of greater delicacy and transparency.

So far as dry plates are concerned there is no fear of going wrong; there are plenty of good ones in the market—indeed, I do not know that there are any bad ones; but those I have used lately have been Thomas's and Swan's, both of which are extremely good, the latter being about twice as fast as the former. The makers of these plates each have their own formulae, but it is immaterial which you apply to which. There is no great difference in them, except that one maker uses sulphite of soda, while the other uses meta-bisulphite of potash as the pyro preserver; both, however, give their formulae in the wholesale manner that is so exasperating to amateurs, and that requires such an amount of intricate calculation before we can see

exactly what they mean. This matter is really a very great grievance that amateurs have against plate makers in general; we do not make up our solutions by the Winchester quart, or even by the imperial pint, and our dark rooms are crowded enough as it is with only such moderate bottles as four, six, or eight-ounce. I suppose there must be some motive for publishing formulae in this annoying way, but cannot imagine what it is, except it is to throw dust in our eyes and make it impossible, unless we are mathematicians of the highest order, to see what a formula really is when reduced to its simplest terms. It is on the same principle that doctors write their prescriptions; but though it may not be very important for us to know exactly what it is that cures or kills us, when we come to the more serious subject of photography it is necessary for us to know exactly what we are doing, if we are to have any intelligent interest in our work. Why cannot plate makers tell us what every ounce of solution contains, as well as give us instructions how to make wholesale quantities?

I give now, in what I consider a reasonable manner, formulae for the pyro developer recommended by the two makers mentioned. Thomas gives in one ounce (approximately):—

A.	
Pyro	2½ grains.
Sulphite of soda	7½ "
Citric acid	1¼ grain.

B.	
Bromide	2½ grains.
Ammonia	1¼ minim.
Carbonate of ammonia	2½ grains.

Take equal quantities.

In making up the developer, I confess I have not striven in some of the ingredients for mathematical exactness. Thus, in the item sulphite of soda, I have taken as much in my hand as I thought *would do*; I have dissolved this in *some* warm water, and have taken of this solution as much as I thought would about hit the prescription to a nicety. Again, not finding carbonate of ammonia in my stock of drugs, I used carbonate of potash, which I found to suit perfectly; indeed, the developer (and all developers I have ever seen) will stand a considerable amount of modification, according to the taste or fancy of the party, as Sam Weller says. The result of development, when carried out in the conscientious manner I have spoken of, is, when dry and viewed by reflected light, a whity-brown, approaching collodion colour, with absolutely clear glass in the high lights.

Swan's formula is simpler, being—

A.	
Pyro	2 grains.
Meta-bisulphite	6 "

B.	
Bromide	2 grains.
Ammonia	7 minims.

The result by reflected light is a much redder brown than Thomas's, but viewed as a transparency the colour is much the same.

A very excellent developer is one half of which is taken from a formula given in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1888 by Mr. Edwards. It is a stock bottle made thus:—

Ammonia	2 drachms.
Bromide	3 "
Water	4 ounces.

Of this you may use as much as you like, but after many trials I have found about a quarter of an ounce to give about the best result. My formula would then be:—

Pyro	2 grains.
Sulphite of soda	6 to 10 "
Edwards's, as above	¼ ounce.
Water, to make	2 ounces.

The components of "Edwards" will be about, in this quantity, ammonia, 6 minims; bromide, 9 grains.

Mr. Brennan, some of whose slides I shall show presently, used Paget's developer, which is in great contrast with this last-named one. In a two-ounce solution the composition is about as follows:—

Pyro	2 grains.
Citric acid	1 grain.
Sulphite of soda	8 grains.
Ammonia	1½ minim.
Bromide	½ grain.

These two developers show how wide the room for the operator's fancy is.

After development and before fixing, I put the plate for about five minutes in a solution of chrome alum, quarter ounce to the pint, and this has the important effect of rendering the film pretty nearly insoluble in hot water. Swan's film will not, however, stand the same heat as Thomas's. Two or three plates may be developed in the same solution (two ounces), and should there be any slight discolouration or deposit during development, a rub with the fingers in hot water entirely removes it. In fact, hot water is an excellent clearer and quite safe up to 110° to 120° Fahr. The disadvantage of chrome alum is that it is difficult to wash the films off the glass if you want to do so.

As well as the pyro developer, Thomas gives the following one for hydroquinone:—

No. 1 STOCK BOTTLE.

Hydroquinone	100 grains.
Sulphite of soda	2 ounces.
Citric acid	60 grains.
Bromide of ammonium	20 "
Water to	20 ounces.

No. 2 STOCK BOTTLE.

Carbonate of potash	2 ounces.
Carbonate of soda (crystal)	2 "
Water to	20 "

Take equal parts.

This gives in two ounces of solution:—

No. 1 STOCK BOTTLE.

Hydroquinone	8 grains.
Sulphite of soda	5 "
Citric acid	3 "
Bromide of ammonium	1 grain.

No. 2 STOCK BOTTLE.

Carbonate of potash	5 grains.
Carbonate of soda	5 "

This is really an extraordinary developer; it is quick, gives an admirable colour, remains quite clear in use, and the same two ounces may be used for a dozen plates, one after another. I have developed fifteen, and the last one came almost as quickly as the first and was quite as satisfactory. It is necessary to develop to a slightly greater apparent density than is required for the result; the plate clears with perfectly bright high lights, and is satisfactory in every way.

I should say that all these developers produce equally satisfactory results with plates exposed in the camera or by contact to gaslight. I do not think there is a pin to choose between them.

Now, I am sure any one may make lantern slides, and good ones, too, and by gaslight may get through a dozen in an hour easily. In the camera the process is, of course, slower, especially in weather such as we have had for some time, every one requiring with a stop of $\frac{1}{8}$ an exposure of from four to fifteen minutes.

Exposure, whether to day or gaslight, must be a matter of some uncertainty, and the best of us may have to intensify or reduce, and even those important processes may, I think, be safely carried out with gelatine plates. Before doing either, I consider it is much the best plan to first dry the transparency. I have not tried many reducers, but the safest and quickest I have found to be common chloride of lime in water. The action is almost immediate; but if the solution—or, I should say, the lime in suspension, for it does not dissolve—is not kept moving, a pitting of the gelatine takes place, which, if allowed to go on, quite ruins it. If the plate is put dry into the bleach, no alteration in colour takes place, but a marked and immediate one is visible if the transparency is dipped into it before drying, the shadows assuming a bluish colour; the transparent parts are also attacked and slightly clouded, which is not the case if the plate is put in dry.

Intensification is safe and easy, but it also should be deferred until after drying. The usual bichloride of mercury may be followed, after washing, by a solution of sulphite of soda, and the result is generally, but not always, successful. A few weeks ago a formula for intensification was recommended in the leading columns of THE BRITISH JOURNAL OF PHOTOGRAPHY which seems to be an excellent one. It is as follows:—

Bichloride of mercury	20 grains.
Chloride of ammonium	20 "
Water	1 ounce.

Wash well and tone with—

Liver of Sulphur (sulphide of potassium) {	20 to 60 grains
	to 1 ounce.

The latter substance has a dreadful smell, exactly like the choicest Marrogate sulphur water, but it produces capital tones, and great

variety of colour may be obtained from it. I think it a very useful addition to our laboratory, notwithstanding its unsavoury qualities. I may add that I think a better colour is obtained if, after washing the chloride-bleached picture, it is dried again before putting it into the liver of sulphur solution. ABEL HRYWOOD, JUN.

PHOTOGRAPHIC OBJECTIVES.

FACTS AND FALLACIES REGARDING THEM.

[Read at the Minneapolis Convention.]

THE literature on photographic optics is exceedingly meagre, and that which is open for study is distributed mainly in the form of papers and articles written in photographic journals. The terms "depth of focus," "distortion," "chromatic and spherical aberrations," and "visual and chemical foci" are used rather promiscuously, and I fear not always understandingly.

It is not my purpose to give you a treatise on optics pertaining to photographic lenses, but to mention those terms and give explanation of them which meet one in pursuit of photography, and draw attention to some things which, from my experience and a varied correspondence, I am led to believe are not fully understood by all. The diversity of qualities pertaining to lenses for photographic purposes is apt to be confounding, unless a person has the benefit of extended experience or study on the subject, and there is no question that the assumption of knowledge where it did not exist, or relying on statements which were not correct, have led to many errors of judgment, which, in turn, have been the cause of disappointments, prejudices, and loss.

I therefore think that any statement of facts which are incontrovertible, because they are natural laws, will not only be fruitful of a better knowledge, but may in time lead to some unity of action in the mode of examining and testing objectives, for I venture to say that there is a necessity for this, inasmuch as different persons follow different plans, giving varying results, and few of them accomplish the complete result.

It may be best to say at the outset what the qualities are which are involved in a first-class photographic objective, and which, with many others, are the problems for the optician to solve. They are as follows:—Exact coincidence of visual and chemical foci; a formula involving such glass and curves as will give the utmost freedom from spherical and chromatic aberration; such a relation of glass and curves as will avoid internal reflections and consequent "flare" or "ghost;" length of focus; diameter of lenses; absolute homogeneity of glass, or freedom from striae or veins; grinding and polishing the various surfaces, so that they shall be strictly spherical; absolute centring of lenses before and after mounting.

I cannot think that I can better show the importance of these various factors than by leading you through the process of completing a lens, omitting the minutiae of work, and thus, also, showing you the difficulties which beset the path of the optician in his endeavour to reach the result. We will assume that he desires to make a medium-sized objective, of the form which is principally used to-day (a system of two symmetrical combinations), and that he has laid out in advance the formula on which he intends to construct it.

He has in his possession four plates or discs of rough and unsightly glass, two of which are crown and two flint, which are to be to him the cause of disheartening failure or gratifying success. If he has any experience at all, he will use no other than such as is warranted by the glass manufacturer, because even then he will find considerable difficulty in obtaining perfect glass. The glass comes from the manufacturer with a guarantee or not; in the latter he assumes no responsibility, while in the former he does, as far as the refractive index and most glaring thoughts are concerned. If they are of guaranteed form, the discs have facets ground and polished on the edges on opposite sides, by means of which the maker has carefully tested the glass, and by which means the optician may do the same.

I would say here in parenthesis that none of this glass is produced in this country, and none of the glass manufacturers with whom we have yet come in contact have shown any inclination to undertake to make it. We hope and feel confident that the time will come when it will be made within our borders, and when so, with the natural facilities at our disposal, we feel certain that we shall obtain a higher and more satisfactory result than exists to-day. The cost of the glass is now a very important factor in the price of the lens. The glass itself must, of course, conform to the formula, and often the formula must conform to such glass as it is possible to obtain.

Any variety of crown or flint may be obtained, but it has been found that the light flints and crowns give the most satisfactory results. Flints are usually the outer lenses of double combinations, and

when heavy are exceedingly soft and subject to oxidation. The optician now begins to abrade the glasses, giving them approximately the form he wishes them to have, and then begins the process of grinding and polishing. Although this is done on the same general principle, the details vary with different opticians; and although the same result may be and is accomplished in different manners, it is safe to say that if one were to follow the plan of another he would fail. There is a peculiar touch or feeling in doing this work which it takes years of practice to acquire, and even then I find a person must be adapted to it. One might give the method of procedure down to the minutest detail, and this has often been done, and for all that a person might follow it any number of times and still fail. One thing, however, is true, that few persons have any conception of the amount of exactness which is required in this work. This remark, of course, applies mainly to an objective which is to be of the highest standard, and which, to a certain extent, varies with different opticians according to their skill, and not to such productions as may be called commercial, for the reason that the pecuniary return, and not excellence, is the paramount consideration. A certain amount of care is observed even in the cheapest forms, but these are not subjected to critical tests, and any faults which are not apparent to the purchaser are allowed to pass, which is not the case in the highest grade, where the best is none too good; the result is, of course, that they are inferior, varying and unreliable, and while occasionally one may find an excellent lens among them, no reliance can be placed upon them. It has been computed that an error or variation from the spherical surfaces, for instance, so infinitesimally small that there are no mechanical means for determining it of $\frac{1}{100,000}$ of an inch, will have a noticeable and sometimes disastrous effect in the formation of an image. We all know, from the fact that we have read it often, of the utmost exactness with which a telescope objective must be made, and the claim is generally made that, because the image from the objective is magnified by the eyepiece, a greater perfection is required than in the photographic objective. I have found, however, that any lack of perfection which is noticeable by an eyepiece is as pronounced in the camera, and I therefore claim and make this emphatic, that a first-class photographic objective requires as much perfection as that in the telescope or microscope, and no work spent upon it to accomplish this result is lost.

To return to our objective, we will suppose that all the surfaces have been ground and polished. This in practice means considerable. The difficulty of doing the surfaces increases out of all proportion with the increase in size, as well as the danger of scratching. It is an ordinary event to scratch a surface during the process of grinding and polishing, and nothing uncommon to do so in the last stages of the latter, when the entire work must be repeated. No matter how good a surface may otherwise be, a scratch is inadmissible; not that it does any particular harm, but an optician who takes pride in his work cannot bear it, and the customer who has to pay for it will not accept it. After polishing, the lenses are put into a lathe one by one and centred—that is, the optical axis is found, which we know we have when on revolution of the spindle the two images which the surface gives are stationary. The edges are now ground down to the diameter of the cell in the mounting.

EDWARD BAUSCH.

(To be concluded.)

PHOTOGRAPHING THE NEBULÆ.

[Discussion on Mr. Common's lecture at the Camera Club given on page 56 in last week's issue.]

DISCUSSION.

THE CHAIRMAN (Mr. J. Traill Taylor) said he did not know whether this subject was one that would provoke discussion, but thought the wiser way would be for those who are somewhat backward on the subject of sidereal photography to put some questions to Mr. Common which, perhaps, he would kindly answer; and, by way of starting the ball, he would ask concerning the second slide shown on the screen—one which was taken at the instigation of Dr. Gill, at the Cape—whether that was done by an ordinary photographic lens or by a telescope? He observed that the stars were all slanting, as if the time had been an element; that is to say, the camera had been standing still while the heavenly bodies were moving, therefore he supposed it would have been scarcely an equatorial arrangement.

MR. COMMON: The reason of those stars being elongated in the direction you saw—and it required rather sharp eyes to see that—was this: The ordinary photographer's camera, taking a small plate with a lens of two-inch aperture and eleven-inch focus, was strapped on to a six-inch equatorial, and it was not stars that were followed, but the head of the comet; and the motion of the stars on the late represents the actual motion of a comet during about one hour.

THE CHAIRMAN: Thank you; that is very satisfactory. In the olden time used to point the camera to the heavens sometimes, and I recognised that effect in a very marked way. Means have to be taken to check the stars, to ensure that what we have got is not a speck of dust or dirt on the plate but really and truly a star. That can be done in the case of an equatorial arrangement by stopping the clockwork for a moment and duplicating it.

MR. COMMON: You have been anticipated there. Rutherford did that in 1864. He did that in a very remarkable picture he took of the Pleiades with an eleven-inch lens especially corrected for photography. He was one of those who found the limits of the collodion plate, because he never could get below the ninth magnitude. He then got his orientation. He allowed one star to troll along the bottom of the plate, and hence he got his photograph well marked.

THE CHAIRMAN: It is not a difficult matter to construct an equatorial stand of the lower type. I was a little sorry to hear Mr. Common say that photographing the moon was a waste of time. I used to be rather fond of that some years ago with a very humble appliance; but about twenty-six years ago, one year before I went into photographic journalistic harness in London, I constructed a stand, mounted a camera on it, and had a segment of a wheel and an Archimedian screw, and thus kept the moon tolerably sharp. I observe in some of Mr. Common's projections that the stars had very sensible discs. If we look at a star through a telescope it is simply a point. I was going to inquire how it comes that that point extended to such a very sensible disc as some of them, but I presume that it is by halation by the brightness of the star; the brilliancy is converted into space in fact. That is a consolation for photographers who employ lenses which are not so highly corrected for sidereal photographic apparatus as those costly instruments by which these admirable results have been produced. A landscape lens, for example, or any other kind of lens, even a telescope lens that is not corrected for photography, will give the stars definite discs by which they could be seen.

MR. COMMON: If it is badly focussed.

THE CHAIRMAN: But even if it is well focussed it might do the same, provided it is not corrected for photography, in the sense of the chemical and visual foci not being coincident; but I was going to ask, What is the cause of the disc, seeing in a high-class telescope there is no disc, and yet here, on the screen, we see the stars in various magnitudes?

MR. COMMON: I can only say it is only one of those dispensations of Providence which get us out of great difficulties, for if you consider what would be the effect if we took a photograph and found that the stars were all the same magnitude it would be very puzzling. It is a most interesting point, and I look to photographers to explain it. As you say, the image of a star in a good telescope is a point, and the question of a small telescope, which you alluded to on my interruption of your remarks, that it would show still a point—good focussing in that case means finding the focus by ascertaining the difference between the visual and chemical foci and using the actinic focus, which is the correct focus for work. But there is a remarkable thing under the production of stellar images, and it is that they vary in area in the same way as we have marked them in magnitude, and if you take the area of a star of the first magnitude and the area of a star of the tenth magnitude on the plate you will find they will vary in just the proper proportion of two and a half times the difference in magnitude. It is a most remarkable thing. I was careful enough to compare the photographic magnitude with the actual diameter of the discs on Henri's plates, and it came out in that way; and it is one of those remarkable dispensations of Providence which enable us to get out of a great difficulty, for it would be an enormous difficulty if we had to locate and specify which particular star was the first magnitude and which was the sixteenth. On the Henri plate it is in a very remarkable way that the image encroaches. They, for the purpose of identification, made them in little triplets; they exposed them one hour and got it on a triangle of five seconds. The very large ones still hold a very circular shape, as if they had been struck with a centre that was laid on the corner of the triangle. It looked as if vibration of the molecules went out just in relation to the time in which the plate was exposed; but, as I said before, it is to photographers I should look for an explanation of that very remarkable thing.

THE CHAIRMAN: Then I say it is simply lateral halation due to the bright spot being received on a diaphanous surface.

MR. COMMON: That is to say, in proportion to the brightness of that light so is the expansion?

THE CHAIRMAN: That is so. As I say, it is the conversion of brilliance into magnitude.

MR. LYONEL CLARK: I should like Mr. Common to tell us in what way we as photographers can help with our usual tools. We have not these marvellous five-foot reflectors or refractors, but is there any way by which we can with ordinary cameras help towards resolving this problem of the nebulae? There is a very interesting example in the photograph we have here of 31 M. When that nova appeared you could not be sure in any fixed observatory of getting a fine day; but if we made every amateur photographer on the globe capable of taking it, it would have been practicable to get a very large series of the nova as it appeared—the gradual way in which it increased in density. I saw it with an eight-inch refractor, but it was not fitted for photographing; but if it was possible for us to act in that way perhaps Mr. Common will tell us what we could do with the ordinary implements which an amateur photographer has at his command. With respect to the use of plates, I have not

heard Mr. Common make any remarks that the orthochromatic plates have been used. I think a great deal must depend upon the astronomer himself what colour he gives a star. I think it must depend a great deal upon his ability to estimate colours. There is a nova in Cassiopeia particularly—a blood-red star which happened to be described, and the right ascension and the declination was given in *The Observatory*. I think that star would have been absolutely insensitive to any ordinary plate, but with the orthochromatic plate, as Captain Abney says, we can do it—it would be able to be obtained. Gemini is rich in ruby stars. Granulation must undoubtedly come out in the using of such plates, for if we use a very rapid plate, then the granules of the emulsion are larger than in a slow plate. In very rapid emulsion you can see the emulsion standing up in a coarse grain altogether. Therefore it is somewhat a drawback in those plates that in order to get smaller grains we get a longer length in the telescope. Whenever I have worked with orthochromatic plates I have found they are so much more granular than any ordinary plate, and I think the fineness of the image is inversely as the speed of the plate. Of course a series of exposures made of any nova would be most useful for determining the luminosity; it, no doubt, would be the chemical value, but a chemical measurement is much more trustworthy than any optical one, and I fancy measuring the stars will not be obtained by the ordinary wedge photometer, but will be based upon some chemical apparatus. Captain Abney, in his experiments, gave a certain quantity of squares exposed to different lights for an equal period of time, and in that way he got them on the actual plate he was using; that is to say, he got a perfect scale alongside by which he could compare the deposit exactly with the actinic value of the plate. Another thing is the use of the eyepiece. Were these photographs by M. Gothard taken with the eyepiece?

MR. COMMON: No.

MR. CLARK: They were not taken direct?

MR. COMMON: Yes.

MR. CLARK: Is it an advantage to use the eyepiece, or is it better to take it on the film and enlarge from the film? I think this is an important point. If it is practicable to use the eyepiece I think that would be rather a simple way of correcting any ordinary astronomical telescope which is corrected for actinic or visible rays.

MR. COMMON: It will not alter the image originally formed by the telescope. An enlarging apparatus that is correct itself, and which you may consider perfect, will not make an image imperfectly formed into a perfect one. Touching that point of applying the lens, Mr. Christie did apply a corrector to the equatorial, and he found very excellent results from a Barlow lens lengthening the focus of the original and tending to bring the otherwise divergent rays to the one common point.

MR. CLARK: I believe that is the way the Lick telescope is corrected?

MR. COMMON: No, it is not. The telescope has a flint glass of thirty inches aperture placed in front of the object glass which shortens the focus by ten feet.

MR. CLARK: Would it not be possible to use a process described by the Chairman? In the old days of photography the lens never was corrected for any other than the visual focus, and an arrangement was made by which he placed in the axis a simple lens of the value of the difference between the visual and actinic foci with which he made the visual focus, and when it was taken away he got the actinic focus exactly right; but we are working with a flint focus. We can use for correcting it a lens of very much smaller aperture. We can correct it with the stop on any one of the more brilliant stars at very much less expense than the whole lens. Two such lenses with another two-foot lens would be very expensive, but by using a corrector for focussing, and by removing it for the exposure, we get all the advantage at a very much less cost during exposure. That is a point I wish to ask, and whether Mr. Common thinks it is possible that photographers in any way can help astronomers?

MR. COMMON: Touching the correction of the two-foot lens by a six-inch diameter placed in the converging cone of rays, it would have two effects: In the first place, it would affect the field very considerably; the central pencils would be right, the marginal pencils would be largely spread. It is no use using the two-foot lens when you can get a two-foot speculum. With regard to the use of orthochromatic plates, it is necessary to consider your plates. If you are going to make comparisons between photographs taken at one time and those taken at another you must be careful to have the plates sensitive to the same part of the spectrum, otherwise you will get various difficulties. The whole thing is quite in its infancy yet, and all these questions are questions that want solving. They will be discussed as our knowledge increases by experiments, for that is the only way I know of to work safely and properly. As to how photographers can help, there are several things I should like very much to know and photographers can tell me. I should like to know how to get on the plate the greatest amount of faint detail. That is a question which depends largely upon the developer as well as upon the plate. You will get with one developer a picture that would not show so much fine detail as with another developer. That is one point where the photographer can come to the assistance of the nebula photographer very well indeed, and my impression of that sort I shall be very grateful for. How to get a plan to show the effect of the faintest light upon the surface; to get, in fact, the greatest amount of faint detail. A lot of these nebulae stretch away for dozens against the sky; in fact, I am not sure that the whole sky is not one mass of nebulae. I would make a remark about the plates. In 1890 I was

examining the Pleiades with the telescope, and I made a note in the *Monthly Notices* of the Astronomical Society, and I was met with the remark that I had been using the telescope with an inferior aperture. No one saw those patches until Mr. Roberts and the brothers Heuri photographed them, and, by Jove! there they were. Going back to that point, I want to have one hit back and get something out of you as to this point, if I might.

THE CHAIRMAN: I remember, at the Birmingham Photographic Convention last July, when I prevailed upon the Rev. S. J. Perry to give us an address on celestial photography, he dealt largely with that question, and he said every photographer could assist by taking a small portion of the heavens and photographing it with ordinary photographic appliances and examining the results. I think that is what Mr. Clarke was referring to.

MR. CLARK: Yes.

MR. COMMON: If there is any willingness on the part of photographers to help us, they must help us in the way in which we want help.

THE CHAIRMAN: Mr. Perry, as an inducement, said there was no knowing what a number of comets one might catch!

MR. CLARK: Does Mr. Common back his plates for halation?

MR. COMMON: No, never. You are liable in certain weather, and I think the fog has something to do with it to get a ring round some of the brighter stars. I took a photograph on Sunday night with an hour's exposure, and one of the brightest stars in the margin of the plate had a bright, defined ring, and Colonel Tuxman has the same thing. It is not a thing you can always get.

Colonel TUXMAN: You can always get it with long exposure. The diameter of the ring is often four times the thickness of the plate.

THE CHAIRMAN: That is halation.

MR. CLARK: That is curable by backing or by staining the film.

Colonel TUXMAN: You cannot prolong the exposure enough if you colour it.

A MEMBER: On the contrary, you increase the exposure.

MR. COMMON: All these questions are burning questions which require elucidation. I have been confining my remarks to one branch of a very large subject. The subject of astronomical photography is an extremely large one. It is only in the last decade that anything has been done. The number of men who worked on the nebulae you could count upon your fingers at one time, while for the number of men who could work on them is great.

A MEMBER: But it is a very doubtful point whether orthochromatizing does not affect the light.

MR. CLARK: It will not so much affect the faint light, but it will affect the bright light.

MR. COMMON: I spoke to Captain Abney years ago about this. I believe you could get a great deal more detail of the nebulae. Blue nebulae are all right and will work on the present plate, but I think if we can get orthochromatic plates they will work in the red end and we might get some surprising results.

MR. CLARK: It is almost within the last fortnight that any success has been obtained in photographing well down in the red.

MR. COMMON: Apart from this question of what may be done, there is at the present moment a great deal that is possible to be done which is not being done. These things are very interesting in themselves, and will no doubt assist us further on, but there is a tremendous lot now which ought to be done in concerted action in photographing nebulae as well as stars. That is the point I want to bring before you to-night. Other things, of course, will follow. We cannot neglect any advantage that will come through a greater fineness of the plate or a greater sensitiveness; but with the present appliances, particularly after the work of M. Gothard with such a small instrument, there is a possibility of doing an enormous amount of work with the present instruments and the present plates.

A MEMBER: With regard to the fineness of the deposit on the plates, it has been said this evening that the more rapid the plate the more coarse the deposit. That is so as a general rule, but that is not always absolutely the case. I have been comparing some bromide paper and Chapman's gelatino plates. The sensitiveness is about the same—perhaps Chapman's plates are less sensitive. The bromide paper produces quite a coarse grain deposit, but gelatine and albumen plates—how they are made I do not know—are about the same rapidity and have a very much finer deposit. If it is true, as the advertisements say, that they do contain albumen, it is possible in using these plates that we may use finer plates. You must be struck with the remarkable fineness of these plates, and I have not been able to see any grain at all with even a strong magnifier.

THE CHAIRMAN: It is a characteristic of albumen plates that if properly prepared they give a stain. You can apply a power of, say, a quarter of an inch microscopic power to them without showing sensible granulations.

MR. COMMON: This would be invaluable on such an object as the moon because you have so much light. It is difficult to get a sufficiently short exposure with the present plates, so that if you had a plate one-half as sensitive, or one-tenth as sensitive if you had the means of getting a finer deposit, you have the means of getting a better picture. I do not know the most sensitive plate to use. If any one will tell me of a sensitive plate I shall be glad.

MR. CLARK: Cramer's "Seed" plates.

MR. COMMON: I have tried the Seed plates, and they are not a bit more sensitive than Paget's plates, and in other respects with regard to deposit I do not see that they are a bit better. I was so decided about it that I ordered

a few dozen plates that I wanted, because I like to have all plates made in one batch, and I know they are all the same, and I begin to learn all the peculiarities of them before the finish of the batch. I have ordered those plates in preference to getting more of the Seed plates.

Mr. CLARK: But do not you find that with rapidity you get a much coarser deposit on the silver?

Mr. COMMON: No; I am satisfied so far as they have gone, but I should like to get them finer.

A MEMBER: Have you tried hydroquinone?

Mr. COMMON: I used it when it was twelve shillings an ounce; now it is two shillings. Instead of using hydroquinone I put in as much pyro as would stand on half a crown, and I put an ounce and a half of water and two ounces of potash solution, and I got beautiful results.

A MEMBER: One of the greatest necessities of the case is to keep the pyro down and with no bromide whatever.

Mr. COMMON: I found I used too much pyro. Everybody has found what I have found myself, that it is of infinitely greater importance to get a middling developer and know its practice than to be butterfly about from one formula to another. I have always got the best results by sticking to Paget's plates and sticking to the developer as long as I could.

The CHAIRMAN: I think we should tender to Mr. Common our thanks most cordially and heartily for his eloquent discourse and for permitting us to see that which to so many of us is invisible. (Applause.)

The proceedings then terminated.

COLLODIO-BROMIDE EMULSION.*

My experience with the carbonate of ammonia developer was rather unsatisfactory. I mixed the solution according to Mr. Brooks's directions: it had a strong odour of ammonia, which I presumed was the alkali intended to bring out the picture, but somehow it failed, and it was only by great patience and perseverance that I succeeded at all. Mixing it as directed, and pouring on and off the plate, it took at least five minutes before the faint show of an image appeared, and by constantly working over the plate I managed to secure a slide in about twenty minutes, somewhat over dense in the shadows, which I regarded was due to too slow development.

I mixed up half an ounce of dried carbonate of soda—not the ordinary crystals—in ten ounces of water, and applied two or three drops to the same developer, when used on another plate, and to my gratification the image appeared rapidly, and acquired the requisite density and brilliancy in the time I thought it ought to. Remembering that I used to employ the soda on Mr. Newton's plates long ago, and meeting Dr. Higgins, who also advised it, I have ascertained that it is much better than ammonia, and puts the relation of exposure to developer on a solid basis. We have no fickle alkali like ammonia, but a certain fixed alkali, which may be relied upon to act as you expect it should every time. Mr. Newton advises using the pyro dry; I obtain just the same results in slide making by using it preserved in solution with sulphurous acid and sulphite of soda. It prevents the developer from getting muddy, which it is otherwise sure to do if you are compelled to prolong the development. I believe the only person suggesting the use of hydroquinone on these plates is Captain Abney in his work on *Photography with Emulsions*. I have tried it, and think, if anything, it works quicker than pyro, and produces equally as good results.

Therefore, for Brooks's emulsion I can recommend the following developers:—

Stock Solution, No. 1.

Carbonate sodium (dried)	230 grains.
Sodium acetate	120 "
Potassium bromide	120 "
Water	10 ounces.

No. 2.

Sulphurous acid and sulphite soda, pyro solution, after my formula based on the strength of forty-eight grains of pyro to the ounce, or any other pyro solution based on the same strength.

To develop a slightly over-exposed plate, add twenty minims of the pyro No. 2 solution (and the same amount also of No. 1), then fill the graduate with water until the whole measures half an ounce.

You thus have a dilute developer to begin with. The image will appear in a few seconds (probably ten) after the developer is applied, and will be finished in about a minute, or perhaps three. Then the image is examined by transmitted light, and when the desired density is reached the developer is poured off and the plate washed under a gentle stream of water for a few seconds, just enough to clear it of the developer. If the water runs too strong it is apt to split the film and carry it off the plate.

Then comes the fixing in less than half a minute with the cyanide, which is most rapid, leaving the high lights beautifully clear, and the dense portions exactly as you saw them before fixing. The cyanide is

* Continued from page 41.

quickly washed out under the tap or by soaking the plate in water. In a few minutes the plate may be dried by heat over a lamp or near a stove, then varnished, and it is ready to mount. Here there are two important advantages over gelatine, the non-over-fixing out of the dark portions and the rapid drying. If the developer works slow, and the image appears to be slightly under exposed, simply add a few drops at a time, at short intervals, of the No. 1 solution until the details appear sufficiently out.

I rather prefer the hydroquinone to the pyro, because it keeps better, and you can use the same developer over again. It appears to give the plate equally as good a colour as pyro.

I mix a solution as follows:—

Hydroquinone, chemically pure	15 grains.
Sodium sulphite, chemically pure	40 "
Distilled water	1 ounce.

Put one and a half drachms of the above into the graduate, add twenty minims of the No. 1 or soda solution, and fill with water until it measures four drachms, then apply to the plate.

This process is especially useful in making slides from negatives having thin skies, and when it is found that the sky of a slide is veiled or fogged, it may be readily removed by the use of an alcoholic solution of iodine.

Mr. Brooks states that the solution should be prepared as follows:—

Iodine	20 grains.
Alcohol	1 ounce.

Drop a few drops of the above into an ounce of water; if the solution should appear cloudy a little more water added will clear it, pour on and off the plate from a developing measure for a minute or so, and if one place seems more fogged than another pour on and off that part, the high lights will assume an opalescent appearance. When this has taken place wash well under the tap and again pour over the cyanide solution. The image will then clear up and the fog will be removed from the high lights. This manipulation can be repeated until the desired effect is obtained.

If properly exposed and developed the slide should have a brown tone by transmitted light. Mr. Dunsterville gives the following for toning and strengthening, which I have not had time to try:—

To tone the transparency take—

Platinum tetra-chloride	1 grain.
Nitric acid	1 minim.
Water	4 ounces.

And immerse the plate. Watch carefully, as the toning proceeds very rapidly. As soon as the wished-for colour is produced, take the plate out at once and wash well and quickly. Should the toning have gone too far, the warm colour may be restored by flowing again over the plate the alkaline developing solution and the toning done over again more carefully. Should the picture appear too thin after toning it may easily be intensified to any degree by the following solution:—

Pyrogallie acid	30 grains.
Citric acid	30 "
Alum	30 "
Distilled water	15 ounces.

To each drachm of this add two or three drops of a twenty-grain solution of silver nitrate.

Should the picture appear too dense after toning, it may be reduced by flowing again over it the cyanide fixing solution.

I may remark, further, that these plates can be developed with a weak ferrous oxalate developer, restrained with bromide of potassium, as easily as gelatine plates. I have been thus explicit as regards details in order that any amateur wishing to make these beautiful pictures may have a practical guide that is reliable, and I trust some of our members will try working the process.

It is well known that the perfection of the collodio-bromide process in this country was largely due to the exhaustive experiments carried on by Mr. Henry J. Newton, and I have deemed it but just to him and all American workers to include in this paper his formula for an unwashed collodio-bromide emulsion as now given to me by Mr. O. G. Mason, of Bellevue Hospital, who, as some of you may know, is still using Mr. Newton's formula. The collodion is prepared as follows:—

Alcohol	} Equal quantities.
Ether	

Pyroxyline (gun-cotton) six grains to each ounce of alcohol and ether used, compounded as follows:—

Put the alcohol in a bottle of sufficient capacity, then add to each ounce sixteen grains of bromide of cadmium, then add to each ounce twelve grains pyroxyline, and, lastly, add as much pure concentrated sulphuric ether as alcohol used. Let the collodion thus made stand several days to ripen and settle.

To silver the emulsion, prepare for each ounce twelve and a half grains nitrate of silver crystals by pulverising in a mortar, put it in a flask or

bottle, and add for each two grains of silver one drop of water, and apply gentle heat, preferably over a water bath, until dissolved.

Then add to this dissolved silver four drops nitric acid for each ounce of emulsion to be made, and while the mixture is yet warm, not over 100° Fahr., add it to the proper amount of bromised collodion, as previously given. Let the whole stand six hours, then add to each ounce of bromised and silvered emulsion one grain of tannic acid.

At the expiration of six hours for clear brilliant work (or twelve to eighteen hours for a more sensitive plate), after adding the tannic acid, add for each ounce of emulsion three grains of finely pulverised chloride of calcium, and shake the mixture until the calcium is dissolved.

The emulsion improves by age and frequent shaking. He says nothing about the developer, but I presume he employs the soda and pyro developer always recommended by Mr. Newton.

(To be continued.)

F. C. BRACH.

SUN PICTURES.

THE second of the free popular lectures to be delivered this session at the Working Men's College, Great Ormond-street, was given recently to a large audience by Professor B. Thompson Lowne, F.R.C.S., his subject being "Sun Pictures." Professor Gringon presided, and briefly introduced the lecturer. Professor Lowne, in his opening remarks, said that one of the first exhibitions which he saw when he was a little boy was a camera obscura—a very beautiful and wonderful invention. He supposed the fact that a lens made a picture must have been known for centuries, but this particular kind was invented two centuries ago by an Italian physician. This was one kind of sun picture, but there was another kind which they saw in every photographer's window, and the latter had grown out of the former. How that art had grown up since the early days of the present reign! It had grown up into something which was most elaborate and most wonderful, and he was going to try and explain to them how it had grown up, and the principle upon which these pictures were made. In his other lecture he would tell them something about a much more wonderful phenomenon, which was much older than photography, and much older even than the human race, which had grown and grown with the human race, and had attained a marvellous perfection, and the time would come when it would attain to a more marvellous perfection still. Within the last thirty or thirty-five years he had travelled all over the world and seen everything which was worth seeing, yet, with the exception of one or two short voyages, he had done it all within the four walls of his own study. He had seen mountains and most wonderful plants and animals, and when by any chance he had come upon any of these things he had seen, by means of what he called brain pictures, he had found that they were the very identical things which he had expected to see. So far as he could judge from the experience of his life, and from having been able to compare brain pictures which he had seen with the realities which had inspired them, he had found that they were as like as two photographs, and in fact there was something in the production of the brain picture which was very like the production of a photograph. The professor then proceeded to explain, by means of familiar parallels, the action of the lens, and through it the images formed in the camera obscura. It was founded on the principle that a lens brought the light which came from a point back to a point. He then went on to trace the development of photography. In the dark ages there were men who were seeking to learn secrets, not for the sake of knowing them, but for the purpose of finding the elixir of life, and with it the way to make gold. Amongst other discoveries they found that silver with common salt, under certain conditions, gave rise to a new substance, which they called horn silver, the yellowish compound which was known now as chloride of silver, and they discovered also that this substance, when exposed to the sunlight, turned black. They did not trouble themselves much about this discovery, but in 1802 Mr. Wedgwood and Sir Humphrey Davy set themselves to work to find whether pictures could not be made with horn silver upon porcelain or some other suitable substance. They covered porcelain with lunar caustic and exposed it to the camera obscura, or put a leaf or flower on it and exposed it to the sunlight. In a short time they got a picture, all the parts of the prepared porcelain not covered turning black, and those partially shaded becoming dark. But they could get no further with the process, for they found no means of preserving the picture, which faded directly it was exposed to the light. Nothing came of the discovery till 1814 or 1815, when M. Niépce made experiments another way, and got a permanent light picture, but even he had to expose his photographic plates for twenty-four to forty-eight hours before he got any result. M. Daguerre, after twenty-five years' work, in 1839, was able to announce to the world that he had made a permanent photographic picture. But still it took from fourteen to twenty minutes' exposure before a picture could be obtained. He discovered what modern photographers called "development," which was the most beautiful process in photography. He got very beautiful pictures, and the only question was how to shorten the time taken in producing them. Mr. Fox Talbot, an English gentleman, was labouring at the same time in another direction, and found a means of taking pictures on prepared paper, for they had hitherto been only taken on metal. Since these days photography had taken

enormous strides, until, at the present time, an express train, a flying bird, a racehorse at full speed, could be transferred to paper—the operation taking the minutest fraction of a second.

DUTCH RIVER SCENERY FOR THE CAMERA.

IN TWO PARTS.—PART I.

FOR those who have abundant leisure for the time being, and who feel reduced pleasure in careering round Europe with the velocity of a sky-rocket, there is no more lazy, pleasant, sleepy way of traversing portions of the Continent than by its lake and river boats. Under an upper deck awning, screening the tourist from the sun, the happy hours may be dreamed away, or photographs taken at comfortable leisure with endless changes of real scenery obligingly placing themselves in front of the lens. The developing room down below, or in one of the little deck cabins lent by its obliging official occupant for the occasion, is kind enough to accompany the tourist on his travels at the expenditure of no exertion on his part; on long river journeys the bedroom or bunk travels with the developing room, so also does a restaurant. One of the longest journeys of this kind, with a starting-point within easy distance of London, is first up what may be called "the unvisited Rhine," and next, in the same boat, up what might be called "the over-visited Rhine," that is to say, the particular German portion so well known to tourists.

Of the "unvisited Rhine" it is my mission now to speak, for I traversed it by boat partly out of laziness and partly out of curiosity about sixteen months ago. The Rhine, which the German worships as a Hindoo worships the Ganges, and which is the subject of Teutonic songs and legends innumerable, rises in the mountains of Switzerland, and acquires some volume after leaving the Boden See, called by us the Lake of Constance. This lake acts as a natural reservoir, and as the Swiss glaciers in its vicinity melt in the summer's sun and pour their waters into the lake, so does the river rise in far-off Germany and Holland; hence, curiously enough, there is most water in the Rhine in the summer, whilst in the late autumn, when there may be plenty of rain about, the river is at its lowest. Sometimes the water will rise or fall considerably in a few hours owing to meteorological pranks in the Swiss mountains, to the discomposure of the stolid people who live and work far away on the lower reaches of the river. Near Basel or Bâle are the great falls of Schaffhausen, after which the Rhine winds for many scores of miles through pretty country—sometimes flat, sometimes hilly—to Mannheim, where its passenger steam navigation now practically begins. At one time small steamboats found their way the whole of the long journey thence to Bâle, but shifting sand and mud banks of late years have proved more than a match for the steamboats on the higher reaches of the river. Coming down the Rhine from Mannheim the more celebrated part of the river, visited for the beauty of its scenery, begins at Bingen and ends near Bonn. English passengers traversing this best part of the Rhine usually have boat tickets available between Cologne and Mayence. After leaving Cologne on the downward river journey, Düsseldorf, hallowed by the names of Liesegang and Hubert, is the next large place reached; lower down the Dutch frontier is crossed, and the river winds its way all across Holland to Rotterdam, before reaching which place it throws out many arms, so that it is somewhat a matter of choice to say which of them is the Rhine and which is not.

The passenger who leaves Liverpool-street, London, at eight in the evening, finds himself on board the boat at Harwich a little after nine o'clock, and at Rotterdam at about seven or eight o'clock the next morning. On landing he may tell a cabman to take him to the boat of the "Niederlandische Dampschiffe-Rhederei," or should this be too much exertion, tell him "to the Rhine boat of the Dutch Company." (Plenty of cabmen, common workmen, and all kinds of people about Rotterdam speak English.) Or he may ask to be driven to the Rhine boat of the Cologne and Düsseldorf Company, for two companies ply for passengers between Rotterdam and Mannheim. They do not run their steamers in official connexion with the Harwich boats, but usually start at times when passengers thereby have a good chance of catching them. They start from the same side of the river as the Harwich boats, but a mile or thereabouts higher up, the intervening bridges, and the irregular times of opening them, making it inconvenient for the Rhine boats to come down to the same pier.

Suppose the tourist photographer to have boarded one of the boats of the Dutch Company, to go slowly as far up the Rhine as he can against stream, here is the journey he has before him—I quote from an old timetable, at present I believe the boats start at a later hour:—Rotterdam, 7 a.m.; Nymwegen, 3.30 p.m.; Emmerich, 2 a.m.; Wesel, 5 a.m. (one day and night); Düsseldorf, 12 midday; Cologne, arrive, 5 p.m.; Cologne, depart, 10.30 p.m.; Bonn, 1.30 a.m.; Coblenz, 7.45 a.m. (two days and two nights); Bingen, 1.15 p.m.; Biebrich, 3.30 p.m.; Mayence, arrive, 4 p.m.; Mayence, depart, 3 a.m.; Mannheim, 8.30 a.m. (three days and three nights from Rotterdam). The return voyage with, instead of against, the stream is quicker. I think a line of passenger steamers direct from London runs in connexion with the Rhine boats of the Dutch Company. The way to ascertain is to write to the Company at Rotterdam, and ask for the information, together with a time-bill, list of fares, and tariff for sleeping accommodation and "restauration." All these

will be found to be astonishingly moderate for first-class or other accommodation, and doubtless it will be a surprise to many a photographer to discover how easily and cheaply he can thus spend, if but a week, in penetrating to the very centre of Europe and back again, carrying with him his bedroom, sleeping room, restaurant, and steward who speaks English, for language is an impediment to many photographers in the matter of foreign excursions. If my memory is not at fault, the Rhine boat tickets for long distances allow the bearer to break his journey wherever he pleases along the route, so that he need not sleep on board should he feel otherwise disposed.

In the times stated in the preceding sentence a portion of the more picturesque part of the Rhine, namely, that between Bonn and Coblenz, is not altogether passed in daylight; the finest scenery of all lies higher up, between Coblenz and Bingen, and all the morning is occupied in traversing this length. Coblenz is an interesting place, strongly fortified, at the mouth of the Moselle; opposite it is the great fortress of Ehrenbreitstein; all around the scenery is magnificent. The Germans do not seem to make so much fuss as do the French about photographing near fortifications from points of view which may be described as thronged places of public resort; those photographers who get into trouble seem, from the published accounts, to be, for the most part, persons who have selected special and out-of-the-way points of view, so may be supposed to have almost intended to invite suspicion. Mr. William England has lantern views of Ehrenbreitstein fortifications as seen from Coblenz, so which cannot be supposed to contain anything of a private nature; had the same class of photograph been taken in France he would probably have had rough treatment. From Coblenz those with leisure may make a day's excursion up the Moselle, along which river steamboats run of about the size of the penny boats on the Thames, but not such dismal, poverty-stricken structures. How comes it that the Thames has probably the worst river steamboat service in Europe? If some decent, comfortable boats were substituted, like those on the Seine, river travelling in London might become as popular as it is in Paris, where the boats, with their comfortable and roomy saloons, stuffed seats, electric lights, and so on, are usually well filled. The running of a Paris steamer on the Thames would make a sensation in London.

The time-tables of the Rhine boats give mostly but the principle stopping places: the full list of all stopping places would be a long one; but at most of the smaller places in Holland the steamboat merely pulls up for a minute or two in the middle of the river, whilst passengers are taken on and off in a small boat at a trifling cost.

In giving this general description of the Rhine and its long-distance passenger services, the space at command has been exhausted before reaching details about what can be photographed in the way of river scenery in that curious country, Holland, inhabited by curious people, so that matter is postponed until the second part of this article is reached.

The headquarters of the larger and richer passenger steamboat company, the Cologne and Dusseldorf Rhine Steamboat Company, are in Dusseldorf, whence information can be obtained on application. This is a newer company than the Dutch one, the boats of which latter have been running for a generation or more. Some engineering literary duties late in 1887 caused me to go into the whole subject of the history of the steam navigation of the Rhine.

The photographer who wants quiet and rest had better not make this long water journey in the fashionable autumn season, when the boats between Cologne and Mayence are crowded by all the world and his wife. A fortnight after the season is over, he and a half a dozen other passengers may possibly have all the saloon and half the best part of the boat to themselves. Neither should they traverse the lower reaches of the Rhine in wet or foggy weather, for then the flat country and everything else will be depressing in the extreme; but given bright sparkling weather, this is one of the liveliest trips obtainable near London when judged from a photographic point of view, as I hope to show hereafter.

W. H. HARRISON.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1187.—"Improvements in Changing Boxes for Photographic Plates, and in Camera Obscura Dark Slides for use with Changing Boxes, and in Preparing Photographic Plates for use in the said Boxes and Slides." J. BURN.—*Dated January 22, 1889.*

No. 1261.—"Improvements in Photographic Apparatus." H. BLACKWOOD.—*Dated January 23, 1889.*

No. 1278.—"Improvements in Photographic Cameras." H. N. E. GOOD.—*Dated January 23, 1889.*

No. 1334.—"Improvements in connexion with Diaphragms or Stops for use with the Lenses of Photographic Cameras." J. STUART and G. HARRON.—*Dated January 24, 1889.*

No. 1365.—"A New or Improved Lamp for Photographic Work and for other Purposes." W. J. LANCASTER.—*Dated January 25, 1889.*

No. 1438.—"Improvements in Portable Stands for Photographic and for other Purposes." W. J. LANCASTER.—*Dated January 26, 1889.*

No. 1439.—"Improvements in Photographic Cameras." J. W. TURNER.—*Dated January 26, 1889.*

No. 1461.—"Improvements in Photographic Transparencies." Complete specification. W. J. WILSON.—*Dated January 26, 1889.*

PATENT COMPLETED.

A NEW AND COMBINED APPARATUS OR DESK FOR RETOUCHING PHOTOGRAPHS. No. 3352. EDMUND JOHN PASSINGHAM, 14, Tyttel-street, Bradford, Yorkshire. *March 5, 1888.*

THIS invention has for its object the combination of certain parts in such a manner, so as to be enabled to construct an apparatus capable of being packed into little space, and which, when fully opened, is capable of receiving and holding photographic negatives in such a position that the same may be examined and rectified of any defects, and when folded into another position the same is converted into a desk suitable for examining and rectifying positive photographs.

I form the apparatus by hinging together four boards or plates, the base-board or plate being provided with supports by which the adjoining board or plate hinged thereto may be elevated and held at varying angles of inclination; and to the last-named board or plate is attached an adjustable mirror.

To the mirror supporting board or plate is hinged another for holding the negatives, and in which is inserted a piece of ground or semi-transparent glass, over which the negative is held by a suitable clamp, the mirror being in such position that the light is reflected through the before-mentioned glass and negative covering the same.

A cover is hinged to the last-named board or plate, and the sides connected by opaque flexible material, for excluding some of the light in the room falling on the negative, the cover being held in position by a support attached thereto.

On partly folding the apparatus the same is converted into a desk, the inclination of the same being adjustable and held by one of the before-mentioned supports.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 4	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 5	North London	Myddelton Hall, Upper-st., Islington
" 5	Holmfirth	
" 5	Sutton	Society's Rooms, Sutton, Surrey.
" 5	Sheffield	Masonic Hall.
" 5	Paisley	Paisley Museum.
" 5	Bolton Club	The Studio, Chancery-lane, Bolton.
" 6	Coventry and Midland	The Dispensary, Coventry.
" 6	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 6	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 7	Bolton Photographic Society	The Baths, Bridgman-street.
" 7	Leeds	Philosophical Hall, Leeds.
" 7	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 7	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 7	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

ON Thursday night, last week, at the ordinary meeting of the above Association, Mr. W. E. Debenham presided.

Mr. A. L. HENDERSON said that in some experiments which he and a Brighton photographer had made, a rather explosive sample of gun cotton was dissolved in ether and alcohol, then mixed with chlorate of potash and magnesium powder, and dried; small portions of this could be exploded when desired to give a flash light. Amylic alcohol would dissolve celluloid.

Mr. A. HADDON remarked that the most explosive descriptions of gun cotton were absolutely insoluble in alcohol and ether.

Mr. W. H. HARRISON stated that the British Government authorities would not give a license for the manufacture of any explosives containing chlorate of potash; such compounds were highly dangerous; they were liable to explode under the influence of a glancing blow as well as from other causes, although a few of them might be used safely for a time.

Mr. HENDERSON knew of a case in which the admixture of chlorate of potash in an explosive had been permitted by the Government.

Mr. J. J. BRIGNSHAW exhibited a specimen of Bell's asbestos cloth, also some of the material from which it had been made.

The CHAIRMAN remarked that asbestos cloth had been known from times of high antiquity; the ancients used it sometimes to envelop bodies which were to be cremated.

Mr. BRIGNSHAW had heard that mummies had been wrapped in it.

Mr. EDGAR CLIFTON doubted it, as there was no object in so doing. An aged bitumen was found in mummies which made a useful pigment; perhaps that bitumen might be useful in the photo-zincographic process.

Mr. HADDON said that asbestos cloth was useful to put between glass chemical flasks and flames to moderate and more equally distribute the heat.

Mr. HARRISON stated that "asbestos" meant "the undefiled" or "the imperishable," and that the ancient Romans would clean raiment made of it by throwing such garments on the fire.

Mr. C. H. COOKE had some carbon tissue which when not quite dry had stuck to parts of a negative; how could he remove the stain?

Mr. A. COWAN recommended him to try caustic potash in weak solution.

Mr. LAWROD exhibited some bromide paper prints which had been cleanly and evenly developed by hydroquinone after he had developed four negatives in the same solution; he had cleared them with weak hydrochloric acid.

Mr. T. E. FRESHWATER asked the cause of certain spots on negatives on gelatine plates which had been sent him from India to obtain the information.

Mr. HENDERSON thought that they might be due to insufficient motion of the plate during development.

Mr. P. EVERETT thought that high temperature of development might have partly dissolved the gelatine.

The CHAIRMAN believed that high temperature would set up frilling before it produced spots.

Mr. HENDERSON suggested that the spots might be due to undissolved particles in a strong solution of alum.

A question was asked, "What is the best leather for camera bellows?"

Mr. EVERETT suggested Russian leather, as it was attacked neither by damp nor insects.

Mr. CLIFTON believed Morocco leather to be the best, where expense was not an object. As a matter of fact, he believed that sheepskin was the material actually used.

The CHAIRMAN called attention to some sunk mounts sent by Mr. Fallowell to the meeting for exhibition. He believed sinking to be best done after the prints had been rolled.

Mr. COOK thought that prints should never be rolled or glazed.

Mr. W. H. FRESTWICH said that rolling would not take out a plate mark.

Mr. T. KERR exhibited two negatives—one taken with a roller blind shutter next the plate, the other with the same roller blind shutter close to the back of the lens; the latter negative had received far more action from light than the former. He added that he had always argued that the proper place for a roller blind shutter was at the back of the lens.

Mr. COWAN remarked that if Mr. Kerr thought the matter out he would find that he had considerably lengthened the exposure by placing the same shutter with the same large aperture close to the back of the lens.

The discussion of the subject of roller blind shutters was adjourned.

The question was asked, "What is the formula for making shellac varnish for glazing collotypes?"

The CHAIRMAN thought that borax dissolved in ammonia was used; to this Albert used to add a small proportion of alcohol. He did not remember the proportions used.

Mr. EVERETT asked if there were any advantage in using a lens of larger diameter, supposing it to be stopped down to the same extent as the aperture used with a lens of smaller diameter.

The CHAIRMAN replied that under certain conditions the larger lens would give more illumination at the corners of the pictures.

CAMERA CLUB.

On Thursday, January 24, Mr. W. MARRIOTT, Assistant Secretary of the Royal Meteorological Society, read a paper on the *Application of Photography to Meteorology*. Mr. Francis Cobb occupied the chair and introduced the lecturer, who gave a most interesting account of the uses and application of photographic paper in securing automatic records of barometric and thermometric variations. He also described the processes adopted for measuring the movements of clouds, and drew attention to the subject of lightning photography, pointing out the assistance in this matter which photographers could afford to the work of the Royal Meteorological Society.

Some interesting apparatus and a large number of photographs, barograms, and thermograms, were on exhibition in the rooms. Some discussion followed, in which Messrs. Elder, Whipple, Symonds, Ferrers, Lionel Clark, Stroh, Captain Wilson Barker, and Dr. Marcet took part.

The subject on Thursday, February 7, will be *Entargy*, when Mr. J. E. Austin will read a paper. Mr. Austin will illustrate his subject with some enlargements on Alpha paper, which will be shown in the rooms.

WEST LONDON PHOTOGRAPHIC SOCIETY.

At the meeting on Friday, the 25th instant, Mr. William England, the President, in the chair, Mr. John A. Rogers gave an account of a tour with the camera in North Wales, illustrated by the exhibition of upwards of fifty slides produced by himself from his own negatives.

At the conclusion of the descriptive portion of his paper the lecturer said that, as he was addressing an audience of photographers some of whom might not have had much experience in touring with a camera, a brief reference to his own experiences might prove instructive. In regard to the size of the camera, he was of opinion, taking comfort and convenience into consideration, that a half-plate camera was the largest size that could be carried for a whole day in a mountainous locality by a person of ordinary physique; and, personally, he preferred a 5 x 4, or even a quarter plate. The small pictures were large enough for presentation or for mounting in an album, and, with the exercise of ordinary care, excellent enlargements of any desired dimensions could easily be produced. Further, the small negatives afforded an easy means of making transparencies for the lantern by contact printing, although better results were obtained by reduction in the camera.

On Friday, February 8, Mr. Wallace Bonetto will read a paper on *Lighting and Focusing*, and Mr. J. Desiré England will give a demonstration of the method of using the flash light for portraiture. Visitors are invited.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

The annual dinner of the above Club went off with great éclat at Beale's Restaurant on the 21st ultimo. Each diner had a 5 x 4 photographic menu, one of the *entremets* being *Feasting & its Photography*. After the toast a smoking concert was held, at which Messrs. Saville, Beckett, Hiscock, Pither, Crutts, Humphries, Stewart, and Rayment, assisted.

On Monday evening, January 23, the Club held a meeting in the Iron Room, Strand Green, when the subject for discussion was *Cameras*.

Mr. V. W. Davies Broughton, of Hatton Garden, exhibited two cameras of his own make, of good workmanship and design.

Mr. William Beck, jun. (of Messrs. R. & J. Beck, Cornhill), exhibited one of

their hand cameras, which embodied many improvements, some of the specimens of its work shown being especially good.

Mr. Martin exhibited some prints from negatives taken with the flash light. The next meeting will be on Monday, February 11.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held January 10, 1889,—Mr. J. S. Pollitt in the chair.

The following gentlemen were elected members:—Messrs. R. J. Kerr, A. L. Bostock, T. Grosse, T. Broadbent, T. Beeston, F. Spencer, Rev. C. P. Smith, and S. Tiller.

Mr. JOHN SCHOFIELD demonstrated the fact that a gelatino-bromide negative may be developed without the aid of a dark room, viz., by a developing solution coloured by a dye that is very soluble in water; and, though staining the film before and after development, the stain can be washed out entirely during the ordinary washing after fixing. From a number of experiments Mr. Schofield had made he concluded eosine was the best. Mr. Schofield said: I first take sufficient water to cover the plate about one-quarter deep, to which add enough eosine solution to give a deep ruby, place the dish containing this coloured water under a cloth, and turn the gaslight down, or select a place where the daylight is much reduced, but sufficient to see; having placed the dark slide along with the developing dish, open it under the cloth and pass the plate into the coloured water for about two minutes; now put into the developing dish the pyro, ammonia, and bromide in the usual way. The negative now can be uncovered and the coloured water mixed with the developing salt in the cup, and again returned to the plate, and development proceeded with in the usual way. The plate can be lifted out of the solution when sufficiently advanced in development to be examined; it will then be found to be stained a deep ruby colour, which will all wash out in about an hour after fixing. I only advise the negative to be slightly washed before fixing and a subdued light used during the operation. I claim it is more convenient when travelling, and you can have more photographic friends in your dark room, and without torturing them with the semi-darkness.

Some discussion followed, after which Mr. ARTHUR HEYWOOD, JUN., read a paper on *The Development of Gelatino-bromide Lantern Plates* [see page 70].

At the conclusion of the paper a number of transparencies were shown on the screen developed by ferrous oxalate and the various developers described in the paper, and some of them intensified or reduced. These were contrasted with one another, and also in several cases with collodion transparencies by professional photographers, but from the same negatives. The latter were by no means always the best.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE usual fortnightly meeting of the above was held in the Technical Schools, Bridge-street, on Thursday, the 24th instant,—Mr. R. Karlewe, Vice-President, in the chair. There was a very large attendance of members.

The minutes of the last meeting (which was special for raising the subscription for the purpose of obtaining larger rooms and accommodation required for the increasing number of members in the Society) were read and confirmed.

Letters were read from the Camera Club, asking for a representative for the Conference, and from Mr. A. Tate, Belfast, conveying the thanks of the Ulster Society for the loan of lantern slides.

Messrs. Thomas Cook, H. A. Dugan, R. Folland, Herbert Miller, A. W. Willis, J.P., and W. L. Willis, were elected members; and Messrs. T. H. Kendrick, W. F. May, and G. E. Wilson, nominated for election.

The CHAIRMAN requested members to volunteer for leaders for excursions during the summer months and to hand in to the Secretaries suggestions as to routes, &c.

Mr. E. C. Middleton exhibited a negative, 12 x 15, of a newspaper taken with a cheap 10 x 5 lens, which showed sharp definition to extreme edges.

Mr. W. R. Osborn presented to the Society, for library, *Photography*, by R. Hunt; and the *Photographic Journal of London*, 1857.

The CHAIRMAN announced that four of the prizes at the late competition not having been won the donors had kindly consented to continue the prizes for the next competition.

The thanks of the meeting were unanimously voted to Mr. Osborn for the present of books, and to Messrs. J. Collier, E. H. Jacques, W. S. Harding, J.P., and W. Tylar, the donors of the prizes held over for competition.

The remainder of the evening was devoted to the exhibition of members' slides, under the superintendence of Messrs. Bonehill and Fowler, of the Lantern Committee. Upwards of two hundred and fifty slides were thrown upon the screen, including many interesting views of Switzerland and the Alps, Holland, &c., and other holiday trips of last year; and some splendid specimens of hoar frost, by Messrs. Archer, Harrows, Harold Baker, Barnett, Hutton, Bonehill, Fowler, Greening, Gollrey, Harrison, Jacques, Marley, Miller, Osborn, Pumphrey, Pickard, Southall, Tittley, Thomason, and Wakelield, the whole showing marked improvement on former exhibitions of members' slides.

Messrs. Harold Baker, E. H. Jacques, and Charles Pumphrey presented the slides they exhibited to the Lantern Committee, and the thanks of the meeting were voted to these gentlemen.

The Council have decided on taking a suite of rooms at the Grand Hotel, Colmore-row, for the new rooms of the Society.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

A LECTURE was delivered by Mr. J. R. Payne on *Photography, Past and Present*, in the Lecture Hall of the Literary and Philosophical Society, Newcastle, on Thursday, January 24. There was a large audience.

The lecturer at the outset referred to the fascination of the art of photography, its spread amongst amateurs, and the rapid progress it had made in public departments. Amongst the numerous photographic associations their

own Association took a prominent position. During the last three or four years there had not been an exhibition of photography held in any part of the United Kingdom of any importance where that Association had not been well represented, and on each occasion they had carried away awards. The lecturer then described in a local manner the chemical action of light, and urged upon amateurs generally the great importance of their devoting attention to the character and quality of light. He traced the history of photography during the past century and detailed the different processes, papers, and experiments that had been adopted by various workers, commencing with Scheele, and proceeding on step by step to the Daguerreotype, waxed paper, and albumen processes. The important labours of Moser, Niepce, Crookes, Hardwich, Archer's collodion process, the various dry collodion processes, and the collodionisable process of Sayce and Bolton, were all of them explained. The introduction of the gelatino-bromide process was next explained in detail. Lantern slides made by the various processes referred to by Ferrier, York, Bolton, Traill Taylor, Payne, Green, Lee, Wilson, and others, were shown on the screen by Mr. Ridgway, of Sunderland. The various printing processes—albumen, gelatino-chloride, collodio-chloride, gelatino-bromide, platinumotype, cyanotype—were severally dealt with and examples shown. Commencing with Niepce's bitumen process, and instancing Daguerre's method, the many photo-mechanical processes were each explained, including those of Fizeau, Mouton, Lechevalier, Lecomte, Fox Talbot, Swan's carbon process, the Woodburytype, collotype, photo-lithographic, and other methods. Examples of these were shown, as well as specimens contributed by Green, Bacon, Parry, Wilson, Laws, Eastman, and others. The lecturer read a letter which he had received from the Rev. F. Hardwich, M.A., who said: "At the date of publication of the first edition of my photographic book it is not too much to say that almost nothing was known of the chemistry of photography. The best operators worked by rule of thumb. The late Prince Consort got up a committee to examine the cause of fading of silver prints when he found that those taken by himself and others were not permanent. He gave 50*l.* towards the experiments, and I made them in the laboratory of King's College; you will find a report in one of the old journals of that time. I worked harder, however, at the chemistry of collodion than at anything else, and found it a hard nut to crack. These two points, however, proved to be the crucial ones:—The fibre of the cotton must be parcellised by using excess of oil of vitriol; this gives toughness to the film and intensity to the negative; secondly, the pyroxyline must be the lowest, and not the higher and explosive variety; this produces a smooth flowing collodion which sticks well to the glass. With reference to dry processes, in my opinion Major Russell's tannin process was the best of the old methods. Your lecture will, I am sure, be a very interesting one." As proof of the rapid progress which photography had made and the important position it now held in scientific, artistic, and industrial pursuits, the lecturer explained how the manufacture of photographic apparatus and its appliances had resulted in the formation of a great industry. The publication of photographs in various forms, the illustration of magazines, and the reproduction of pictures, showed in an unmistakable manner the position the art of photography held with the public.

The lecture throughout was of an interesting character, and the practical hints upon the art were warmly appreciated, especially by amateurs, who formed a large portion of the audience.

DEVON AND CORNWALL CAMERA CLUB.

AT the last meeting of the above Club, Mr. W. Gage Twedy in the chair, Mr. R. MURRAY read a paper entitled *A Retrospect by an Old Photographer, with a Few Hints to the New Generation*.

The lecturer began by saying that some forty years ago, when he first commenced the art, photography was very different to what it now was. It was then surrounded by a mysterious halo of wonder; its study was confined to a very few patient and simple-minded people, and processes were all slow in every sense of the word. Apparatus was then solid, made for all time, and the cameras then in use would not now be called portable, being huge brass-bound chests made of wood specially selected for its strength and weight. There were no lenses with wonderful, unpronounceable names, no conflicting developers, no squabbles of rival inventors, and no photographic journals. The calotype process was his favourite one, as, being on paper, it was light and easily carried about; the equipment for the 10×8 photographs taken by him in Egypt would have been a very heavy load for a camel if glass had been used instead of paper. It was quite enough as it was. In his opinion the brilliancy and transparency of collodion plates had not since been equalled. Collodion, of course, had its disadvantages, which had led to its abandonment. One required to carry about a dark tent, chemicals, and water, &c., whereas now nothing was taken but the camera complete and a few ready-prepared plates. As a sample of the amount to be carried in the olden time, he instanced Mr. Wilson, of Aberdeen, driving up to the Blair Athol Hotel in a four-horse coach laden with the necessary apparatus for taking his photographs. The lecturer then stated that nowadays any one could take a photograph; to secure an artistic one was, however, quite a different affair. A really good photographer was to the manner born, with special aptitudes. He should be clever with his fingers, neat and orderly in his habits, patient and hopeful, and, above all things, should possess a fair allowance of brains, having also a keen appreciation of the beauties of nature. He recommended that a beginner should commence with a quarter-plate camera, and stick to one make of plates and one developer until he had mastered the subject. Then a larger size might with advantage be attempted; he thought 10×8 the smallest "picture," but he preferred 12×10. He thought "ordinary" plates more useful than "extra rapid," which latter were difficult to manage and were seldom required except for instantaneous pictures. He asked them always to carefully consider the subject before exposing a plate, remarking that one really good artistic picture was worth a dozen bad ones. As regarded plates *versus* films, he thought the former better for portraiture, but the latter for views, principally on account of their lightness, freedom from breakage, and the absence of halation. He devoted a few remarks to composition, avoidance of straight lines, proper proportion of foreground, middle distance, and sky. He advised every one to do his own printing, many a fair negative being labelled by careless printing. Beginners should not be unduly puffed up by the praise of their friends, but should always be ready to take hints from their more experienced associates. In conclusion, he recommended the art to all, as giving

plenty of exercise both to body and mind, occupation, and enjoyment, and, in his opinion, every photographer should be a happy individual.

Major BARRINGTON BAKER, while cordially agreeing with most of the lecture, took objection to the statement that 10×8 was the smallest camera that should be used. He pointed out that complete with, say, three lenses, &c., its weight would be some thirty pounds, and that this was more than most amateurs would care to carry any great distance. In his opinion, half-plate was the most suitable for ladies and whole-plate for gentlemen; few cared to go much larger on account of the weight.

Several specimens of collodio-albumen, coffee, calotype, and Eastman paper negatives were handed round for inspection.

The next meeting will be on February 6, when Mr. A. A. Carnell will give a demonstration—*Contact Printing on Bromide Paper*.

YORKSHIRE COLLEGE PHOTOGRAPHIC CLUB.

THE annual exhibition of lantern slides was held on Friday, January 25, in the Chemical Lecture Theatre at the College. There was a very large attendance of members and their friends.

One hundred and thirty-eight slides were contributed by Messrs. C. H. Rothamley (President), T. B. Davies, H. B. Hall (Secretary), and Herbert Ingle, Professor E. H. Jacob, and Messrs. A. E. Nichols and H. Pocklington. All the slides had been produced during the past twelve months, and were entirely the work of the exhibitors. The subjects were chiefly landscapes and architecture from the counties of York, Lincoln, Leicester, Warwick, Oxford, Merioneth, and Somerset, and Scotland and the Isle of Man; but a few sea-pieces of figure studies were also shown.

At the next meeting, on February 28, there will be a discussion on *Fine Art in Photography*.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

THE fortnightly meeting of the above Society was held at their studio on Wednesday evening,—Mr. S. W. Allen in the chair.

The Hon. Secretary of the Cardiff Naturalists' Society attended and explained the views of his Committee *re* photographing places of historical interest in the neighbourhood for permanent record.

An arrangement was made by which the Society undertake to act upon any suggestion that may be thrown out by the Naturalist Society with this object in view.

Mr. George Davidson, Secretary of the Camera Club, was duly elected an honorary member, and was requested to represent the Society at the Club Conference held in March next in London.

The lecturer for the evening, Mr. C. MURRELL, gave a lecture on *Hydroquinone as a Developer*. From the specimens passed round for inspection, the lecturer has evidently been very successful in his researches in this new phase of photography.

Mr. Annibal Pinheiro will give a lantern exhibition on Wednesday next; subject—*Brazilian Scenery*, from photographs taken personally. All photographic friends are invited.

PAISLEY PHOTOGRAPHIC SOCIETY.

THE Lantern Section of this Society held a lantern meeting in the Free Library and Museum on Thursday night last, which was a great success.

Mr. R. HARRIS, the Vice-Chairman of the Society, briefly stated that this was the first of a series of exhibitions they intend holding during the next few months.

Mr. RASTALL (the Secretary) stated that they were trying to inaugurate a system of exchange of slides with other societies, with the view of adding variety to the exhibition.

Mr. Mure then exhibited by the lantern with the limelight two hundred and twelve slides. A box containing seventy-eight was sent from Dundee, and they were all exceedingly pleasing. Mr. Fleming, of the Glasgow Amateur Association, showed a number of good slides, and the Society was represented by Messrs. Mure, Rastall, and Thomson.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

THE annual meeting of the Society was held on January 2,—The President, Mr. Frederic Graff, in the chair.

The annual reports of the Treasurer and Executive Committee were presented and ordered to be filed.

The average attendance for the ten stated meetings during the year was forty-six.

The active and life membership, December 31, was reported as one hundred and eighty-two. During the year thirty-six new members had been elected. There had been five resignations and one death, making a net increase of thirty members.

The election for officers and Committee for 1889 resulted as follows:—*President*: Mr. Frederic Graff.—*Vice-Presidents*: Messrs. John G. Bullock and Joseph H. Burroughs.—*Executive Committee*: Dr. Herbert M. Howe, Dr. Ellerslie Wallace, and Mr. William A. Dripps.—*Treasurer*: Mr. Samuel M. Fox.—*Secretary*: Mr. Robert S. Redfield.

The *PRESIDENT* congratulated them upon the prosperity of the Society, which so ably maintained its reputation and influence in advancing the interest now so general in the useful, instructive, and pleasurable pursuit they were all engaged in. They had reason to feel proud of the papers read and of the work of the members from time to time exhibited. They had every reason to look forward to a year even more full of improvement than the past, which, while it has not been remarkable, perhaps, for any very startling new methods, has most certainly brought forth many valuable improvements on old ones. The introduction of new supports for the sensitive medium as substitutes for glass, increased sensitiveness of films, and more portable apparatus, have added to the

facility of working and given renewed inducement for amateurs to indulge in photography as a study and amusement.

Mr. Bartlett exhibited several photographs which were interesting from a historical point of view, the property of Mr. Julius F. Sachse, of Philadelphia. They were the work of Mr. Langenheim, one of the pioneers in American photography, and antedated the days of collodion. The impressions, which date about 1850, were made from silver albumen glass negatives upon plain paper without toning, and represented a portrait of Mr. Langenheim, one of President Fillmore, a view of the Treasury building at Washington, and what seemed to be an instantaneous view of Niagara Falls with natural clouds. The first attempts at negative retouching were apparent, and the importance of the process indicated by the signature of the retoucher appearing on the prints.

Correspondence.

Our Correspondents should never write on both sides of the paper.

CAMERA CLUB CONFERENCE.

To the Editor.

SIR,—Will you kindly permit attention to be drawn in THE BRITISH JOURNAL OF PHOTOGRAPHY to the forthcoming Camera Club Conference which will take place at the Society of Arts on Tuesday and Wednesday, March 26th and 27th.

The Conference will be presided over by Captain W. de W. Abney, C.B., B.S., F.R.S., who will open the proceedings at 2 p.m. each day.

At the same time an exhibition of apparatus will be held in the Library of the Society of Arts, and there will be a collection of member's photographs at the Club rooms.

An international exhibition of lantern slides is being arranged for the evening of the 26th, and at the conclusion of the Conference, on the 27th, the annual Club dinner will be held.

On the Monday previous to the Conference, a smoking concert will be given at the Club.

Full particulars and programme of papers to be read, and other arrangements, will be announced later.—We are, yours, &c.,

G. DAVISON, } Hon Secs.
E. G. SHERRA, }

Camera Club, 21, Bedford-street, W.C., January 29, 1889.

DALLMEYER'S PATENT DIAPHRAGM SHUTTER.

To the Editor.

SIR,—I am surprised that Mr. Dallmeyer should have taken the trouble to notice seriously the ridiculous pretensions of Mr. C. Purcell Taylor. As one of the persons to whom the shutter was confidentially shown in its various stages, I have much pleasure in corroborating the statements of Mr. Dallmeyer, and I need not advert to the matter further than to inform you that I saw the instrument in its present form at Mr. Dallmeyer's establishment in January, 1888—a period at which Mr. C. Purcell Taylor was totally ignorant of the optical requirements of a photographic shutter, probably even of its functions!—I am, yours, &c.,

A. E. HAYMAN.

5, Chandos-street, Charing-cross, W.C., January 28, 1889.

[Mr. C. Purcell Taylor has sent a further short communication, intimating that he has only read the first paragraph of Mr. Dallmeyer's letter in our last issue of the JOURNAL, and that the "matter will be decided in due course by the proper authorities," whatever this may mean. Would not Mr. Taylor have acted more wisely had he read the whole of Mr. Dallmeyer's letter, and also that of Mr. Beauchamp, and then treated the subject on its merits? The dicta of those gentlemen are also endorsed by the letter of Mr. Hayman. The evidence being thus against Mr. Purcell Taylor's allegations, the matter here terminates.—Ed.]

CARBUTT'S FILMS.

To the Editor.

SIR,—When writing a few weeks ago about the price of these newly advertised films, I promised that when I had tried them I would give your readers the benefit of my experience. Through the courtesy of Mr. J. Carbutt, I received, with very little delay and carefully packed, a dozen 3½ x 6½ of these films, some of which I have duly tried, notwithstanding the very unfavourable weather we have lately been having. The films appear slightly thicker than the Frodman film, and a good deal stiffer; they are as polished as glass at the back, and very flat; no signs of peaking at the edges, which is so often the case when gelatine forms the support. They preserve this stiffness in the developer, as water does not seem to affect them in any way, and they can be lifted out and examined as easily as glass. When fixed, they were absolutely transparent and clear. To dry, they are hung up by one corner in a warm place, and the drying takes place quite as quickly as with a glass plate; the film curls inward, but remains perfectly plane and free from cockling,

and if, when dry, it is placed between the leaves of a book or under press for a few hours it becomes quite flat. In fact, I cannot imagine a more perfect substitute for glass, of which they possess all the good qualities without any of the drawbacks. The emulsion with which the films I tried were coated was the most rapid made, and I consider they are fully equal in rapidity to the best English plates I have used; they give, even with short exposure, a vigorous and brilliant image. The coating is very even, and free from defects. I should say, from the colour of the emulsion and its slowness in fixing, that it contains a good deal of iodide of silver.

Though my experience has been short with these new films, I can safely congratulate Mr. Carbutt on having put on the market a perfect film. Its only drawback is the price, and I do not despair seeing this come down with increased demand and improved methods of manufacture of the support, which is at present much higher than glass.—I am, yours, &c.,

GEORGE MANSFIELD.

A PHOTOGRAPHIC SOCIETY FOR BRIGHTON.

To the Editor.

SIR,—Will you allow me to state that a Photographic Society has been started for Brighton and the neighbourhood? The following resolutions passed at the preliminary meeting will make the terms of membership clear:—"1. Ladies and gentlemen, amateur or professional, shall be eligible for election. 2. That the annual subscription shall be five shillings, with an entrance fee of two shillings and sixpence, which fee, however, will be remitted in the case of the first forty members, or those submitting their names to the Society before February 7th." Any further information may be obtained from—Yours, &c., W. H. REAN, Hon. Sec. (pro tem).

36, Vernon-terrace, Brighton, January 28, 1889.

GUTTENBERG'S MAGNESIUM LAMP.

To the Editor.

SIR,—I notice in last week's JOURNAL a criticism of my magnesium lamp by "Junius," and will feel much obliged if you will kindly publish this in answer to the same. In the first place let me state that you published the provisional specification only, and in the complete specifications I have made several essential modifications.

I now proceed to take up "Junius's" criticisms point by point. He displays his ignorance in saying that the burning of a magnesium train would be a new method of dividing glass. The only effect of burning a thin train of magnesium powder mixed with a combustible compound on the smooth side of a stout piece of ground glass is, that after the first ignition the glass becomes indelibly marked along the course of the combustion, and after that no change occurs, as a sediment is deposited which is not affected by further ignitions. I may here mention that I have discarded the use of gunpowder for chlorate of potash and kaolin used as a mechanical separator, because the gunpowder robbed the magnesium of much of its actinic light; and a train of the mixture I now use will, on a given length, give an exposure of a certain duration within an inappreciable fraction of a second as any number of trains of the same length and quantity of mixture. The intensity of the illumination will vary according to the amount of magnesium powder used.

I have just dealt with the question of the desirability of using gunpowder, and need not say any more on the subject. The lamp, after an exposure, can be cleaned with a dry duster and need not be very carefully done, and as for the light being obstructed that is all moonshine, as the powder is burned directly on the glass, and the light comes through on to the sitter without passing through a thick cloud as one would assume from what "Junius" says. As regards the direction and area of the light, the former may be nicely adjusted, and the latter is not confined to the small space of glass, because of the diffusion which naturally takes place, and which is increased by the intervention of a tissue-paper screen between the sifter and lamp.

Lastly, the "fearful and wonderful" part of the apparatus exists only in "Junius's" imagination, which would be wholly dissipated by a personal inspection of the same.—I am, yours, &c.,

W. GUTTENBERG.

29, Triangle, Queen's-road, Bristol, January 28, 1889.

To the Editor.

SIR,—"Junius" having formed so wrong a conception of Mr. Gutenberg's lamp, I think it only fair to the inventor to say that he invited me to see it experimented with. The results obtained were far ahead of many that I have seen produced by some flash lamps, and my conclusion was that it is a most practical apparatus.—I am, yours, &c.,

16, Royal Promenade, Clifton, Bristol,

GODFREY ALLEN.

January 29, 1889.

IVES' SATURATOR.

To the Editor.

SIR,—In reply to Mr. Ives' letter in last week's JOURNAL, I write to say that I have not had the pleasure of seeing or trying the American-made saturator, and so my remarks applied to the English one. No doubt, as Mr. Ives has shown so much ingenuity in designing the saturator, he, or the English maker, will presently find a way of making the joints sound

without the application of soap, either before or after screwing on the cap. I find the screw-valve for the filling opening, as fitted in the modified Broughton-Hardwich oblong saturator, some three or four years since, is quite sound now, so probably a slight modification in this direction, or by using an indiarubber cork (or a specially prepared ordinary cork), the little difficulty can be got over.

In case I did not make myself quite clear in the short article in the *ALMANAC* (and there are one or two typographical slips I see), I now say that I found the U form saturator, with flannel roll inside, give a steady and satisfactory light.—I am, yours, &c.,

G. R. BAKER.

London, January 29, 1889.

COPYING OIL PAINTINGS.

To the Editor.

Sir,—I am afraid "Pictor," in his last voluminous communication, has somewhat lost sight of that element of common sense he so emphatically refers to. He says that when "Glycerine, &c.," was suggested, he and others concluded it was to be applied *per se*. For instance, it is a very usual mode of expression to say such-and-such a negative is developed with pyro or ferrous oxalate—now here common sense comes in and suggests that the pyro or ferrous oxalate should be used with water, and not rubbed on to the film *per se*. In the absence of common sense such might be the case; so with the application of glycerine or many other things which will, in all probability, suggest themselves to "Pictor" now his attention is called to it. May I ask "Pictor" if he has ever himself seen an oil painting damaged or destroyed by the application of glycerine either *per se* or diluted? and, if he has, *when* and *how* did it occur? No one is too old to learn, but from my own experience I never saw or heard of any harm accruing to oil paintings treated in the manner under discussion, or knew of anybody else who did, but as positive is better than negative evidence, it will be interesting, not only to the writer, but to others, to hear particulars of such a case, and all the detail therewith connected.—I am, yours, &c.,

EDWARD DUNMORE.

SHAKESPEARE AND PHOTOGRAPHY.

To the Editor.

Sir,—Mr. Lyonel Clark will find in *King John*, act iii., scene 1:—

"To solemnise this day, the glorious sun
Stays in his course, and plays the alchemist;
Turning with splendour of his precious eye,
The meagre cloddy earth to glittering gold."

I am, yours, &c., EDWARD HEALEY.

10, Endymion-terrace, Finsbury Park, N.

[Replies have also been received from Mr. J. Tilfor; Rev. F. Brown; Mr. A. E. Smith; G. B.; Messrs. H. Whitfield, William Lang, jun., and others.—Ed.]

Exchange Column.

*. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

An old Chippendale mirror, perfect order, very handsome, in exchange for a 12x10 or 10x8 tourist camera with back.—Address, Ash, 143, Barking-road, Essex.

Wanted, 12x10 long extension field camera with lens and three backs, or roll holder; exchange, light roadster safety (Baylis & Thomas).—Address, A. F. THORPSON, 114, Acree-lane, Briston, S.W.

A modern bellows camera complete, not less than 12x10, also a nine-inch condenser for enlarging lantern, also a Kodak, wanted in exchange for full value in drawings by members of the Royal Society of Painters in Water-colour.—Address, A. I. Church-street, Leamington.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED:—

R. W. Sharp, Hamilton, N.B.—Two photographs of James Alston Dykes, Procurator-General for Lanarkshire.

V. R.—Your letter is libellous and cannot be published.

A FRIEND.—The weekly *Journal of Patents* sells at sixpence.

ALPHA.—Grained plates can be obtained at Hughes & Kimber's.

PUZZLED AMATEUR.—See reply to "J. Hoddington" in last issue.

GARRE.—One gramme is equal (approximately) to fifteen and a half grains.

FAIRPLAY.—Certify your statements by supplying names and other particulars.

THE FAIRLEY PHOTOGRAPHIC SOCIETY are desirous of exchanging lantern slides with other societies.

AMATEUR (Nottingham).—Do not carry the glazing of side and roof close to the end, but leave about three feet opaque.

P. Q.—1. Chloride of sodium is nearly as soluble in cold as in hot water.—2. The person named is a charlatan.—3. Thanks.

HYDRA HYDRATE.—Sodium hydrate is also known as caustic soda. Washing soda is the carbonate, but baking soda is the bicarbonate.

D. S. L.—It is certainly in bad taste to have a tree or other straight vertical line right behind the sitter's head and growing, as it were, out of it.

SILVER IODIDE.—We do not think that the spots arise from metallic particles in the paper, but rather from the subsequent treatment to which the paper is subjected in course of printing.

G. A. GROVE asks: "1. Is the School of Photography in Vienna open to ladies?—2. Will it be open in March and April?—3. Can one join in the middle of a term?—4. What are the terms?"—Can any reader answer?

GEORGE STRAHAN.—No patent can be taken for a moveable or revolving platform on which to pose a sitter, this having been in use for many years; but you may obtain protection for new or improved means for effecting such movement.

DAVID MALCOLM.—It is impossible to give directions in the shape of a formula; but the general principle governing rapidity is long cooking of the emulsion coupled with the employment of ammonia nitrate of silver. It is a matter of experimenting.

JAMES DAVIDSON.—1. The articles for beginners were reprinted in our *ALMANAC* for 1888.—2. The fumes of ether, in moderation, have no ill effect upon persons working with collodion.—3. Jabez Hughes's *Manual* of from ten to fifteen years ago will give the required instruction.

THE PHOTOGRAPHIC DEPARTMENT (Leven Ship-yard, Dumbarton) inquires: "What is the best method for preserving home-made sensitised paper from becoming yellow, either by putting the preserver into the silver bath or otherwise?"—In reply: Float the paper upon a weak solution of tartaric or citric acid.

SULPHITE.—Either of the plans will be suitable if the front portion be made of glass. If any buildings obstruct the light it may be diffused by glazing with ground glass or covering the present glass with tissue or waxed paper. By putting the glass much light is stopped. It might pay you to have an expert examine your studio.

A. J. R.—By placing your lenses in a shorter tube, so as to bring them closer together, a larger angle of view will be included, but not on the same size plate. In order to obtain this it will be necessary to insert lenses of shorter focus. Our advice is not to attempt to make any alteration yourself, but send it to a competent optician to be done.

J. G.—It is quite within the bounds of literary propriety to make extracts from the columns of *Punch* confining yourself to the typographic matter and properly acknowledging the same, but the case is different in regard to the illustrations. In this case you must apply to the publisher for permission, which, considering the object in view, would, we think, be most readily accorded.

F. EVELYN THORNHILL.—On dissecting the transparency we found that the stain was not a chemical one, but arose from a physical cause, the gelatine being disintegrated at each spot. We washed it with a solution of cyanide, in case of imperfect fixation, and while wet the opacity had quite disappeared, only to reappear again when dry. We then gave it a coat of varnish, by which the transparency was permanently restored.

C. T. FRANKLAND.—We have no knowledge of the plates named. With regard to the quality of plates now placed in the market, while it is quite possible that there are some that are not all that can be desired, yet it is very certain that at no previous period have those of such excellence been produced. This applies also to apparatus. If any photographer will have the "cheap and nasty," instead of better and more reliable productions, it is their own fault, and they do not deserve to succeed. If we judge of the state of the art in some parts of London by specimens which we have seen at some doorways, we should say that your strictures are well deserved, but you know there are photographers and photographers. Take a more cheerful view of things.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, February 6, 1889, will be on *Photographic Lenses and the Work for which they are best suited*.

HUDDERSFIELD PHOTOGRAPHIC SOCIETY.—February 6, 1889, Lantern exhibition by Mr. T. K. Mellor. Lady friends of the members are invited. February 20, A discussion on *Developers and Developing* will be opened by a short paper by the Hon. Secretary. Members whose subscriptions are unpaid should communicate immediately with the Treasurer.

THE GRIMSTONE SHUTTER.—A further improvement of a revolutionary nature has been effected in this well-known shutter, which is now constructed to give both instantaneous and time exposures. There are two index fingers, both emanating from the same centre: by one of these the tension of the actuating spring is increased or diminished, by which a considerable range of rapidity is imparted to the "instantaneous" movement. The other index point places the action entirely at the command of the operator, so that he can either have the quicker movement or one which can be protracted indefinitely. The mechanical action is pretty and of a nature not likely to get out of order, and, what is of great importance, it effects its various movements without a jar when operated, as it is, by a pneumatic ball. Provision is made to keep it open while focussing, and it will prove a valuable addition to the numerous shutters now in the market. Messrs. Wratten & Wainwright are agents for this improved Grimstone.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1501. Vol. XXXVI.—FEBRUARY 8, 1889.

ASTIGMATION—ITS NATURE AND EFFECTS.

THERE is no one who has at any time undertaken the task of delivering a lecture on photographic lenses but is invariably forced to the conclusion that not one hour, but many hours, would be necessary in which to get the subject treated in anything like a reasonably comprehensive manner.

One of the branches of photographic optics upon which, for the reason hinted above, Mr. Beek did not treat in course of his lecture at the Society of Arts last week, but which slightly obtruded itself during the brief discussion which ensued, was that of Astigmatism. Time precluded the possibility of this topic being entered upon during the discussion, but we now make the attempt to explain, in language so simple as to be understood by the tyro in the art, the meaning of the term, and the nature of the distortion or defect to which it refers.

Astigmatism, or astigmatism, is a defect in a lens or combination of lenses in virtue of which a difficulty is experienced in obtaining the same degree of sharpness at the sides or margin of a photograph as at the centre. This property is scarcely treated of in any standard works on Optics, because of there being little necessity, except in the case of photographic objectives, to recognise the transmission of rays obliquely through lenses.

To discover astigmatism, the easiest way for the photographer to proceed is to make a circular hole, the size of a sixpence, in an opaque sheet of paper or card, and close alongside of it cut out a cross of this form +, that is, one in which the lines stand in a direct vertical and horizontal direction. The arms of this need not exceed one inch in length. It will suffice if a disc and a cross be cut out of white paper and pasted upon a black ground.

To the object thus prepared the camera is now directed, and all the stops having previously been removed from the lens, the disc and cross are focussed as sharply as possible on the centre of the ground glass. Now rotate the camera so as to bring these images to the margin, when, if the screen be moderately large, the following phenomena will be observed if the image is examined with a magnifier:—A general falling off of sharpness in any case, and, on an attempt to obtain better definition by refocussing, the little disc loses its circular shape and becomes elliptical.

By racking the lens in or out, it will be observed that when it is turned in the oval image stands up and down, while if it be racked out to the point of greatest sharpness, the elongation of the oval is in the horizontal direction. The image of the cross, too, behaves in a strange manner, for when the lens

is racked in so as to secure the greatest sharpness of the image of the now oval disc, the horizontal lines of the cross become so indistinct as to be sometimes barely discernible, the vertical lines remaining sharp and distinct; while upon racking out the lens until the oval stands in a horizontal direction the vertical lines of the cross, formerly so sharp, are now indistinct, the horizontal ones alone being defined.

It will thus be seen that the rays which are transmitted obliquely through a lens come to a focus at two distinct places, one of these foci being nearer to the lens than the other, and this constitutes astigmatism. The skill of the optician is taxed to have both these foci brought as close together as possible, while preserving flatness of field in the greatest possible degree. It is possible to reduce astigmatism to a minimum, but this is effected at the expense of rounding the field, the flattening of which introduces as a concomitant the evil referred to.

Hitherto we have been assuming the employment of a lens with full opening; but by the insertion of a stop the astigmatism is reduced, at least as regards its photographic effect, and in this is found a convenient remedy for the defect and one open to every photographer to utilise.

In this brief article we have dwelt only on the perception and effects of astigmatism. Its cause optically must remain to be treated on a future occasion.

CHOOSING A CAMERA.

OUR present object is not to write a treatise on the myriad forms this piece of apparatus assumes in the workshops of modern makers, but rather to draw attention to those points which are more frequently ignored in selecting an instrument for future real service. A little common sense brought to bear on a question which is too frequently decided by caprice, or an inclination to sink all other considerations provided a particular one is carried out, will be very useful.

Rigidity, portability, and lightness, combined with facility of erection, should be prime considerations in the construction of almost every camera; but there are many on the market at this present time ingeniously designed and beautifully made, but which, in actual service, could only be characterised as "rickety." Yet, because they possess some particular quality to perfection, those purchasers who consider this quality the one main essential of camera construction are too apt to look lightly for other qualities that are really equally needful. One

man must have the lightest camera capable of being constructed, while another takes his stand on the rapidity with which it can be erected. A third will not work at any which will not extend to about a yard long, while a fourth thinks that one with every possible motion to the front is the *summum bonum* of camera design. A fifth looks upon one that has an infinity of ingenious and complicated motions as the acme of perfection, which yet another finds in the shape of the bellows, whether conical or square. And so on, we could describe individual requirements in number sufficient almost to fill a JOURNAL.

In purchasing a camera, therefore, the first point for consideration should be the class of picture it is to be used for, and the lens or lenses to be used with it. Many amateurs nowadays spare no money over lenses, and they possess batteries of them enough to make their less fortunate brethren's mouths water; yet they do not always choose wisely. For example, there are many useful working forms of camera that do well with lenses of light weight, but which would be both shaky and apt to get "out of square" when weighted with a heavy optical combination in front, so much so as to be useless. Again, great length in a camera may at times be a vast gain, and enable subjects to be secured which would be quite unphotographable with those of ordinary length; but such an instrument is useless in this direction unless the user possesses a lens to correspond. Take, for example, a half-plate camera extending to twenty inches, what use is the extra ten inches to a photographer who possesses only a six-inch focus lens, or, mayhap, a five and an eight, the latter by no means usual? The extra cost entailed by such an instrument would be far better spent otherwise. Length in a camera is very like wide-angle power in a lens; it can only be utilised when certain conditions are present: an eight-inch wide-angle lens would belie its name when used on a half-plate, and a twenty-inch extension to a camera a useless encumbrance unless with a fourteen or fifteen-inch focus lens.

We have lately seen several cameras purchased within the last three months, at a high price, with swing backs, of a most inefficient character. In the first place the swing was far too limited, and, secondly, there was no side swing. Now, when a photographer is educated enough to know that a swing is good for other purposes than that of restoring the parallelism of lines made to converge through tilting the camera, he ought to be able to see that the side swing is really more useful than the vertical for ordinary work, and, seeing how much quick work—snap exposures, &c., with full aperture—is attempted, the use of a side swing, as well as the vertical, is of great importance for foreground objects.

Turn we now to another aspect of the subject. Many cameras are made for which it is specially claimed that they can be used with short-focus lenses, yet which are useless for the purpose in many instances. They may answer quite satisfactorily when the plates are used "landscape" fashion, that is, with the longest side parallel to the ground, but the moment the plate is used vertically, and particularly if the lens has been lowered, which has to be done for interior work at times, they are useless, as the lower part of the plate presents a picture of the base of the camera extension. There are patterns of repute, and many of them now made, which will not permit any lens of shorter focus than an eight or nine inch on a 12 × 10 plate. The majority of subjects would be embraced, it is true, by such a lens, but when interiors, for example, are likely to be required, every camera should be

rejected which will not, without showing the structure of the camera on the negative, allow a negative to be produced with a lens with maximum focus of half the length of the largest plate the dark slide will carry. If this point be looked to it will be found that a large number of popular cameras will not stand the test.

We will conclude our remarks with a reference to another very important requirement ignored in, perhaps, more than half the cameras brought out within the last ten years. It is seen more especially by those possessing a good range of lens power for use with varieties of subjects. We allude to the inconvenience of a projecting tailboard when short-focus lenses are used. Taking again, for a type, a well-made 12 × 10 camera of an old and favourite construction, hinged tailboard, with screw focussing arrangement and moveable front, we find that if a seven-inch focus lens be used for, say, the interior of a church, the board is so much in the way that focussing becomes a practical impossibility for those objects thrown upon the lower part of the plate. The full force of this drawback is only seen when short-focus lenses are used; it is only a slight inconvenience at other times, hence many photographers have no practical acquaintance with the defect, for grave defect it is. Some makers of modern cameras have a knowledge of this, and have devised ingenious modes of shifting either the body part of the camera or the front, so as to bring the ground glass immediately at the back, with no intervening obstacle between it and the observer. This, we say, is done in some cameras, but our final advice in this regard is, let the operator beware that when the ground glass is so placed, and the moveable front also withdrawn from its more usual position at the front to allow for the use of short-focus lenses, the former error we described does not show itself, we mean the inclusion of the camera base within the field of view. In all these latter points we can only now say—*caveat emptor*.

WITH a view to bringing about uniformity in the sorting of slides for photographic exhibitions, Mr. F. York in another column makes a suggestion which is both practical and valuable. It consists in affixing numbers to each in a manner which he fully explains.

AMATEURS will soon be considering their work for next season, and the apparatus they will adopt. Lantern slides are now very popular, and stereoscopic ones will probably be equally so during the coming season; therefore we advise every one to provide himself with the means of taking them. Most of the modern cameras for outdoor work of the half-plate size and upwards are usually constructed for taking binocular pictures, and those which are not can be easily adapted for the purpose. The most awkward cameras to apply are those with a conical bellows, in which the front is narrower than the distance necessary between the two lenses. But the difficulty is not insurmountable. Two lenses, though desirable, are not really necessary, as the stereoscopic effect may be obtained with one. But in this case the lens must be fixed to a sliding front, capable of being moved horizontally the same distance that twin lenses would be mounted apart.

ANY quarter-plate camera, or one capable of taking lantern-size negatives, can also be utilised for stereoscopic work. All that is necessary is to have the means of moving the camera, laterally, about three inches between making the two exposures. This is easily managed by having a small board to screw on to the stand in the same manner as the camera, with guide pieces in which the latter can slide. Although a repeating back—to take the two pictures on one glass—is a great convenience, it can be dispensed with, and the ordinary dark slides used. Two lantern-slide negatives, taken, say,

three inches apart, are all that is required to make a stereoscopic picture. Of course, when only one lens is used, care must be taken that the two exposures are identical. If they be made on two separate glasses, they should be developed simultaneously in the same dish, in order to secure equal density in each. Amateurs who have only small apparatus need not be discouraged from using it for stereoscopic photography, for, as a matter of fact, all the earliest stereoscopic pictures were taken with monocular cameras.

MUCH of the fugitiveness in silver prints may, no doubt, as stated in our American notes last week, often be traced to over washing. By this we do not wish it to be inferred that the picture can be too perfectly freed from the hyposulphites; but that any soaking in water after this is accomplished serves no purpose whatever, and is injurious to the permanence of the picture. Long contact with water, particularly in warm weather, is liable to set up a decomposition in the albumen, as well as the fixing material of the paper, and this cannot fail to act deleteriously on the image. There are some photographers who think the "hypo" is removed from their prints after four or five hours' washing; but with the view, as they say, of "making assurance doubly sure," leave them in running water all night, so that they receive in the end from twelve to fifteen hours' soaking. This is a mistake. There is no question that the quicker the hyposulphites can be removed from the paper and the print dried, the better it is for the stability of the picture. By careful treatment, and continuously changing the water, a couple of hundred or more prints can be effectually washed in from two to three hours, and a smaller number in still less time. Experience has demonstrated that prints from which the hypo has been eliminated in about the time mentioned are more permanent than those made under similar conditions which have been washed for twelve or eighteen hours.

It does seem a pity, as soon as a thing becomes popular, that its popularity should be arrested by its being made too commonplace. Manifestly is this the case with pictures on opal glass. The quality of the pictures may now be said to have degenerated into the "cheap and nasty," for some, now to be seen in the shop windows, are anything but a credit to the process by which they are made, or to photography itself. Some little time back we mentioned that the *favor* for this class of picture was on the wane amongst the *élite*, and now we learn that some of the better class of fancy stationers have discontinued keeping them. Inquiry is often made as to the process employed for these cheap productions. The majority of them are made by the ordinary carbon process, but some are by the Woodbury process. In the latter case the prints are first made on paper, and afterwards transferred to the glass.

As we predicted it would when these cheap carbon opal pictures were put into the market, their introduction has had a material influence on the business in highly finished "porcelains," both as regards price and demand. Expensive portraits on opal glass are not so highly esteemed now as they were a few years back. This is to be regretted.

WHAT facilities photographers possess nowadays for accomplishing what a few years back would be impossibilities! yet how frequently do they neglect to avail themselves of them! Here is a case in point. The week before last several photographic copies of three letters were required, on the following day, to be produced in one of the Law Courts. Somewhat late in the afternoon one of the solicitor's clerks was sent with the letters to several different photographers to try and get them copied, but none would undertake the work in the time. Later on another clerk took the matter in hand, and tried other photographers, giving them to understand that expense was no object provided the copies were delivered in time. Finally, with this understanding, one photographer undertook the order, and, as daylight had departed, this is how the work was executed:—The letters, in turn, were fixed on the copying board, the focusing being previously done by measurement—the exact equivalent focus of the lens being known. Then some magnesium ribbon was burnt just above, and a little behind, the camera. One or two trials determined the exposure

necessary, and thus the three negatives were secured. They were then washed, as well as time would permit, and dried by alcohol. The prints were made by gaslight, on bromide paper, and were ready for delivery in the morning. The work proved satisfactory to the customer, and the cheque for it equally so to the photographer, for the charges, though necessarily high, were not questioned.

THE possibility of obtaining views of buildings at night by the agency of the magnesium flash light is now fully established. At the meeting of the North London Society on Tuesday evening a 15 x 12 print of a building was shown. It had been obtained by the light from a Hart's patent lamp, situated at a distance of sixty feet from the building. The charge of magnesium was only sixty grains, and the lens—a rapid rectilinear—was worked with a stop of $\frac{1}{2}$. There are numerous architectural subjects of which, owing to crowded thoroughfares or like causes, it is difficult to obtain a photograph during the day. But when night has set in, and the traffic has become quiescent, then is the chance for the photographer, who, with a magnesium light, is enabled to capture shops, warehouses, and other scenes, otherwise unattainable.

It is not such a great number of years since the natives of the Hawaiian Islands in the Pacific were not quite so far advanced in social, commercial, or any other kind of culture as we know them to be at present. For at least a decade the inhabitants of Honolulu have rejoiced in the possession of a daily newspaper, and evolution has been carried a stage further by the formation of a camera club there. We learn from official sources that there are about fifty amateurs in these islands, which ought to be enough material to make the organization prosperous and useful. The public has an interest in it, as one function to be assumed by the camera club is the holding of exhibitions. The photographers of Honolulu have our best wishes for their success in their incorporated capacity.

At the club room of the Photographic Society of India (Calcutta) a daylight enlarging camera has recently been fitted up, together with all the necessary apparatus for manipulating large sheets of sensitive paper. India has recently increased in its number of photographic societies, the most recent being those at Madras, Bombay, and Allahabad. At the latter, an A B C photographic class is held after the ordinary business is transacted.

A FOREIGN chemical journal is responsible for the statement that in hot weather ready-mixed hydroquinone developers spoil in less than a week, while in cold weather they last two or three weeks, and also that all gelatine films developed with alkaline developers strip off in warm weather. It suggests as a prevention to the latter that the negative be soaked in a strong solution of salt after development.

THE employment of alcohol methylated, so as to render it unfit for use as a beverage, free of tax in the arts and manufactures, has lately been receiving attention from the Congress of the United States of America. The Bill before Congress contemplates the use of bonded warehouses for storing spirits of not less than 80 per cent. proof; the removal of such spirits free of tax from such warehouses to bonded store rooms to be used in certain manufacturing establishments. The proprietor of any bonded alcohol may, according to regulations, methylate the spirit so as to render it unfit for use as a beverage, and remove it free from taxation. As in Great Britain and in Germany, such methylated spirits cannot legally be purified, heavy penalties being prescribed for such purification.

ON THINGS IN GENERAL.

It must have been a rare treat for those members of the Camera Club, who were present on the occasion, to listen to Mr. Common's most interesting discourse on *Photographing the Nebulae*. To hear a "past master" of the science discourse so instructively, and withal so genially, upon one of the most important branches of our

science would be well worth travelling far. If every beginner in photography (I am afraid I may give the same advice to many an old hand) would cut out of the JOURNAL where it appears, and paste in the most prominent position in his dark room the last reported of Mr. Common's remarks in the discussion, and would attend to them, we should have a deal more good work and a deal less futile talk than we now get. I will repeat them here: "Everybody has found what I have found myself, that it is of infinitely greater importance to get a middling developer and know its practice than to be butterflyling about from one formula to another." Here is the very essence of common sense and the very best advice. Moreover, Mr. Common has added a new word to the photographic vocabulary—"butterflyling." It is so expressive that I do hope it will stick, and be of frequent use as long as the state of things it describes continues. More, it will help to kill by ridicule the formulæ-mongering of the plate makers and the preposterous system they recommend for compounding the developer.

I admire, too, the lecturer's ready way of admitting that he could not explain the cause of the variation in the size of the photographic star discs, which vary as the magnitude of the stars themselves—it was a "special dispensation of Providence," and he looked to photographers to explain it.

The discussion or conversation bearing on this point was by no means satisfactory: more pertinent remarks might have been made on this still little understood subject. It was surprising to learn that Mr. Common did not back his plates, though certainly the brand he mentions needs it as little as any.

I was interested in the discussion at the London and Provincial Photographic Association meeting, in *re* magnesium powder. Little seems now to be said of the mixture of magnesium powdered and chlorate of potash, yet it will give a splendid light with less trouble than any, and I do not think it at all likely to be dangerous if stored.

At the same meeting, one of the speakers alluded to a useful pigment made from the bitumen found in old mummies. The first oil colour-box I ever had contained a tube of "mummy brown;" but I quickly learnt its treacherous nature. It ought never to be used, as it cannot "dry"—a painful fact well instanced in the works of some of the older English painters. It is stated that in the cellars of the National Gallery there lies an oil painting, placed upside down in the hope of the eye gradually coming back to its proper place from the middle of the cheek to where, owing to the use of bitumen, it had slowly descended after being correctly painted. I have never seen the picture, but the story is old.

Those who wish to try "Junius's" plan of exploding magnesium with explosive sawdust may save themselves the trouble, danger, and mess of making it by buying Schultz powder, which is the same thing specially prepared for firing in gems. I should think the plan would be very good, and far superior to gunpowder, with its unpleasant fumes. By-the-by, the inquiry is made as to where to purchase the absorptive cotton wool spoken of. Any chemist would obtain it; some dealers send it out unspecified when best cotton wool is asked for. On one occasion I got in a two-pound parcel of wool, and at once detected it by its curious and unpleasant feel. It has a peculiar dry touch, that causes a sensitive cuticle to experience the same unpleasant sensation that is felt upon handling objects after a long immersion of the fingers in hot water. It is splendid for making into pyroxyline; it goes down like a damp sponge instead of an air-bell-imprisoning piece of ordinary wool.

I am very much surprised that no one has accepted Mr. Haddon's challenge as to the impossibility of producing an image on any but a portion of the plate when a small piece of the lens only is used. I respect Mr. Haddon's practical and theoretical skill, so much that I think he must really have been attempting to hoax his audience. Taking the report in this JOURNAL (p. 20), he describes how a portion of this picture was absent when a small segment only of the lens was exposed to the object. This is, no doubt, a perfectly correct account of an experiment, and if left there would be rather a puzzle to many; but when he next says, "I again say, and I say most emphatically, that unless a considerable portion of the lens is uncovered, the light which passes through is confined to a portion of the plate only." If, now, he had omitted the phrase "passes through," his assertion would be correct. It is the very fact that a portion of the light received does

not pass through, that explains the matter. The lens he treated in the manner described would be not a pin the worse in use, either as regards duration of exposure or otherwise, if he permanently painted a narrow black ring round the margin of its anterior surface. The explanation is that rays received at a certain angle near the margin of the lens pass through the front surface and then are lost, owing to their being received upon the blackened edge of the glass before they have a chance of reaching its posterior surface. If the lens were a single positive, with sharp edges, this would not occur.

"Pictor's" last literary production presents no new argument, consisting, as it does in the main, of excited reasseverations of his previous errors, and accusations of dishonourable practices on my part, which will only raise a smile wherever my letters have been read, so uncouthly false the accusations are. The courtesy with which I have treated him seems lost upon him; I therefore have no resource but to cite authorities which show that this writer, who makes such professions of knowledge, is, as regards these particular subjects, quite ignorant. On his first appearance he writes, "There are many colours—such as the lakes, Vandyke brown, ivory black, &c.—which would scarcely dry in twelve months, unless specially ground in drying oil, or mixed with varnish or some other siccativ." The sentence is meaningless; the colours are dry to start with, and no one in the possession of his faculties would purposely mix artists' colours with non-drying oil. "Pictor" writes, "The objection to them (nut and poppy oils) is that when they are not boiled they will scarcely dry in less than twelve months, as a rule." This is what Watts says of nut oil in his *Dictionary of Chemistry*, vol. iv., p. 145, "It dries more quickly than linseed oil;" and Cameron, in his work on oils and varnishes, says (p. 44), "Poppy oil dries and keeps well." I have before pointed out that "Pictor's" knowledge of the subject of oils appears to be derived from some particular little bottle or two he possesses. "Pictor" writes, "I have a bottle of refined linseed oil and a bottle of nut oil in use at present, both purchased from the same artists' colourman; the linseed is nearly colourless, the nut has rather more colour than common linseed oil." I quote Watts again (same page): "Walnut oil . . . commonly called *nut oil*, is greenish when newly prepared, but becomes pale yellow by keeping;" (vol. iii., p. 702) "the cold pressed oil of fresh linseed is pale yellow."

All this from one who "more than a quarter of a century ago commenced an extensive range of experiments, conducted under counsel from the highest living authorities on the manufacture of artists' colours, varnishes, oils," and "Pictor" has utterly and needlessly dragged in a question of my personality. With regard to his personality I will not hazard a guess, but I will say that his remarks, involving as they do a display of complete ignorance of the subject he gave such earnest study to, rather negatives the idea that he is a house painter, for the latter would know more of the subject. I conjecture that the varnish he is most familiar with is negative varnish. If he be an operator who has picked up a little knowledge of painting, it is very creditable to him, but does not make him an authority. As for myself, I have received medals and certificates of competency from the South Kensington authorities which for years have qualified me to act as a teacher, under South Kensington rules, in various branches of drawing and painting.

FREE LANCE.

PHOTO-MECHANICAL JOTTINGS.—III.

PHOTO-LITHO in half tone differs totally from line work from beginning to end. In line work the photographer does merely a mechanical transfer of a subject previously drawn by an artist. In half tone work the photographer works from an ordinary half tone negative, breaking up the half tints by reticulating the gelatinous coating upon the paper or glass used to produce the required transfers upon.

Half tone transfers for stone are made direct upon paper from an ordinary negative, or upon collotype plates specially prepared and dried at a very high temperature. For the direct transfers Husband's process is the best published, and with certain precautions yields perfect results. The paper used must be extra stout to carry the thick film of gelatine necessary to produce the requisite reticulation or grain. The best way of getting a good even coating of gelatine upon the paper is to coat it twice, suspending the sheet to dry the second time by the opposite edge it was suspended from the first time. The

coated paper must be thoroughly dried, then rolled up and kept in an air-tight case, as it is very hygroscopic, and unless so stored gets sticky and spoils.

The drying after sensitising should be done in a box heated to 90° or 100° Fahr. The box to be ventilated top and bottom, so as to get a gentle current of warm air constantly circulating, then the film of gelatine will dry evenly and quickly. If the box be a closed one the gelatine will melt at much less than the proper temperature. During the exposure under the negative the whole of margin of print must be protected from the light by means of an opaque mask, else the print will be unmanageable when on the board for inking up on account of the strong curl. Do not stint the size of paper used. A negative 10x8 should have a piece of paper at least 14x10, with at least a tail piece of three inches at one end, so as to give a good hold at the joint of inking up board.

Do not allow the print to soak too long before inking up, else the half tones will not hold the ink, in this case a sponge charged with methylated spirits rubbed over the print will save it. Winstone's photo-litho transfer ink may be used for inking up these prints, and save the trouble of mixing it at home, which is not an agreeable operation. Don't get too much ink upon these transfers, else they are sure to squash in transferring, and do not omit the final bath of tannic acid and bichromate, nor the exposure to light when dry. This final exposure to light of the whole transfer renders the whites incapable of absorbing too much moisture when in the damping-book, so lessening the chance of a squash in transferring.

For transfers from collotype plates the Petch process yields good results, as does the process of Swan, in which a trace of calcium chloride is added to the gelatine. The following formula, now first published, has given, in my hands, and in those of several pupils, excellent results, and with absolute certainty.

The requirements are:—A collotype oven fitted with levelling screws, and capable of being heated to a temperature of 150° Fahr., and plates a quarter of an inch thick coated with a substratum of silicate of soda and beer. These plates are placed in the oven, and, after being accurately levelled, are warmed to 130° Fahr., then coated with the following mixture in the proportion of 200 c.c. to a plate 15x12:—

Nelson's amber gelatine	200 grammes.
Glycerine	2 c.c.
Water	500 "

Soak the gelatine till quite soft, then melt at a temperature of 140° Fahr., heating the water up gently from cold. When dissolved, add the following, dissolved, and heated to 140° Fahr.—

Bichromate of potash	30 grammes.
Ferricyanide of potassium—the red prussiate ..	10 "
Nitrate of potash	5 "
Water	500 "

If the salts are powdered, solution will be more rapid.

Strain through muslin, then coat the warm plates, returning them to the oven to dry, the temperature being maintained at 150° Fahr., which will dry the films in from three to four hours. When dry, expose under a reversed negative rather flat but well exposed. The printing being continued until the image can be seen with all details at the back of plate.

When sufficiently exposed to light, soak in an upright vessel—changing the water at frequent intervals—until the whole of the yellow bichromate is removed, then stand the plate away to dry. The plate outside the picture must be protected from the light, or the ink margin will render the task of pulling a clean transfer very difficult, besides dirtying the blanket and backing sheets. The operation of pulling transfers from these plates is the same as printing from collotype plates, and will be treated under that head, merely remarking here that they are, after damping, rolled up with a leather roller charged with transfer ink, and the print made upon scotch transfer paper.

The operation of transferring these pictures to stone must be entrusted to a skilful lithographer, it being quite beyond the skill of a photographer quite unused to the transferring even of an ordinary line job.

W. T. WILKINSON.

WHICH IS THE BEST POSITION FOR A SHUTTER—BEHIND THE LENS, OR IN FRONT OF THE PLATE?

[A Communication to the London and Provincial Photographic Association.]

THIS question, which has been submitted to us for solution, and elicited some difference of opinion, has induced me to jot down the following remarks as a small contribution to the debate. I do not claim any originality, for most of the ideas have been frequently

expressed before. My aim is to bring the question clearly before you, to draw attention to some points which have been overlooked, and, if possible, to reply to the inquiry.

It is, I think, understood that the class of shutter is of the curtain pattern. I believe it will be conceded on all sides that such a shutter, if placed in front of the plate, will allow the full power of the lens to work on each portion of the plate as it is being exposed. It will also be conceded that such a shutter placed behind the lens will cut off a portion of the light during the opening and closing of the lens. These two facts seem to have disposed of the question in some minds, and the conclusion has been arrived at, that a shutter placed in front of the plate must be the better. Such an opinion I do not share, although I am willing to admit that in the case of very brief exposures, under special conditions, a shutter placed in front of the plate would give the best result.

In the manufacture and use of a shutter there are other circumstances to be considered besides the one of illumination, and were we to disregard them we might, perhaps, find after all that the shutter did not give us the results we expected of it, and that our choice had fallen on the wrong kind. The motor, the material of which the curtain is made, the size of lens, and the size of plate, are all of them important factors, and besides these there are the questions of distortion and blur which are deserving of consideration.

We will assume, for argument sake, that we have a shutter in front of the plate, that the opening in the curtain is four inches, and that the length of the plate to be traversed is four inches also. You will require four inches of curtain to protect the plate before exposure, and four inches to cover it after. The minimum length of curtain must therefore be twelve inches, and the length to be unwound to effect exposure at least eight inches. If the shutter is worked at the speed of $\frac{1}{15}$ second per inch, the plate will receive an exposure of $\frac{1}{5}$ second. We will suppose the lens used is a six-inch rapid symmetrical. This has a diameter of one inch. If we placed the shutter behind the lens, and fixed the length of curtain to be unwound at eight inches, the same as in the former case, we can use an aperture of seven inches in the curtain. The speed being fixed at $\frac{1}{15}$ second, as before, the exposure would last $\frac{1}{15}$ second. But in this case the illumination is not equal throughout, consequent upon the opening and closing of the lens. For this we must deduct one diameter of the lens, which leaves us with six units of exposure as against four units in front of the plate, or an increase of fifty per cent. But the exposure lasted $\frac{1}{15}$ second, as against $\frac{1}{5}$ second, which is an increase of seventy-five per cent. in time. If we reduce the exposure to four units in both cases, we can do so by shortening the aperture in the curtain behind the lens by two inches. The result then will be, that we obtain the same effect of light upon the plate by an exposure of $\frac{1}{5}$ second with a shutter in front of the plate, as against $\frac{1}{5}$ second if the shutter is used behind the lens.

Again our opponents will say, this being the case, why do you not admit the former position is the better? We have assumed equal conditions throughout, but, I ask, can they be maintained? Suppose the spring we use is worked at its highest tension, and the curtain will bear no more strain, we shall then have attained our highest speed with the shutter in front of the plate. But with the shutter placed behind the lens we have less curtain to unwind, and we can increase its breadth considerably. In other words, we have less to move, consequently more speed; and greater strength of curtain, owing to more breadth, therefore more latitude for increase of tension.

In respect of length of curtain we have room for a gain of more than thirty per cent.; and in respect of strength, measured by the breadth of curtain at the weakest part, probably room for gain of 400 per cent. at least. I arrive at these figures by assuming the curtains are eight inches and six inches long for what is unwound, and three and a half inches and one and a half inches for breadth respectively.

I shall probably be met by the answer that we can reduce the slit in the curtain before the plate to very narrow limits. This brings us to the question of distortion as against blur. If we have a curtain passing across the plate and the slit is narrow, objects will be shortened or lengthened, curved or partially shut out, according to rate of movement in object or shutter in the same or opposite directions. On the other hand, if we place the shutter behind the lens, the exposure, assuming it to be longer, will produce a small amount of blur. I say small amount because we are enabled to strengthen our springs so considerably, if my assumptions are correct, that the fractional difference in time must be very small, comparing the two positions of shutter. Now of these two drawbacks I certainly prefer a slight blur to distortion. Some would say, pictorially, it is an advantage, as imparting an idea of motion, and I do not think they are wrong. I am not certain as to the speed that can be obtained with shutters of the curtain pattern affixed to the lens, but I believe I shall be within the

mark if I state that exposures of $\frac{1}{10}$ second can be given with a lens one inch in diameter. This would meet almost any requirements.

Thus far I have taken the ordinary conditions of a detective camera; and, assuming the conditions correctly stated, I should reply to the question asked, that a shutter placed behind the lens would be preferable. The diameter of lens as compared with length of plate being determining conditions in the problem, were a portrait lens used the result would be different. I have not had time to work out the question, but I think the shutter in front of the plate would then be best. If, however, we go to larger sizes of plates and lenses of the rapid symmetrical type, there will be an increase of advantage in using the shutter behind the lens, for I find lenses are smaller in diameter in proportion to the plates for which they are used, as we ascend in the scale of size. We must also bear in mind the factors of weight and bulk. A camera would have to be made larger if the shutter were placed in front of the plate, and cameras increase in weight according to the square and not the length of the plate. Thus I am again brought back to the answer I have already given, which is, that the back of the lens affords the better position for a shutter as compared with the front of the plate.

T. EVERETT.

PHOTOGRAPHIC OBJECTIVES.*

FACTS AND FALLACIES REGARDING THEM.

THE next step is cementing. This is a delicate process, for although in each part of the work heat has been used, a much higher degree is required, and the danger of cracking the lenses is increased. It is no ordinary occurrence to lose lenses in this work, or, for that matter, at any point of the process. Great care must here be observed to prevent the cement from turning yellow, and thus disturb the transparency of the lens and thereby cause loss of light. The lenses are next temporarily fixed in the mounting and are ready to be examined in the camera. Now comes the moment of suspense. Focussing on an object—and for this purpose I consider a large flat screen covered with printed matter containing various sizes of letters, or a large map hung against a perpendicular wall, the best—the first thing which comes to our notice is the focal length of the objective. It may be one-half of that which was figured upon, or twice as long. However, if not correct, we make note of how much it varies and proceed to examine the image. This may be sharp and brilliant in the centre and gradually become more indistinct as it nears the edge, and may remain indistinct near the edges under any amount of focussing; or it may have the same fading out of the image toward the edge when the central portion is sharp, but this may be brought out clear by change of focus; or the image may be such that it cannot be sharply focussed at any point. There is yet one possibility, but a strong improbability, that the image may be quite sharply defined over the entire screen; this of course is the most favourable condition. After making note of whatever the appearance may be, we proceed to determine the coincidence of visual and chemical foci. As is well known, there are, photographically speaking, two sets of light rays emitted by every object. Those that form the image on the screen, and which are most perceptible, or the visual ones, are made up by the red, yellow, and orange colours of the spectrum; whereas those which make the photographed image, or the chemical rays, are formed by blue, green, and indigo, which are the least discernible, and it is a problem of some difficulty to bring both sets to form an image in one plane. To determine this, we proceed to make an exposure on a plate. Before doing this, however, we must be assured of three things: First, that the ground glass is flat; second, that the plate which we intend to use is flat; third, that the plate when exposed will be in exactly the same plane as the ground glass. I lay great stress upon these points because on them depends a reliable result, and then because with many plates and cameras these conditions are not fulfilled. If you will go through a package of plates you will find some almost perfectly flat, others that are convex, and others concave, the deviation being fully as much as one-sixteenth of an inch, and in larger plates even more.

I do not mention this in the way of finding fault with the plate manufacturers, because ordinarily, and particularly when stops are used, it is of little moment, and because it would be almost impossible to furnish selected flat plates at the present prices. The Eastman roll holders I have found well adapted, because the film passes over a fixed and flat back which remains constant in its relation to the ground glass. If the ground glass is flat, then flat plates should be selected, and if the ground glass be concave, then plates corresponding to it should be used. I believe that, as a rule, where care is observed,

* Continued from page 72.

slightly concave ground glass in plates are used, because they come in this way and this form favours the lenses. The one thing, however, which should be insisted upon, and which I am sorry to say is not always the case, is that the film side of the plate should be exactly in the plane of the ground glass when it replaces it. To determine this, the following plan, which I think is used by manufacturers of cameras, is effective.

Take a straightedge and allow it to rest upon the face of the frame of the ground glass which rests against the back of the camera. Cut a small wedge of wood and insert this between the straightedge and ground glass as far as it will go, and mark the edge in line with the straightedge when it fills up the space. Now take a plate which is suited to the plate holder and which is known to be flat, and place it in this, and by the use of the straightedge and wedge proceed as above with the ground glass. It is unnecessary to say that the marks should agree exactly, and if not should be made to do so.

These precautions are alike necessary for the optician and photographer, whether for the purpose of determining the quality of the lens or for making comparisons between several lenses, and it is a test which every camera ought to undergo. After the plate has been exposed and developed, we may find that although we have a sharply defined image on the ground glass, the one on the plate is very indistinct, which shows that the chemical foci may be shorter or longer than the visual. To determine the extent of variation a number of exposures must be made, placing the ground glass within or beyond the visual focus until as sharp an image is obtained in the negative as on the ground glass. We now have all the principal data to enable us to proceed with the correction of the lens. First is the focal length, next the spherical aberration, then the amount of distortion, and last, but for the present most important, the difference between visual and the chemical focus.

To attempt to correct any one of these qualities will disturb the others, and not only that, they are often to such an extent antagonistic that to improve one will considerably augment another fault. It is not within the province of this paper to show what the likely changes would be which should be followed to improve the objective, but I can indicate what some of the results would be which would arise. For instance, if the visual and chemical foci do not coincide, it is evident that the objective is chromatically over or under corrected, and if the objective would otherwise give a good image, the inner or cemented surface would probably be changed; this might very naturally affect the focal length, which in a telescope objective would hardly be noticed. The focus of the lens might easily be doubled before the proper correction would be reached, and then changes would again be necessary to bring the focus to the proper distance, which would again disturb the chromatic correction as well as, perhaps, the spherical, which latter designates the amount of curvature of the image. Thus, a change of one-sixteenth of an inch in the radius of one of the inner surfaces, which would hardly be noticed in an ordinary lens, might lengthen or shorten the focus of the photographic objective several inches. The changes which sometimes occur are often surprising and inexplicable, even to one who is accustomed to them. It may be found that the amount of spherical aberration is so great that no amount of changing will bring it to the proper standard. One means of partially overcoming it would be the decrease in the size of the lenses, which would mean that they will admit less light, and consequently be slower.

The thickness of the lens which causes the distortion must be accurately determined. However, we will assume that the various corrections are finally combined as far as is possible, and the skill of the optician must determine to what extent they will be. It may be possible to combine the spherical and chromatic aberrations sufficiently to make the former acceptable, and a new series of experiments will have to be undertaken, based on a combination of new glass.

After a lens which meets the ideal of the optician is completed it may be said, "We can understand that the first lens has involved a great amount of work, but after the completion of the sample none of these difficulties will arise." To a certain extent this is true, but it must be remembered that the optician's work is almost entirely empirical. Each lens is an experiment; there is an individuality in each which cannot be overlooked. A lens is rarely, if ever, perfect when completed, and each one is a special study. There are certain features which rarely, if ever, change when working under the same formulae and using the same glass, such as coincidence of visual and chemical foci, centring, and size; but others, such as homogeneity and refrangibility of glass, sphericity of surfaces, length of focus, are variable, and often can only be reached after repeated trials, and in many instances cannot be obtained at all.

EDWARD BAUSCH.

(To be concluded.)

INTENSIFICATION BY MERCURY.

There is no doubt but that up to the present time mercury, in some form or other, is the favourite means employed to confer density on gelatine negatives, as it was in the wet collodion days, if black-and-white images were required. Gelatine does not lend itself so kindly to intensifying processes as collodion did, being much more liable to stains and markings, even if considerable care is exercised, than did the process it has superseded. A solution of bichloride of mercury will alone change the colour of the image by converting portions of it into chloride, if the solution is used weak and its application not long continued; and this method is adopted by at least one experienced and well-known photographer. The image so altered will naturally change on exposure to light, the chloride of silver darkening, and it entirely depends on the evenness of the chloride formation if the negative becomes irregular in density or not; the chances are that in time such intensified negatives will become defective and patchy.

The doubtful permanency of negatives that have received only treatment with bichloride of mercury has induced the generality of photographers to follow it up by some oxidising or sulphurising solution, in order to add permanency in addition to strength. The most favourite solutions are of cyanide of silver, ammonia, or sodium sulphite. The greatest difficulty is to regulate the intensity with any of them. It seems that to ensure a thoroughly even film the bichloride must be allowed to act until the image is whitened through equally, as may be seen by examining the back of the plate. When this is effected after treatment by bichloride of mercury, the image will consist of chloride of silver and subchloride of mercury, and to make it available as a negative these chlorides must be decomposed into either sulphurets or oxides.

The sulphur compounds have a somewhat more non-actinic colour, and when much increase in density is required are preferably used, much depending, however, on the strength of the solutions; but if only a little extra strength of negative is required, a more slowly acting solution is advisable. Amongst the sulphurising compounds, sodium sulphite of about ten grains to the ounce of water is very good, and not liable to stain, even if the bichloride of mercury is not carefully removed by previous washing.

Another good plan, simple and inexpensive (although under any circumstances the expense is scarcely worth considering, it never being great), and one which I think is not generally known, is, after the usual whitening by bichloride of mercury and well washing, to put the negative in a bath of lime water until it is darkened evenly throughout. This gives a very even and good colour, and is permanent as any other method of mercury intensification, the metal being reduced to a state of oxide. Lime water, for the information of those who have not made it, is easily prepared by taking, say, half a pound—the quantity is immaterial—of freshly-burnt lime, not slaty, place it in an earthen pan or jug, and just cover it with cold water. The violent action which takes place in a few minutes being allowed to subside, half a gallon of cold water added, the whole stirred together and poured into a bottle and allowed to settle, the supernatant solution of hydrate of lime being poured off as required, and filtered, if necessary, for use. The only precautions necessary are to keep the bottle filled up with water, giving it a good shake after each addition, and well corked, only pouring off as much as is required for immediate use, as on exposure to the air insoluble carbonate of lime is formed at the expense of the hydrate, and the solution gradually becomes inert. This will be found to give an exceedingly even and pleasant coloured negative, and will not cause brilling. If the intensity is judged to be not right, a bath of hyposulphite of soda, a good wash and treatment with dilute hydrochloric acid, will fit the negative for any other kind of intensification that may be thought better.

E. DUNMORE.

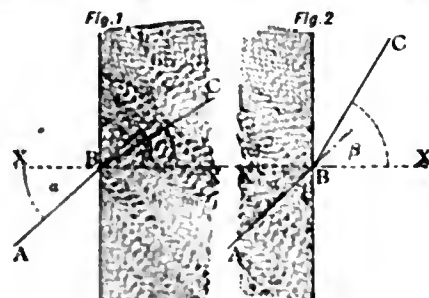
THE CONSTRUCTION OF PHOTOGRAPHIC LENSES.

[A Communication to the Society of Arts, by Conrad Beck.]

THE paper you have done me the honour to ask me to read to-night will, owing to the extent of the subject, be very incomplete. It is of course, in a single evening, impossible to do more than indicate a few of the main principles that are involved in the construction of photographic lenses; and if in some of my preliminary remarks I weary you by the repetition of matter that "every schoolboy knows," I must ask you to excuse me, as I feel that the only safe way to approach a subject of this kind is entirely *ab initio*.

The theory which has explained the majority of the phenomena of light is that it is produced by vibration in a medium we call ether, which is assumed to permeate everything. Although this theory may be superseded—or, more correctly, developed—it is quite sufficiently certain for us to accept its results for the purposes of this paper. The vibration is held

to be a wave motion which takes place at right angles to the direction in which the light is moving. The distance between two consecutive crests or hollows of the wave is termed a wave length. This wave length does not depend on the intensity of the light, and for the same coloured ray it is always the same when travelling through the same medium. But should this ray pass into another substance of greater density—as, for instance, from air into water—its wave length will be shortened, and will give rise to the phenomena called refraction. Without, however, entering fully into the causes, let us merely examine this fact we call refraction. We can at once see, by the very simplest experiments (as, for instance, placing a stick in water), that the light which comes from an object in a denser medium is bent on its journey, and as rays of light in one medium alone are experimentally proved to move in straight lines, this alteration of direction or refraction must take place at the surface of the two media. Precisely the same result ensues when light passes from a lighter into a denser medium. But it is observed in the two cases that the direction of the refracted ray is different. In Fig. 1, where the ray passes from a



lighter into a denser medium, it will be noticed that the refracted ray turns towards the perpendicular to the surface which divides the media, whilst when it passes from a denser into a lighter medium it turns away from this perpendicular, or the normal as it is called. We find, by experiment, that if we take the ray which cuts the dividing surface at right angles it will pass direct into the second medium without refraction, and that rays which impinge on this surface at different angles are refracted to a different extent. It only remains to discover whether there is any law which these refractions follow which can determine at what angle any ray will emerge in a given medium when entering it for another given medium. It is curious to find that Ptolemy, in the second century, made observations of the angles of incidence at a surface, and their corresponding angles of refraction. Vitello, a Polish mathematician, in the thirteenth century, did the same, but the law of refraction was not discovered until 1621 or so, by Willebrod Snell. This law (which is established by experiment) states that when we are dealing with two media of different density, the sine of the angle of incidence, divided by the sine of the angle of refraction, is equal to a constant quantity, which is called the index of refraction; and it was also observed that the incident and refracted rays lie in one plane. The angles of incidence and refraction are the angles which the incident and refracted rays make with the normal; thus, in Figs. 1 and 2, the angle of incidence is the angle ABX (α), and the angle of refraction is the angle CBX (β).

Let us now consider light coming from a point, O, in one medium (A), Fig. 3, say air, and entering another medium (B), which we will suppose

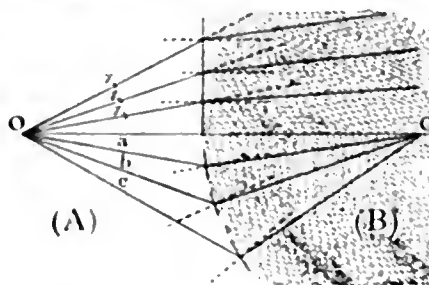


Fig. 3.

denser, say glass. Light will impinge on the dividing surface, which for the first case (upper portion of Fig. 3) we will consider flat, at all angles. Let us first note, as we said before, that the ray which strikes the surface at right angles goes through it without refraction. All other rays will be more or less bent, and the law of refraction shows us that those in which the angles of incidence is greatest have greater refraction in proportion than rays of smaller angles of incidence, for if we differentiate $\frac{\sin \alpha}{\sin \beta} = \mu$ we shall see that as the angle of incidence is increased the amount of refraction, or the difference between β and α , is increased much more rapidly. In the second case, suppose instead of a flat surface we

take a series of small facets and place them at right angles to each ray, then these rays will all pass through into the glass without refraction; thus, if we have light coming from the centre of a circular surface, it will pass through it without refraction.

Next (Fig. 3, lower portion), let us place our series of facets in such positions that, instead of destroying the refraction of the several rays, we increase it. Let us do this to such an extent that, instead of having a diverging series of rays, we make them converge towards the axis. Now, by properly arranging our plates we can make the three rays, *a*, *b*, *c* (Fig. 3, lower portion), converge to the same spot. But since the number of rays is infinite, we shall need to place a series of plates so small as to be merely points. These points will trace a curve, and the form of this curve will be the necessary shape of the dividing surface of the two media, in order to cause a bundle of rays proceeding from a point, *O*, to converge to some point *O'*, in the denser medium.

Now this is just the proposition we have in photography. It is required to converge the light emerging from one point of the object to a single point on the photographic plate; but as a rule the object is at infinity, and light impinges on the surface in a parallel bundle. The practical photographer must not be misled by this word infinity; it is a relative term, and a distance of twenty feet, for instance, when compared with a distance of two or three inches, is practically at infinity, *i.e.*, we can treat all light which starts from such a distance as travelling in parallel rays. Now the curve which would bring parallel rays to one single point is a conic section, and Descartes showed that if lenses could be made whose sections were ellipses or hyperbolas, they would accurately accomplish this. But, alas! all practical men know that it is impossible to make these surfaces true enough for optical work. One true surface we can make, and that is a spherical one, and this is the one which, for want of a better, we are obliged to adopt. To make it clear why a parabolic or elliptical surface cannot be made, I will merely draw your attention to the fact that, in order to grind or polish a lens surface, a tool must be made of the exact shape of the lens required, the lens must then be ground with emery or some other material until the glass assumes precisely the shape of the tool, and in order to accomplish this it is essential that the glass be moved over the tool in several directions, and that it is at the same time touching the tool over its whole surface during the operation. In practice it is found that the more irregular the motion within certain limits, the more likely the surface of the glass is to be ground equally all over. As an example, let us suppose we wish to make a lens of elliptical shape, the only way in which the glass can be moved in the tool while it remains in contact over its whole surface is by its being revolved on the axis of the ellipse. It is evident that if this be done, as the periphery moves more rapidly than the apex, more will be ground off the edge than the centre, and a true curve cannot be obtained.

What, now, is the effect of using a spherical surface? The rays no longer all meet at one point, and the larger the surface of the sphere we are considering, the more difference is there between the points to which they converge. The error which thus arises—due to the fact that it is necessary for us to use spherical surfaces—is called spherical aberration, and I propose to show what are the devices by which we reduce it to a minimum.

There are only two cases in which it is possible for us to obtain no aberration for light passing through one single surface, and both of these are useless for photographic purposes. The first case we have already mentioned, when the object is placed in the centre of a sphere, but, as we saw, this gave no refraction; the second case is when the distance of the object from the centre of the sphere is equal to a certain quantity, *viz.*, the refractive index multiplied by the radius of the spherical surface. For photographic lenses the radiant point is almost always at a great distance, and its rays being therefore parallel, cannot enter any surface as if they emerged from a point comparatively near to the centre of the spherical surface as this would be.

I shall not weary you by going through the mathematical steps which determine the exact amount of aberration for rays due to refraction through a single surface, but the amount is given by the equation:—

$$\Delta f = \frac{\mu - 1}{\mu^2} (\rho + D)^2 \left\{ \rho + (\mu + 1) D \right\} \times \frac{y^2}{2}$$

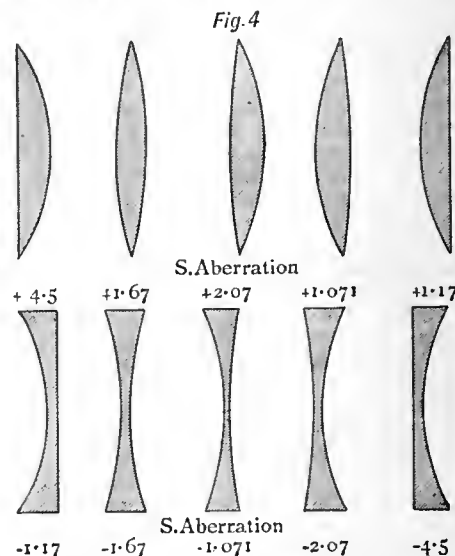
Where *f* is the reciprocal of the distance of the point to which the rays converge from the refracting surface, *ρ* is the curvature of the surface, *y* the semi-aperture, *D* the reciprocal of the distance of the radiant point from the surface, and *μ* the index of refraction. In dealing with this equation we must not take the absolute aberration, but take it with reference to the focus, and there is not time to-night to discuss the way in which it varies.

I have previously mentioned that in order to bring a bundle of parallel rays to a point, we require an ellipse or hyperbola; it should be the former when the rays enter a denser from a lighter medium. It is interesting in this connexion to note that the most perfect projection lens in existence, the human eye, has for its first surface (the cornea) a portion of an ellipsoid, whose section would thus be elliptical.

We assume, therefore, that the nearer a surface tends towards the elliptical form, the less aberration it will possess, and it is evident that a convex surface is nearer to an elliptical form than a flat surface, and will therefore give less aberration, whilst, at the same time, it has greater re-

fracting power. And we can further see that the nearer we make this convex surface approach the given ellipse (which is determined by the refractive index) the more we destroy aberration. If, now, we take two refracting surfaces, and form what we call a lens, we at once ask ourselves: "Can we not, by properly combining the two curves, destroy aberration entirely, and yet leave some refraction, for we see that the two do not vary in proportion?" We find that we can make lenses of the same refractive power, but with widely differing aberration; but in spite of this we cannot entirely destroy it with the kinds of glass that we now possess. We should require a material with a refractive index of at least four, the possibility of discovering which is altogether beyond our most sanguine hopes.

It is therefore impossible to entirely correct aberration in one lens. We can, however, largely modify it. I have made a diagram showing the relative amounts of aberration which arise from lenses of various shapes, and you will see that the lens with the greatest amount of aberration possesses four times that of the best form. As a general rule, we can remember that when parallel rays enter from a less refractive medium—say air—into a denser medium—such as glass—the more curved the surface turned towards the parallel rays, the less the aberration; the flatter the curve, or the nearer it approaches a flat surface, the greater the aberration.



I have placed at the top of this diagram a series of convex lenses, all of the same focus, giving their aberrations, and below them a series of concave lenses, also of the same focus (only negative), giving their aberrations. If, now, we take a convex lens and place it next to a concave lens, with just the same relative aberration, we shall neutralise the aberration, but, since the focus is the same, the refracting power will also be destroyed, and the compound lens will have no power to affect light passing through it. But suppose we take a convex lens with the smallest amount of aberration, and combine it with a concave lens of the largest quantity of aberration, although we get the refraction neutralised, we shall get the aberration far more than corrected, and can reduce the focus of the concave lens, and with the focus the aberration, which is dependent on the focus to such an extent that the aberration is corrected and we shall then have left a considerable amount of refracting power, although, of course, not so large an amount as in a single convex lens.

Let us, then, see to what conclusion we have arrived. We have found that light is bent on entering a medium of different density; that we can nearly bring this to a point, but not wholly, by a single spherical surface. That a lens will, to a certain extent, correct the error thus formed, but not altogether, but that a combination of two lenses will completely do so.

We have hitherto treated light as if it were caused by a single vibration of the material we call ether, this vibration having always one wave length which is only altered when the light passes from one medium into another of different density. This, however, is not the actual fact, though in order to explain spherical aberration it was convenient to assume that such was the case.

The effect which gives rise to the sensation of white light in our eyes is supposed to be produced by the combination of a large series of vibrations all acting together on the retina of the eye. If we consider a vibrating ray emerging from the sun or some other powerful light-giving source, we shall find that it consists not of one vibration with a single wave length, but of a great number all travelling together at the same rate, and differing only in their wave length. On more close examination of this ray we shall find that the vibrations consist of some with a long wave length, others with a slightly shorter wave length, others again still shorter, until we have vibrations with exceedingly short waves. In fact, the complete ray consists of an ascending series of vibrations, each having a slightly shorter wave length than the last, and all travelling together.

It is interesting now to see in what ways these various vibrations affect our different senses. If we isolate from a complete ray the waves only that have very long wave lengths we shall find that no effect of light is produced on our eyes; but if we place a thermometer in the path of these rays, we shall observe that these long wave-length vibrations have heating power. Let us now isolate a portion of vibrations with rather shorter wave lengths; we shall find that the effect of heat is still produced, but that our eyes are also affected by these rays, and the result obtained is that we see what we call red light. Isolating again another portion of the vibrations with still shorter wave length, the effect they produce on the eye is again light, but of a different colour—yellow. The next vibrations produce the colours to the eye of orange, green, blue, and violet, in the order of the spectrum, until at last we come to a point where no further effect of light is produced. The vibrations do not, however, cease here. There are vibrations with still shorter wave lengths than those which cause light, and these, together with the green, blue, and violet vibrations are the waves which affect the photographic salts of silver.

One must not suppose that there is any radical difference between these rays beyond the difference in their wave length. They affect our different senses in different ways. The vibrations that are beyond the visible end of the spectrum would give rise to light, except that our eyes are not delicate enough to see them. We have every reason to believe that they are visible to some of the smaller animalcula. The same applies to the heat rays, and if our eyes were but sensitive to them, we can conceive it possible that we should have no need to ask our companions in the room if they found it too warm, we should see if they did so.

(To be continued.)

COLLODIO-BROMIDE EMULSIONS.

Mr. L. C. LAUDY, of the American Museum of Natural History, Central Park, New York, a well-known worker in the collodion processes, has at my request kindly given me a formula which he obtained from Mr. Newton, and which he says at the time it was used they kept secret.

He says they regarded Mr. Newton in those days as the "shining light" in this country on collodion emulsions. The formula is very practical and gave beautiful results, and all looked for a great future in collodion emulsions, until one day gelatine emulsions appeared, and the glory of the beautiful collodion-emulsion departed. The following are the particulars as given by Mr. Laudy (for Newton's emulsions use Ilanec's delicate cream cotton):—

BROMIDE EMULSION.—FORMULA FOR ONE OUNCE.

Silver nitrate eighteen grains to the ounce. First dissolve in ten drops of water; then add five drops nitric acid for each ounce of solution; then add half an ounce of alcohol, in which is dissolved twelve grains bromide cadmium; then add six grains of cotton, shake well and add half an ounce of ether; let it stand twelve hours, then add four grains chloride calcium.

BROMO-IODIDE EMULSION.—FORMULA FOR TWO OUNCES.

Silver nitrate (crystals) thirty grains dissolved in twenty drops of warm water, then add ten drops nitric acid.

Alcohol	1 ounce.
Bromide cadmium	18 grains.
Iodide ammonium	2 "
When these are dissolved add cotton	12 "

Then add the silver solution and shake well; then add one ounce of ether and let it stand twenty-four hours; then add eight grains of chloride cobalt dissolved in a little alcohol. If the iodide is not used let the amount of silver be twenty-eight grains, and add the chloride cobalt after the emulsion has stood for sixteen or eighteen hours. Plates thus made with this emulsion may be at once exposed in the camera after coating and be developed with the following developer:—

Make a saturated solution of neutral oxalate of potash in water, then add to each ounce fifteen grains of pulverised protochlorophosphate of iron, and lastly, just enough citric acid to the solution to turn litmus paper red.

But if the plates are to be preserved in a dry state they should be put in a special solution made as follows, and called:—

JAPAN TEA PRESERVATIVE.

Saturated solution Japan tea in alcohol	1 ounce.
Water	16 ounces.

The tea solution is prepared by soaking one ounce of Japan tea in six ounces of alcohol, let it stand until a strong tincture of tea is made, then add one ounce of the tincture to sixteen ounces of water. Or better, make a saturated tincture of tea in alcohol, and add two or three drops to each ounce of bromide emulsion. After coating, simply wash the plates in one or two changes of water until the oily lines disappear, and rear up to dry.

To make the plate more sensitive, when it is desired to expose it in the camera, while wet flow over the surface the following accelerator:—

Salt soda	150 grains.
Bromide of ammonium	2 "
Water	12 ounces.

* Continued from page 75.

Mr. Laudy has also sent me a copy of Mr. Newton's printed directions concerning the use and manipulations of the plates. His developer, called a stock solution, is prepared as follows:—

Yellow prussiate potash	1 ounce.
Carbonate of soda	100 grains.
Bromide of ammonium	15 "
Water	10 ounces.

After exposure the plate is washed under the tap a few moments to remove the preservative, then the developer, consisting of half an ounce of the above solution, to which four grains of dry pyro has been added, is poured on. The image soon appears, and the development is accelerated by the air by frequently pouring the developer off and on. If more intensity is desired, add to the developer a little more pyro. Fix in hypo solution, one ounce of hypo to four ounces of water; give the plate a good washing and set up to dry. When dry, varnish the plate to protect the film.

Dr. J. J. Higgins tells me the formula he used successfully is that which was employed by Mr. Albert Levy, and known as Levy's emulsion.

(To be continued.)

F. C. BEACH.

THE SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

THE Committee on Papers and Publications send us the following report:—

The work of two successful amateurs was shown on Friday evening, January 18, 1889, at a special exhibition held at the rooms of the Society, 122, West 36th-street. The exhibition opened with Mr. Charles Simpson's illustrations of the "Open Air Statuary of New York," which comprised forty-three views of about forty different statues. In speaking of his work, he remarked that it was the most difficult piece of photography he had ever undertaken. He made all the views with the detective camera and at different times. Of one he made nine separate exposures before he obtained a picture that was at all satisfactory.

The chief trouble was the exceedingly dark colour of the bronze figures (especially when they faced the north), in bringing out the details sufficiently. Again, very undesirable backgrounds would appear when a position was selected which would make the statue show to its best advantage. It was also surprising to note how scant a record was kept by the city of the dates when the statues were put up, the names of their sculptors and designers, and any other interesting information connected with them. He had great difficulty in getting the information. It had taken him about one and a half years to make the collection. There were only two statues of Presidents of the United States in New York City. The pictures were quite interesting as showing the number and variety of statues in New York, and the work reflected considerable credit on Mr. Simpson for the time, perseverance, and energy he had expended.

Following his views were about fifty beautiful slides by Mr. James E. Brush. These included some wonderful pictures of Niagara Falls in "Ice Chains," as the programme stated, and a great many fine landscapes in the White Mountains. One was an enlarged view of the profile on the Profile Mountain, which he had enlarged directly upon the lantern slide plate from the small image on the negative. The result was to bring out the details remarkably clear, making the profile appear much larger, as if one was looking at it with a telescope. It was said that it looked much larger on the screen than one could see it with the naked eye. To enlarge so successfully requires fine lenses and great care in focussing. Another view was of the steamer *Bristol*, of the Fall River Line, recently burned at Fall River. It appeared like a shadow of its former self.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1475.—"Instantaneous Shutter for Photographic Lenses." J. W. JONES.—*Dated January 28, 1889.*

No. 1499.—"The Improved Packing of Photographic Gelatine Dry Plates. Complete specification." J. T. SANDELL.—*Dated January 28, 1889.*

No. 1504.—"Improvements in Spirit Lamps for the Rapid and Perfect Combustion of Magnesium Powder without Perceptible Smoke for Photographic Purposes." Communicated by J. W. C. C. Schirn. Complete specification. E. EDWARDS.—*Dated January 28, 1889.*

No. 1543.—"Improvements in Photographic Camera Shutters." W. J. LANCASTER.—*Dated January 29, 1889.*

No. 1570.—"Improvements in Magic Lanterns and in Apparatus for use therewith. Complete specification." W. C. HUGHES.—*Dated January 29, 1889.*

No. 1645.—"Photographic Apparatus." E. THORNTON.—*Dated January 30, 1889.*

No. 1736.—"Improvements in Iris Diaphragms." A. S. NEWMAN and F. LINDSAY-SIMPSON.—*Dated January 31, 1889.*

No. 1776.—"Improvements in Photographic Shutters." W. J. SCOTT and C. PROCTOR.—*Dated February 1, 1889.*

PATENT COMPLETED.

A METHOD FOR PRODUCING PHOTOGRAPHIC EMULSIONS NOT REQUIRING A BASE OR SUPPORT AS PHOTOGRAPHIC FILMS.

No. 4574. EARNEST SIDNEY WILLIAMS, 41, Jones's road, Drumcondra, Dublin, Ireland.—March 31, 1888.

My invention or process consists in a chemical combination, wherein I ensure the presence or contact of a salt of chromium with gelatinous photographic emulsions (known as sensitive emulsions) which are spread on glasses, or other suitable smooth material, and as soon as set or cooled I react on such emulsions with sulphuric acid or any of its compounds, whereby the salts of chromium do not affect in any way injuriously on the compound sensitive silver salts contained in photographic emulsions, provided such emulsions are thoroughly freed from excess of sulphuric acid or its compounds.

Hitherto the attempts to produce photographic emulsions for exposure in the camera, without a base or support to carry the sensitive film, have met with no success to my knowledge. Every endeavour was centred to improve the supports for such emulsions, as paper, collodion, and various other transparent tissues. My attempts were centred to render sensitive emulsions capable of being their own supports.

By my method this can be attained, and consists in the following operations: 1 (make or) prepare a gelatinous photographic emulsion by any of the well-known processes, but containing a rather large quantity of gelatine in its composition, add a certain quantity of a chromium salt, preferably the bichromate of potash or ammonia, while the emulsion is yet warm and in a fluid state, mix thoroughly, spread said emulsion in a dark room upon levelled glass plates, or on any other suitable smooth support such as slate, ebonite, or varnished paper, &c., which have been previously well polished and dusted over with french chalk; leave the emulsion to cool, and when set, I immerse the glasses, or other supports containing the emulsion, into a bath of sulphurous acid or its compounds until the acid has performed its chemical reaction upon the bichromated gelatine emulsion, I then wash it in several changes of water to remove all soluble compounds and the sulphurous acid. Lastly, I dry them in suitable dark chambers, and when quite dry, strip the photographic emulsion from the support.

Thus produced, the emulsions can be made in long strips either to be cut up to the required sizes or suitable for roller slides, without any base or support, neither glass, paper, nor any other transparent, hard, or flexible material, and which can be worked just as well as if such bases or supports were used.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The method or process of chemical combination wherein I ensure the presence or contact of a salt of chromium with gelatinous photographic emulsions (known as sensitive emulsions), and react with sulphurous acid or its compounds, whereby the salts of chromium are rendered injurious on such emulsions by subsequent development of the image after exposure to light. 2. The novelty of such dried emulsions, not having any base or support for the production of photographic negatives or positives, combined with the simplicity and cheapness of its manufacture. 3. That such dried photographic emulsions can be exposed in a camera from either side, and that the resulting picture or image will be contained in the emulsion itself, consequently can be printed from both sides without loss of sharpness of such prints. 4. The perfect insolubility of such dried emulsions, not having any soluble emulsion on its surface. 5. That any photographic emulsion, consisting of compound salts of silver suspended in gelatine, can thus be treated, and be made thick or thin, light and unbreakable, yet pliable and firm.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 12	Great Britain	5A, Pall Mall East.
" 12	Bradford	55, North Parade.
" 12	Derby	Sykes's Restaurant, Victoria-street.
" 12	Manchester Amateur	Manchester Athenæum.
" 12	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
" 12	Bolton Club	The Studio, Chancery-lane, Bolton.
" 13	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 14	Bickenhead	Free Public Library, Hamilton-st.
" 14	Cheltenham	
" 14	Manchester Photo. Society	36, George-street.
" 14	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

On Thursday night, last week, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. W. E. Tichenham presided.

Mr. G. W. Atkins was elected a member of the Association.

Mr. EDGAR CLIFTON drew attention to a newspaper report of the accidental death of Mr. Bewley, of Dublin, owing "to the condensed state of hydrogen gas in the bottle" which he was carrying, whatever that might mean. Were iron gas bottles safe?

Mr. J. J. BRIGGS said that Ilin's Oxygen Company, in London, would not fill with oxygen any bottle brought to them for the first time without testing the bottle, for which test they charged a shilling.

The CHAIRMAN remarked that the name of Bewley was well known in connection with mineral water manufacture, in which machinery was used which would give great pressure to gas; perhaps too much pressure had been applied.

Mr. A. HADDON believed that the pressure was eight or ten atmospheres in such machines, and fell to about four atmospheres in the bottles.

The HON. SECRETARY remarked that the meeting had not sufficient informa-

tion as to the circumstances under which the explosion took place to form any opinion on the subject.

Mr. W. COBB exhibited some portraits taken by artificial light by Mr. Barry, of Hull. He thought them to be good, and did not know what light Mr. Barry had used.

The CHAIRMAN thought them to be better than usual. Much depended upon the management of the reflector in such work.

Mr. T. EVERETT then read a paper on *Roller Shutters* [see page 85].

Mr. THOMAS KERR said:—

Since the last meeting I have made a number of experiments that have confirmed me in the opinion I previously expressed, viz., that the best place for the shutter in a camera is as close to the lens as it can be placed. The only exception I can find to this rule would be with a plate of the same width as the diameter of the lens (such as a three-inch plate with a lens of three inches in diameter, a combination we are not likely to have in practical work), in which case there would be shown on an exposed plate a little less movement with the shutter close to the plate than with it close to the lens, but there would be no difference in the exposure (that is, if the shutter with a three-inch opening travelled the whole distance in two seconds each part of the plate would receive one second's exposure in each case). But there will be found a great difference if we go to another extreme, that is, to take a three-inch plate with a three-inch opening in the shutter and a pinhole aperture; now the shutter when close to the plate will have to travel, as in the previous case, six inches to expose and recover the plate in, say, two minutes, so giving one minute's exposure to each part of the plate, and showing on the plate three units of movement on each part of the plate, but as a whole plate (that is, from side to side) showing six units of distortion. With the shutter close to the aperture it will only have to travel three inches, and moving at the same rate as before, six inches in two minutes, it will give a three-inch opening or one minute's exposure, having the full power of the light on the whole plate, and will show three units of movement, but no distortion. Here are a number of plates exposed by means of a curtain shutter in a camera in which I could use the shutter in either of three positions, viz., close to the plate, immediately behind the lens, or in front of the lens, the lens used being a rapid symmetrical of about five-inch focus and one-inch diameter, the shutter with an opening of three inches. To obtain a steadily moving object, I fitted up a bicycle wheel with square tablets of white card, the wheel revolved by means of a clockwork motor, and I so obtained a regular speed. The negatives shown are certainly the best when the shutter was used close to the lens. I next fitted up a pair of stout rollers, seven feet long, in a frame six feet apart, and put on these a band of calico, two yards wide, with black laths sewn across exactly parallel to the rollers; on one roller was fitted a pulley and hand connected to a small motor giving regular speed, and so causing the black bands to travel upwards at regular intervals. Several series of plates were exposed on this screen. The negatives are, in my opinion, equally as good in every way when the shutter was used close to the lens as when the shutter was placed next to the plate, with the advantage that there was very little distortion when the shutter was close to the lens, while it was very marked when close to the plate. After trying the shutter several times with the three-inch opening the opening was reduced to one inch, which gave the same results, only the distortion was greatly increased when the shutter was used close to the plate and not perceptible when used close to the lens, in this case the exposure being made in half the time of that with the shutter close to the plate.

Mr. W. BEDFORD said that the results might have been expected. When the shutter is close to the plate the object moves to a certain extent; when the shutter is close to the lens the object is moving all through the exposure; it is really a question whether preference be given to general movement or distortion.

Mr. EVERETT suggested that in photographing a cricket match the shutter might move in the same direction as the ball and traverse the plate quicker than the ball in the field; thus it might be possible to get an image of the ball and of the man being stumped, that is to say, get two effects upon one plate.

Mr. CLIFTON thought that the camera might be made to follow the object.

Mr. J. B. B. WELLINGTON said, in relation to the roller-blind shutter controversy, that it was good to have old gossips upset if they were proved not to be true.

Mr. WILLIAM ENGLAND tested shutters by means of a white string swinging pendulum fashion before a black velvet background.

Mr. KERR said that Mr. Haddon had proved that the lens had to be nearly a quarter uncovered before it gave any image at all, and this, perhaps, was why less movement was obtained with the shutter close to the plate than might have been expected.

Mr. S. G. B. WOLLASTON stated that under the system of experiments pursued the most horizontal lines must have had the longest exposure, and that was in favour of placing the roller shutter near the plate.

Mr. KERR had found an advantage in placing it next the lens, but did not know where the advantage came from.

Mr. A. COWAN said that the results before them certainly exhibited most distortion when the roller shutter had been placed next the plate.

Mr. BEDFORD thought the principle of the expanding diaphragm between the lenses to be better than that of roller shutters.

Mr. COWAN remarked that one of the best results before them had been obtained with the roller shutter close behind the lens.

Mr. KERR said that the plates of two makers had been used, but judgment should be formed from the average of the whole set of results.

Mr. COBB thought comparative experiments to be of little value unless all the plates came from the same batch.

Mr. W. H. HARRISON said that when mechanical apparatus was described to a public meeting either the apparatus should be produced or it should be described by means of diagrams on the blackboard, verbal descriptions alone were inefficient.

The CHAIRMAN then, by the aid of diagrams, argued that it made no difference whether the roller shutter were placed close behind the lens or next to the plate; he chose for his first illustration a pinhole aperture, and for his second a lens the full size of the plate; he further asserted that the principle which held good for these two extremes of aperture held good for all intermediate dimensions of aperture. Speaking with reference to the evidence of the photographs, he observed that these so-called practical proofs would require to be performed with extreme care, and repeatedly, before they could be supposed to controvert mathematical demonstration. In this particular case, he noted that

whilst one pair of photographs seemed to support Mr. Kerr's statement, another pair tended to contradict it. Various causes, such as changes of the light between the exposures, or a little difference in the sensitiveness of the plates used, would account for such differences in the result, without doing violence to arguments based on sound theory. As an instance of mistaken inference from a difference in two photographs, he referred to the pair now shown, taken of a wheel in motion, bearing a white card. It was argued that because the card was less sharply defined in one picture than in the other, there was more movement in the first than the second. On examining the photographs, however, it was evident that the want of sharpness existed not only at the ends of the card, where movement would show itself, but along the side which was travelling in one line, and that in fact that plate showed much blurring due to halation, and was probably thinner coated than the other. As to the idea that more light reached the plate when the shutter was close to the lens than when it was close to the plate, he thought that it might be proved to be fallacious in the following manner:—Let it be supposed that a plate of four inches was used, and a shutter with a four-inch opening travelling at a given rate, say four inches per second. Suppose also that the aperture of the lens was of the smallest, or take a pinhole instead. It would then be evident that with the shutter next the plate, each part of that plate would be exposed in succession for one second to the light coming through the pinhole. If the shutter were close to the pinhole, the whole of the plate would be exposed for one second to the light passing through the pinhole. The total light passed through would be the same in both cases, but in the first case part of the plate would be exposed earlier than the other part. That disposed of the proposition when the smallest possible stop was used; and by similar reasoning (which the speaker demonstrated upon the blackboard), it could be shown that the same result accrued when a lens of large aperture, supposed in the example chosen to be equal in size to the plate, was in use.

Mr. HADDON said that it would be different if a large plate were in the camera.

Mr. HADDON called attention to an aristotype print of the moon published in *Anthony's Bulletin*, of New York, copied from a negative taken by the aid of the Lick telescope; he believed it to be the best photograph of the moon ever produced.

On Thursday evening, February 14, lantern views relating to Holland will be exhibited before the Association.

CAMERA CLUB.

On Thursday, January 31, Mr. GRAMHAM BALFOUR, M.A., read a paper entitled *Figure in Landscape and Genre* (this will appear in a future number). Mr. Francis Cobb occupied the chair. The lecturer treated chiefly of the limitation of subject imposed by the means used in photography in regard to the use of models in landscape and in figure work.

A note from Mr. Lake Price upon the subject was read, and also a few words from a letter sent by Mr. H. P. Robinson.

A slight discussion followed, and the proceedings terminated by a very hearty vote of thanks to Mr. Balfour for his able paper.

After the meeting some apparatus by Messrs. Broughton were exhibited. Thursday, February 14, will be a members' lantern evening.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting was held on February 5 at Myddelton Hall, Islington, — Mr. J. Traill Taylor, President, in the chair.

Rev. E. Healy showed a lens fitted with an Iris diaphragm by Mr. Newman; there was a slight catch to indicate each of the marked stops.

Mr. F. W. Hart showed a series of excellent photographs taken by his flash lamp, one 15 x 12 print being of a building taken at night, the flash sixty feet distant.

This was a lantern evening, and numerous excellent slides were shown.

The exhibition of members' work has been postponed from February 19, which will now be an ordinary meeting, to March 5.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

The ordinary monthly meeting of the Photographic Section of the above Club was held at the Public Hall, Croydon, on the 1st instant, — Mr. E. Straker in the chair.

Mr. BELLAMITH gave a demonstration of the Eastman Company's stripping film and transferotype processes.

McKellen's camera and the Eastman Company's "Kodak" were exhibited. A series of lantern slides from Kodak negatives taken in Italy showed the value of this apparatus for touring purposes.

During the evening Messrs. Watson's new camera was exhibited by the Hon. Secretary. Its design, particularly in the improvements shown in mechanical details, elicited the admiration of all present.

Much interest was aroused by the exhibition of the Scriptor Company's lantern slide camera, lent by Mr. George Smith, the ingenious arrangement by which a long extension can be obtained, and the compactness and convenience of the instrument, met with general approval.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

At the ordinary fortnightly meeting of the above Society, held at the Institute, Buxley, Friday, January 25, Mr. Pringle in the chair, the minutes of the previous meeting having been read and passed, Mr. Sanderson was elected a member.

Mr. Drusser showed a new album by the Eastman Company and some prints on Fry's paper which had been developed with hydroquinone.

Mr. Pringle showed a number of prints by the cold bath platinum process.

Mr. Crowe showed a transferotype print placed upon opal.

Mr. FENOLLS then gave an address upon *Practical Photography*, upon which a discussion thereon ensued.

The next meeting will be held February 8, at eight p.m.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting was held on Thursday, January 31, at the Royal Institution, Colquitt-street. Mr. R. J. Sayce, the retiring President, took the chair.

The minutes of the last meeting were read and confirmed.

Mr. SAYCE then, in a few words, introduced Mr. A. W. Beer, President-elect, who took the chair.

A hearty vote of thanks to the retiring officers and members of Council was then passed, on the motion of Rev. T. E. BANNER, seconded by Mr. WILLIAM SHARROCK.

Mr. SAYCE responded on their behalf.

Mr. Charles Adamson, Rev. F. A. Bartlett, M.A., Messrs. John Forshaw, jun., W. C. Hepworth, Fred M. D. Howard, J. K. Jackson, N. C. Jellico, Donald Matheson, H. B. Millar, Charles Pearson, Dr. H. B. Powell, M.D., and Mr. F. A. Schierwater, were elected members of the Association.

Mr. BEER then delivered his inaugural address. He said:—

During the twenty-five years of its existence great changes in the personal of the Association naturally occur, and the great bulk of our present members are amateurs of the latest and grandest epoch of our art-science. The perfection of the marvellous gelatine process has in these later days added enormously to our numbers, and it is to our recruits (if I may be permitted to use the term for want of a better) I would particularly address myself, relying upon the indulgence of those veterans in our midst with whom I have passed so many pleasant and profitable hours in the years that are gone. It is a truism to say a man cannot be in constant communication with others working for the same end without greatly increased knowledge and power to do better and more satisfactory work than before, and such, I take it, is our intention in banding ourselves together; as it will be at once admitted that productions amply satisfactory to the worker were he left to himself do not bring him that amount of self-congratulation when compared with the productions of more advanced students; but as he is the more likely to test the novelties that continually appear, so occasionally he finds something worth noting and communicates to others, and, consequently, both sides are benefited. While on this point let me say we detest an assumption of secrecy or secret processes, and particularly in a close society of amateurs meeting for mutual help, improvement, and encouragement, whose delight it has ever been to freely give to the photographic world in an inalienable manner their discoveries or improvements. I need not reiterate to you examples, you know them well. It cannot be commended that a man who is willing to draw from and learn everything that can be extracted from others then, labouring under the impression that he has discovered some little "wrinkle," carefully keeps it to himself; if he had been a careful student of photographic literature he would have long ago arrived at the conclusion that there was very little new under the sun, and the probability that his pet "dodge" had been published long ago. On the contrary, for the sake of our little commonwealth, should not each member take a delight in illustrating his particular achievements? Let one who is an adept in enlargements demonstrate his more successful methods, another lantern slides or stereoscopic work, or, again, some favourite method of mounting and finishing the work, and by so doing not only lighten the labours of our Secretary but also raise the value of the Association and increase its usefulness. Freely we have received our photographic knowledge, let us as freely give. Fascinating as is the pursuit of the photographic art-science, great as the pleasure derived from successful results, manifold as are the subjects waiting the combined action of the sun, the lens, and the sensitive plate, yet photography without a special end and aim, without a distinct object and purpose, is as a ship without rudder or a (hobly) horse without reins; yet in a great many cases the eager amateur, exposing his plates on anything that comes first, soon finds his new "fad" flat, stale, and unprofitable; he has made no special branch of photography his particular forte, or taken any individual class of subjects as his aim. In my own case I am absolutely certain such would have been the result, and at this time, when our ranks have been filled in so astonishing a manner, a word of advice and warning may not be amiss. If you desire your love for the art to be permanent and your interest in it continuous, take up some line or direction as a speciality, it does not much matter which you select so that you do choose one, either from the artistic side, as, for instance, some distinct class of landscape pictures, river studies, tree forms, flower pictures, broad landscapes, seascapes, clouds, or the more stable subjects, that may be more broadly defined as architectural, viz., picturesque exteriors and interiors of ancient churches, grand tombs and edifices, abbeys and castles, Norman doorways and arches, or even the despoiled black-and-white timber halls or colleges; studies of country life, always charming; of the itinerant vendors of novelties in the streets of our busy cities; old country inns, their signs and courtyards. On the other hand, there is the mechanical or scientific aspect—in plate making, the production of lantern slides or transparencies, improvement of the rapid shutter, and a host of other details. Once the interest is aroused the rest is easy; pictures or results are obtained that are of real value, due either to their intrinsic beauty or to the fact that it may be impossible to obtain them again. Localities are constantly changing, old landmarks are being ruthlessly swept away; towns take the place of villages, or an antique relic is in the line of some new railroad; churches are restored out of all knowledge, old manor-houses are destroyed by fire or rebuilt, and a thousand causes operate to effect changes innumerable; of what remains let us secure permanent pictorial records, educating our own minds and being of service to the community at large. How diversified are subjects that present themselves to the diligent searcher in this attractive field of study, and how ample the reward, when we find ourselves in the possession of charming pictures, the embodiment of our own fancies and the tribute to our taste, together with the knowledge that some little contribution is made to the store of general information, an addition that may be of permanent use to our fellows. Is it not a pleasure to be repaid for our exertions in hunting up some quaint, out-of-the-way relic of the past by finding that suddenly the photograph becomes of inestimable value as an unimpeachable testimony of what is gone, and that never can be replaced? Again, the amateur who adopts a class of subjects as a speciality must of necessity become more competent and proficient in that line of work than a mere dillitand worker, and so distinctly raise the general level of his work. For example, it will be admitted that the man who devotes a considerable amount of careful attention to photographing the interiors of our grand churches or ministers, either generally, as the naves, transepts, or choirs, or particularly, as the beautiful altar tombs, carved doorways, or clustered pillars, will produce work that astonishes the photographer who simply "takes" anything that comes first, and trusts in Providence (and his exposure tables) it will turn out all right—and, in present, exposure tables seem to me to be most fatal to

intelligent photography. Use them as "feeding bottles" while babies in the art, if you like, but when twelve months old cast them aside for ever. Certainly not by working out an equation, or amusing oneself with decimal fractions, are the finest pictures made. Use, if you will, a simple spectrometer for determining the value of the light in very dark corners, and for that purpose a scrap of silver sensitised paper is all you require. But I am straying from my subject. It must not be understood that the preceding remarks apply only to photographing the evidences of the past; they apply equally well to pictures of the shipping on our grand and majestic river, or in the docks that line its banks; to the tree-fringed meads of Cheshire, or the rocky glens and babbling streams of Wales beyond; to the busy life in our crowded streets, with the curious studies of the peripatetic, pavement-edge tradesman; applies with exactly the same force to the rendering of bold mountain forms, and the still, but beautiful, life to be found in groups of flowers or ferns. Pardon me if I finally reiterate the point of my remarks. Make some branch of photographic study particularly your own, in which you will do the truest, the finest, and the best work that can be done in that direction. Your art will then be to you a pleasure and a joy greater than it has ever been before, giving you new powers, and showing you fresh delights continually, making keen your appetite for other fields to conquer, quickening that artistic faculty possessed in some degree by all, proving an elevating occupation for spare hours all the year round, as in its multitudinous forms the art-photographic adapts itself to all tastes, all seasons, and almost all purposes. The first purchase of a camera and lens opens a door that comparatively few ever shut again, after they are initiated into the mysteries beyond. A new friend is made, ever willing to accompany you in your wanderings, never complaining of your choice of route, ready to stop when you stop, and journey when you journey, doing for you the work of a dozen artists with slow brush or pencil; a friend, whose company once enjoyed, you will never again wish to leave behind.

The Hon. Secretary exhibited Krugger's book camera, as introduced by Messrs. Marion.

The PRESIDENT drew attention to a circular of the Wirral "Footpaths Preservation Society," whose objects he recommended to the amateur photographers.

Mr. W. TOMKINSON then read a paper on *An Easter Trip to the South of France and Northern Italy*, which was illustrated by a large number of lantern slides from photographs taken on the trip.

The limelight lantern was under the able management of Mr. P. H. Phillips.

BATH PHOTOGRAPHIC SOCIETY.

A MEETING was held at 10, Quiet-street on the 30th ultimo, —Mr. W. Pamphrey, President, in the chair.

There was a large audience of ladies and gentlemen present to hear Mr. PHILIP BRAHAM, F.R.S., discourse on *Light: its Chemical Action, with especial reference to Photography*.

The lecturer said the question of photography nowadays was of such vast importance that no branch of industry failed to benefit by it. To-morrow, he said, would be the fiftieth anniversary of Fox Talbot's discovery of "photogenic drawing" being communicated to the Royal Society, and there were some present who could look back to the time when photographic processes were in their infancy. What is light? — what is electricity? he continued, is a question any one can easily ask. He could only reply, that light is motion, darkness is stillness. At present we regard light vibration in the all-pervading ether, a material in existence, and that ether has several attributes and qualities which can only be scientifically realised, because no one can say what is absolutely the case, but almost all experiments are explained by its means. Photography is not a science; it is an art. Music is not a science; it is an art. Painting is also an art. In science we must measure and weigh all our experiences; whereas with art, the canon of art is subject to change by time. Art cannot do without science, but science can do without art. He once heard a gentleman say that science was a bar to imagination, but that could not be substantiated, and only proved his ignorance of science and scientific workers. Light travels with a velocity of over 180,000 miles per second of time. The earth is only 24,000 miles in circumference — a small quantity in comparison. Electricity has been shown to travel at a similar velocity. Light travels in direct lines, and the experiments to be shown would demonstrate this; also in its passage through various media such as water, it is deflected in accordance with their surfaces. I have here, he continued, a means of throwing a powerful beam of light from an oxyhydrogen jet. In the path traversed by the rays we will interpose an empty sphere, and you see there is no difference. The light passes through, but when I fill the flask with water the beam is brought to a focus just beyond the sphere; if the liquid were denser, the focus would be nearer still. I have here a hollow glass vessel with plano-spherical surfaces; when I fill this cell with water there will appear a nearly perfect image upon the screen. I may also mention that a number of photographs have been taken with a liquid lens. You will notice that the spot, which in the case of the empty cell was at the top, is now at the bottom. We suppose there are a number of rays passing, and that these have become changed. What is the change? We put it down to refraction. Now what is refraction? I will interpose this glass lens, and place a star-pattern screen in front of the condenser, and by a suitable lens we get an image of the star through an empty cube upon the screen. Now I will fill this cube, or rather glass-sided vessel, with water, and replace the star with a line. No appreciable difference takes place, but if I turn the cube slightly the position of the image of the narrow slit is changed. Now we take a hollow prism, and as water is poured in the lines become shifted towards the base. The lines, too, are not only deflected, but coloured. A lens acts like an infinity of prisms, and is governed by the acuteness or otherwise of these prisms. The aim is to produce an achromatic lens. Here is a prism composed of three densities of glass: the lower a heavy lead glass, the middle portion of flint, and the upper of crown. This illustrates dispersion, and to the making of lenses the dispersion of one glass is counteracted by another. The refractive index known, and the amount of light dispersion, a lens almost perfectly achromatic can be constructed. Very few are absolutely perfect in the balancing of chemical and spherical aberration so as to produce an image of any object. It is also a question whether the human eye is perfectly achromatic. It is also a question of the chemical action of light. Light is the mainstay of all animated nature, as instanced in the interdependence of plants and animals; animals consuming the

oxygen of the air, and exhaling carbonic acid; vegetation consuming the carbonic acid, assimilating the carbon, and setting the oxygen free by the action of sunlight. In photography we have to deal with chemicals purely. Some have an idea that light is deoxidising in some cases, and oxidising in others. A few scientists think the effect to be electrical on the small particles or molecules acted upon. Here is a bulb filled with hydrogen and chlorine. It is possible the limelight may be too slow, so we will use magnesium to bring about a combination of the gases at present only mixed in the flask. [Experiment performed: explosion occurred.] Nitric acid decomposes in the light, giving off fumes of a yellow gas in the space above the liquid. Many a druggist has damaged his eyesight when withdrawing the stopper of such a bottle. Do they know that is due to light? In some experiments with Mr. Gatchouse I clearly demonstrated that the action was not on the acid but the vapour. No exposure to sunlight affects a tube entirely filled with HNO_3 , but if a space be left light soon renders it charged with gas above atmospheric pressure. What is chemical action? We only know that an effect is produced, and put it down to chemical action. Here are some tubes containing sulphide of calcium. When the light of burning magnesium is impinged thereon they become phosphorescent. We have now a number of streaks of light, but we cannot say a change of a chemical nature has been produced. Now, it is a fact that phosphorus is the least phosphorescent of any substance — it gives no light in the dark without oxygen and when there is slow combustion — yet the word phosphorus is derived from the supposed property of its bearing light. Is the effect chemical, or is it electrical? With regard to these phosphorescent tubes the particles may be electrically charged and go back to their original state by slow discharge. In some experiments with Mr. Friese Greene we not only got an effect by electricity, but also by magnetism. Photographic gelatine plates were placed between the poles of a powerful magnet, and on development showed a similar action to light, but also a spot of great intensity, which occurred not in the line joining the poles but considerably distant from them.

The CHAIRMAN, in thanking the lecturer for his able discourse and interesting series of experiments, said there remained plenty of work for those who were eager for research, especially in the direction of colour photography. That was the desideratum of the time. Opticians gave them forms of lenses almost perfect, but before colours could be obtained in the camera he imagined a complete revolution in the chemicals used would be necessary. The vote accorded, the Chairman made several announcements, and said he felt it his duty to state publicly that through the generosity of a member all expenses incidental to the formation of the Society, which were considerable, had been defrayed, therefore there was no leeway to make up.

A discussion upon the lecture followed, in which Messrs. Friese Greene (London), J. Dutton, J. A. R. Rudge, Philip Braham, the Chairman, and the Hon. Secretary took part, but no new points of interest were introduced.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

A MEETING of the above Association was held on the 4th instant, over seventy ladies and gentlemen being present.

The PRESIDENT (Henry Blandy, L.D.S. Edin.), in his opening remarks, referred to the courtesy of Professor Clowes, D.Sc., upon his consenting (by request of the Committee) to repeat his lecture, *A Visit to the Land of the Midnight Sun*, to the members of this Association. Mr. G. A. Ball had kindly consented to show the slides with his oxyhydrogen limelight, and being conversant with his ability as a lanternist we should know they would be put through in a masterly manner.

The lecturer, Professor CLOWES, was heartily received, and said that he hardly knew how to address them as a society of photographers, as he was in this art only a novice. But he would call their attention to the difficulty of obtaining good results from the deck of a vessel, and other unfavourable situations incident to a trip in Norway. His experience taught him to give preference to paper negatives, as being far more portable and not liable to break. He then proceeded to detail the incidents relative to the manners and customs of the people, and some fine views were thrown upon the screen, including three with the sun shining at midnight, the reflection on water being exceedingly fine.

SHEFFIELD CAMERA CLUB.

THE first annual dinner of this Club was held at the Freemasons' Hall on February 1. Dr. T. H. Morton, President, occupied the chair.

After the loyal toasts had been duly honoured, Mr. J. ELLINOR proposed "The Sheffield Camera Club," and coupled with it the name of the President. Although not a practical photographer, he held the art in high estimation, and was wishful to know the working of a society which had in view the advancement of photography.

Dr. T. H. MORTON, in responding, said:—

The Sheffield Camera Club, which has honoured me with the Presidential Chair, has not been established sufficiently long to render an audit of its accounts a difficult matter; but you will see by the short report that there is a balance in favour of the Society, and without wishing to be unduly complimentary, the work done during the past few months has been very satisfactory. I wish, in the remarks made this evening, to touch upon the present and future of this and kindred photographic societies; and let me notice in passing the extraordinary number of associations now existing, and probably if all the members were polled they would not represent a twentieth part of the devotees to our fascinating art. In 1878 the number of societies in the United Kingdom was fourteen, including a benevolent association; now, in 1889, we learn from the ALMANAC there are no less than seventy-five, and others are in process of formation. Similar institutions are springing up in India and the Colonies and other countries. The literature of photography has kept up with this general advance. The capabilities and object of photography are too well known for me to reiterate here, but I would hazard the question, What is a good typical photographic society? what its scope, aims, requirements? how does it fulfil the intention of its promoters and satisfy the members? In a few words allow me to answer, if only inadequately. In the first place, a society like this should be able to impart instruction, and that, at least, of such excellence that a member can intelligently follow

and take part in the debates. I assume this is a duty, especially when there are no means of education in the locality. It is surprising that the technical school here has not photography on its curriculum. The London City Guilds recognise its usefulness, and hold competitive examinations, conducted by Captain Abney, F.R.S.; but with the exception, I believe, of Professor Chapman Jones, at the Birkbeck Institute, Mr. Farmer, and one or two more, there are few actual teachers or schools of photography, although many are competent to teach, as C. H. Bothamley, Jerome Harrison, Lionel Clark, T. C. Heworth, Yvelantin Blanchard, and others. What would be the feeling of a person who had not attended a chemistry course who went to hear a paper on the allotropic modifications of carbon, oxygen, or boron, or to listen to a lively discussion on the morphology of mammalian vertebrae, unless he had some knowledge of anatomy or zoology. My impression is, that the decadence of many societies other than photographic is due to the want of timely preparative instruction. The new member attends one or two meetings, then leaves, a sadder but not a wiser man. Some will perhaps say, Photography is so easy now, anybody can pick it up. I heard a tourist saying to another (it was at Bettws-y-Coed, some years ago), "All you have to do is to clap your camera down here, and the thing is done!" and he gave the stone wall a smart hit with his stick. Perhaps he was describing the instantaneous process, which was the talk at that time. Well, I admit photography, the mechanical part, to a certain extent is easy, but is the uncapping a lens, using a standard developer, and taking a print on ready prepared paper from the negative, sufficient to satisfy the aspiration of an enthusiastic amateur. I trow not. He looks for art composition with a faithful portraiture of nature. He finds an extensive range of chemical and physical phenomena in the different methods of developments, the laws of optics and light in the lenses and exposures, and acquires by the aid of photography a true record of microscopic objects, astronomical data, and illustrations of travel, as well as health-giving exercises when in search for the beautiful. These sentiments require the fostering care of every society. I may say, in addition to elementary instruction, suitable subjects for discussion should be provided at regular intervals, and all members invited to contribute their share in the common stock. Laboratory experiments to be encouraged. Some societies are doing excellent work in this respect. Not is the social element to be ignored. Man is a sociable being, and thrives best when surrounded by a congenial sympathy. As regards exhibitions of photographs, now frequent and mostly competitive prizes being given, there can be little doubt that a medal or other reward is an incentive to produce good pictures; but when the highest awards are occasionally given for an indefinite period to the same work, it rather checks the production of new efforts. Again, the printing methods are now so various, one would expect the pictures to compete according to the process selected, say platinumotype with platinumotype, silver chloride with similar, and so on. When judging it ought to be known whether a picture is made direct from one negative or by means of two or three, or copying them and enlarging. Perhaps the Photographic Convention to be held this jubilee year of photography in London may arrive at some uniform system on these and other matters. The programme of our Club is not printed, but I trust the executive will be able to carry out the following items—a lantern entertainment; some elementary or practical class instruction, papers at each monthly meeting; and also the scheme suggested by Mr. Howarth, and which had worked well in the Birkbeck Society, viz., a photographic survey of the district, geological, historical, &c.—but the fulfilment rests in a great measure with the members. As the stability of any office depends upon the cohesion of its parties, so will the performance of this Club depend on the steady efficiency of each individual, and the united action of all. We can then hope to aid materially the progress of those arts and sciences to which photography is closely attached.

Mr. E. HOWARTH proposed "Local Scientific Societies," and spoke of the advantages astronomy had gained by the use of the camera.

Mr. FRANK HARRISON, M.R.C.S., President of Sheffield Microscopical Society, testified as to its utility in medicine and surgery.

Mr. LARBOYD, President of Sheffield Pharmaceutical and Chemical Society, also replied in an able speech.

Mr. WALTER NICHOLSON, artist, gave "The Health of the Council," and related some amusing incidents when meeting the camera in his excursions. He understood the difficulties in taking a landscape photograph, and considered the point of view one of the most important things. It should be very carefully considered. The difference of a few inches either made a picture or spoiled it. He was not very fond of instantaneous views of figures. Some persons were taken with leg or arm uplifted, and he felt that it gave a picture an ungainly appearance, or at least a feeling of unrest. He believed there was a great future for photography.

Mr. WINDEN replied on behalf of the Council.

Mr. NEWSON, M.P.S., in felicitous terms gave "The Visitors," and Rev. W. Seed and Mr. Neill responded.

During the evening recitations were most effectively given by Mr. Winden and Mr. Gilley. The musical part was well sustained by Messrs. F. Harrison, Grubbshaw, and Waddington.

The ordinary monthly meeting was held, and formal business transacted, before the dinner.

KEIGHLEY AND DISTRICT PHOTOGRAPHIC ASSOCIATION.

A WELL-ATTENDED meeting was held in the large Lecture Theatre of the Keighley Mechanics' Institute on Friday evening, January 18, to consider the advisability of forming a photographic association for the town and district. Mr. A. N. Kershaw presided.

In his opening remarks he said that the meeting had been called to test the feeling in regard to forming a photographic association. The time had come, now that they had upwards of one hundred photographers in the district, when they might very opportunely form such an association.

Mr. THOMAS HEAPS said that the Council of the Institute were very desirous of meeting any efforts which they as a body might be disposed to make. The exhibition which had been held in the Museum under the auspices of the Council of the Institute, to whom they were much indebted, was fast drawing to a close, and it was the feeling of all concerned that now was the time for taking action. Their Chairman and himself had sent out circulars calling the present meeting, and it was gratifying to him to see so many present. There were several reasons why they should form an association in connexion with that Institute. The first was the fact that the library already contained several good works on photography, and he had no hesitation in saying that any

proposition for the addition of new books which might be of general service to them as a body would be most favourably received by the Council. Then there was the reading room, which was supplied with photographic literature. There was also the old chemical laboratory that had been standing empty since the erection of the new wing, which was well adapted for their requirements in the shape of a dark room; and last, but not least, the small lecture theatre in which they could hold their meetings, lectures, &c.

After some little discussion, Messrs. A. Keighley, John William Darling, and Thomas Heaps were elected Committee *pro tem.*, to meet the Council of the Mechanics' Institute to arrange upon what terms they could be affiliated.

A general discussion now ensued, at the close of which it was decided to adjourn until Tuesday, January 29.

At the adjourned meeting on Tuesday, January 29, Mr. E. Myers presided.

The Committee *pro tem.* laid the terms of the Council of the Mechanics' Institute before the meeting, which were unanimously accepted.

It was moved, "That the thanks of the Keighley and District Photographic Association be accorded to the Council of the Mechanics' Institute for the valuable and instructive photographic exhibition recently held in connexion with the Institute." Carried.

It was proposed, "That the name of this society be 'The Keighley and District Photographic Association.'" Carried.

The following gentlemen were then elected officers:—President: Major Soglen, C.C., J.P.—Vice-Presidents: Mr. A. Keighley and Mr. Barton.—Committee: Messrs. A. H. Marriner, Ellis Myers, Thomas Heaps, A. Haggas, Preston, J. W. Thompson, E. R. Lee, and G. Smith.—Treasurer: Mr. E. Marriner.—Hon. Secretary: Mr. J. W. Darling, 3, Drake-street.

The meeting adjourned to Tuesday, February 19.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

ON Wednesday evening the members of this Society and their friends were entertained by Mr. ANSELMO PINHEIRO with an exhibition of Brazilian scenery photographically illustrated by limelight. All the subjects shown were taken by Mr. Pinheiro.

Mr. S. W. Allen occupied the chair, and the lantern was under the supervision of Mr. W. Windsor.

Correspondence.

Correspondents should never write on both sides of the paper.

FEBRUARY MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—A BIOGRAPHICAL DICTIONARY OF THE "BLACK ART."—THE SOCIETY INTENDS TO GIVE FÊTES TO FOREIGN PHOTOGRAPHERS DURING THE EXHIBITION.—POSITIVE PRINTING PAPER ON LINEN.—CATHEDRAL GREEN.—A DODGE BY M. LEMIRE.—POSITIVES ON SILVER CHLORIDE PLATES.—DEVELOPMENT BY HYDROQUINONE, REMARKS ON BY PROF. STEINING.

The monthly meeting of the Photographic Society of France took place on Friday evening last, the 1st instant, M. Davanne in the chair.

After reading the correspondence and voting the admission of new members, it was announced that M. Pector, a member of the Society, was compiling a new work in the form of a dictionary, in which will be given the biography of all persons who have invented or done anything for the advancement of the photographic art.

M. Ganthier-Villars, the indefatigable publisher of photographic literature, presented two of his new publications, the one treating of the value of land surveying by photography, the other on the way and means of obtaining a *souvenir* of a tour or voyage by obtaining views of the same. The Society appointed M. Londe to give a report on these books at the next meeting.

A discussion took place as to how the Photographic Society should act towards the foreign members of the proposed congress which is to take place during the exhibition. It is decided that a series of *fêtes* shall be given by the Society, to which will be invited, not only the members of the congress, but all photographers who will be on a visit to Paris at that time.

A number of very fine proofs from negatives taken from the Eiffel Tower were exhibited by Herr Mackenstain. These proofs received great attention, the foreground representing the iron skeleton of the tower, although no more than four yards distant from the operator was perfectly sharp, as well as the Trocadero and other objects in the distance. This lens was manufactured by Steinheil, focus five inches, diaphragm quarter of an inch.

M. Sengel and Dobler presented different kinds of positive paper upon a linen support. This idea is very good, and will render great service to architects, in that their drawings when reproduced by photography will no longer be liable to be torn and destroyed. These gentlemen not only prepare paper with the iron salts in this manner, but also for platina and silver chloride printing.

M. Balagny made a dissertation on the suppression of the red light in the dark room and replacing it by cathedral green, which he said was in every respect better, being at the same time as safe as the red. As this was recognised long ago in England, I need not dwell upon this subject except to say that with the exception of M. Balagny and a few of his intimate friends, cathedral green glass for the dark room has not met with the reception it deserves. A long discussion took place as to what colour was really the safest for the dark room. M. Franck said that he lighted up his factory of gelatino-bromide of silver plates with red glass,

doubled with a white pane of glass, which he had varnished with an ordinary negative varnish. This, in his opinion, acted far better than ground glass.

M. Balagny presented a negative, 27 x 33 centimetres, which he had obtained by a "single lens" manufactured by M. Balbrech, of Paris. The negative represented the Eiffel Tower, which has now attained the altitude of 237 metres above the level of the Seine. M. Balagny speaks very highly of the lens. He says it is very rapid. It is formed of three glasses—two crown and one of flint. Two of the glasses are in optical contact, the other is at a certain distance from the others. A good-sized diaphragm can be employed (half an inch), hence the rapidity.

M. Lumière, of Lyons, who was present, gave very good advice as to how it became easy to judge of the right moment to stop development. He said: "Suppose you have a lantern with a very large surface lighted up, it is impossible to judge if sufficient intensity has been attained or if all the half tones are visible. If you now allow a dark piece of paper having a hole no larger than a half-crown in its centre to fall over your lantern, you will be surprised and enchanted to perceive that you can see distinctly the value of your negative, because all the other rays emerging from the lantern are prevented from entering your eye."

MM. Marillier and Lobelet exhibited a rapid shutter manufactured by Mr. Werber. It consists of a U-shaped flange placed in the centre of the lens. When the legs of the U are before the glasses the rays are prevented from passing, when they are opposite the brass tube the image is delineated upon the sensitive surface. Great rapidity can be obtained by this system, and therefore it deserves attention. I think its motion might be described as the same action as the plug of a tap. When the plug is in a certain position the water rushes out, when in the opposite position the water is stopped, so with the rays of light.

M. Audra exhibited some very fine pictures on glass obtained by the silver chloride process. The image was developed by the hydroquinone developer and gave very good results. As for myself, I now prefer the hydroquinone developer to all the others, being cleaner, cheaper, and easier to manipulate when travelling than all the others. I am now on a tour through the south of France and Italy, carrying with me a whole-plate apparatus, with chemicals, &c., to develop the views taken during the day, and that in the bedroom of the different hotels. On an average I develop twenty-four plates every evening, and so can personally give the advice to try the formula given by me in one of my letters to THE BRITISH JOURNAL OF PHOTOGRAPHY, and all who do so will, as myself, offer thanks and songs of praise to the person who first thought of experimenting with hydroquinone as a developer.

Canine.

PROF. E. STEBBING.

ABSORBENT WOOL—CELLULOID.

To the Editor.

SIR,—In your impression of February 1, in your *Echoes* by "Junius," an inquiry is made where the absorbent wool is to be obtained. I note on the label of the packet that Messrs. Krohne & Sesemann, of 8, Duke-street, London, are the sole agents for Great Britain, and the packet is branded with a red cross. I understand that it is prepared by treating the cotton alternately by alkalis and acids. It is perfectly free from grease or soluble matter, and a tuft of it will sink instantly when placed in water. I have not tried it for filtering emulsion, for the simple reason that I find a properly prepared piece of charmois leather a more economical and perfect filter. The celluloid and magnesium compound referred to answers the purpose admirably. From later experiments with gun-cotton, of different degrees of explosiveness, dissolved in ether and alcohol I can make the material burn as rapidly as I desire, nor have I found the slightest difficulty in lighting celluloid of any thickness.—I am, yours, &c.,

A. L. HENDERSON.

Argyle Mansion, Brighton, February 3, 1889.

[Under the name of "Absorbent Cotton Wool," this material can be readily procured at nearly all the better class pharmaceutical establishments in London. Its price ranges from 1s. 6d. to 3s. per pound. It has been frequently employed in making pyroxyline, being so readily percolated by the acids.—Ed.]

PRUSSIAN STAINS.

To the Editor.

SIR,—In the ALMANAC you publish belonging to your paper you give a way of printing with the iron salts. I tried the one with ammonio-citrate of iron and potassium ferricyanide, and got my fingers stained blue all over, and I find that ammonia will take all the stain out. I thought possibly some of your readers might be in the same fix some day, and would be glad to know of a way to get rid of the stain.—I am, yours, &c.,

W. A. MEIGH.

Ash Hall, Stoke-upon-Trent, February 2, 1889.

HYDROQUINONE DEVELOPMENT.

To the Editor.

SIR,—For some time past I have been experimenting with hydroquinone as a developer, and am much pleased with the results obtained by using the formula published in your issue of November 23 by M. le Vicomte de la Tour de Pin. At the same time, I have tried this developer in

printing on bromide paper, and have found no difficulty in obtaining good prints. It is only necessary to wash well before fixing, and to use fresh hypo for each print. I cannot regard this as a disadvantage, compared with the great convenience of having the same developer for both negative and positive work. As an amateur, it seems to me preferable in many ways to the ferrous-oxalate process.—I am, yours, &c.,

Bournemouth, January 31, 1889.

JOHN J. MASON.

[The formula above referred to is as follows:—

Hydroquinone	1 part.
Sulphite of soda	2 parts.
Carbonate of soda	10 "
Water	67 "

—Ed.]

SORTING LANTERN SLIDES.

To the Editor.

SIR,—Having noticed various suggestions by members of the Photographic Societies and Clubs to overcome the difficulty and confusion of sorting the lantern slides after an exhibition—the suggestion of various coloured papers is good, but the tints would soon be exhausted, and without any settled arrangement as to choice of colour, there would still be a little confusion—my suggestion would accomplish a double purpose. It is now an understood thing that white paper on the top corner of the slide indicates that it should be placed downwards and face the condenser. Now, instead of the two pieces of white paper, numbers should be substituted, and the number should indicate the owner of the slide. A list should be made in the minute-book, thus:—No. 1. Mr. Cowan; No. 2. Mr. Wellington; and so on. After the exhibition the slides should be sorted, and the members ask for their particular numbers. Should any not be claimed then the list in the minute-book would show to whom they belonged. Now that there are so many societies and clubs it would be important that members belonging to different clubs should have the same number in each. The plan would be to start the first list at the Parent Society, the Secretary putting the names of the various exhibitors opposite a number, and forward a copy to the Photographic Club, who would enter the names opposite the corresponding numbers of those belonging to the two societies, adding the names of the members who are exhibitors, and then post it to the Camera Club for the same purpose, who would do the same thing and post it to the Photographic Association, and so on to all the London societies. When all this is arranged the secretaries would indicate to members their respective numbers. In order to keep the numbers clean it is advisable to place them under the cover glass. Now, Mr. Editor, should you approve of these suggestions, your position in one of the most active and prominent of the various societies may induce you to urge upon members the advantage of such a systematic arrangement.

I should be pleased to send sheets of numbers similar to the enclosed if the plan is adopted.—I am, yours, &c.,

F. YORK.

81, Lancaster-road, Notting-hill, W.

PSYCHIC PHOTOGRAPHY.

To the Editor.

SIR,—I have been reading the letters on this subject with much interest, as at one time I was trying experiments in this interesting study. I cannot see why it is impossible or incredible. The photographic plate may, with a long exposure, be able to receive an impression which the retina of the eye is not sufficiently susceptible to perceive. I took up the study with the aid of a professional medium, who at one time I believed to be honest, but I tried to leave no door open for imposition, and never allowed him, to my knowledge, to touch the plates before or after exposure, nor to have anything to say to their development; the plates were 5 x 4 slow Britannia, and were taken in my sitting-room with an exposure of about 25 to 28 seconds. I purchased the plates myself, and they were never out of my possession, and if they have been tampered with, I cannot understand how or when, unless the medium introduced at some time or another a box of plates which he had previously tampered with and sealed up to pass as a box fresh from the maker's hands. I shall be happy to leave some plates at your office for your inspection, and see if you think they are double exposures, or if you can account for the result in any way. I can simply state positively that they were taken by myself in my sitting-room, by daylight, with no one present but the person to be photographed, myself, and the professional medium. In some cases—not always—the plates are very poor specimens of photography, as I was just beginning; but, nevertheless, I would allow no one to have anything to do with them or touch them, so as to reduce to a minimum all chance of my being imposed upon. The figures are not recognisable by myself or any one who has seen them.—I am, yours, &c.,

W. A.

[This correspondent encloses his card as a voucher for his *bond fides*. We shall be glad to be afforded an opportunity of inspecting the plates.—Ed.]

MIDLAND COUNTIES' EXHIBITION.

To the Editor.

SIR,—By a clerical error the dates connected with the above exhibition were wrongly given in the advertisement of last week's issue. As it may

mislead, I ask the favour of correcting them. The actual date of the exhibition is from February 25 to March 2; and last for receiving exhibits, February 22. Thanking you in anticipation.—I am, yours, &c.,
47, Hagley-road, Birmingham. WALTER D. WELFORD, Hon Sec.

COPYING PAINTINGS.

To the Editor.

SIR,—Mr. Dunmore needlessly protracts this already tiresome discussion by putting forward another of his peculiar arguments—quite futile in itself—to prove what I already conceded to him. When he stated that “glycerine and water is the mixture advocated,” I replied frankly, “I accept his statement.” What more should any sensible man want? In order to prove that when glycerine is prescribed it means glycerine and water, he writes, “It is a very usual mode of expression to say that such-and-such a negative is developed with pyro or ferrous oxalate—now here common sense comes in” (Does it? I don’t see it. Having been previously absent, if it comes in now, it only comes in with the water diluted down to nothing—say, water, one ounce; glycerine, *quant. suff.*; common sense, *nil.*), “and suggests that the pyro or ferrous oxalate should be used with water, and not rubbed on the film *per se.*” Seeing that the said solution could not possibly be made without water, the illustration bears no analogy whatever to the use of glycerine, which, being a liquid in itself, does not entail the addition of any water, and in nine cases out of ten is used without it. If an instruction is thus given, say, “Fix with hypo or cyanide,” it involves the absolute necessity of water, which is a *sine qua non*; no one but a lunatic would rub the dry crystals on to a film or print, as that would simply mean instant destruction; but either glycerine *per se.*, or glycerine and water, may be smeared over a “painting brought to be copied” at the option of the destroyer. If I go to a chemist’s shop and ask for a few ounces of glycerine, I get it *per se.*—if he is a honest man—I don’t get glycerine and water. No! I don’t see where the common sense has come in.

He goes on to say, “May I ask ‘Pictor’ if he has ever himself seen an oil painting damaged or destroyed by the application of glycerine *per se.* or diluted?” Considering that not many weeks have elapsed since the cool promulgation of these pernicious instructions, as to the best mode of tampering with oil paintings entrusted to photographers to be copied, it is not reasonable to expect that I should already either have seen or heard of any injurious results from their adoption. I had never previously heard that paintings should, as a matter of course, be exposed to such risks, if it suited the purpose of the photographer so to tamper with them, and I was utterly amazed when I read of these things. Hence I deemed it my duty, immediately afterwards, as an experienced painter of pictures, to utter a strong protest and warning against such dangerous proceedings.

I may here describe an experiment which I performed a few weeks since. Two or three years ago I bought at auction a lot, consisting of an engraving and two old oil paintings; I bought the lot for the sake of the engraving. The oil paintings were of no value—mere lumber; one of them I destroyed last summer for the sake of the wood in the stretcher, which I used to boil my studio kettle. The other had a sketch pinned on until I finished it a month ago. The old painting was about twenty inches by sixteen, and it occurred to me before burning to use it up for experiment on the subject of this discussion. I cut it from the stretcher, and divided it by drawing white chalk lines centrally on the length and breadth, leaving an inch of neutral ground between the four sections. In a warm studio I applied to No. 1 section pure water, to No. 2 glycerine and water in equal parts, to No. 3 glycerine only, to No. 4 heavy imperial stout, in each case adding a few drops of a weak solution of oxgall, and using a distinct piece of sponge for each. Within fifteen minutes the stout was nearly dry, the water dry in patches, the glycerine and water dry only at edges of cracks, and the glycerine quite moist all over. On examining the back I found that the water had penetrated the most rapidly and spread the most extensively; the stout least of all. I renewed the applications every fifteen minutes for an hour, “keeping it moist.” I then left the picture to its fate for twenty-four hours; result—the water was quite dry, but had accomplished the greatest disintegration, and caused the paint to blister and scale off easily at the edges of the cracks; the stout was quite dry, having merely acted as a weak cement, leaving no ill effects beyond brown discolouration of the surface, which was easily cleaned off by a damp sponge and dry cloth, the slight blistering having subsided; the glycerine and the glycerine and water remained quite damp at the back all over their sections, and had even united across the neutral space, thus ensuring that permanent damp which leads to final destruction. The painting was of no value; if it had been of great value, any one of these empirical applications, except, perhaps, the stout, would have completely destroyed it.—I am, yours, &c., PICTOR.

[This subject, especially in regard to its “mutual admonition” aspect, has now received sufficient attention; and as “Pictor” has in his previous letter signified his intention of declining further altercation with “Free Lance,” we here close the discussion.—ED.]

PHOTOGRAPHING IN NORWAY.

To the Editor.

SIR,—Having in contemplation a photographic trip to Norway during the coming summer, I should be obliged if you, or any of your readers,

could give me any information as to whether there are any facilities in that country for sending on parcels of plates in advance to await one’s arrival at any given place. For example, intending in the first instance to land at Bergen, could parcels of plates be sent forward from thence by the steamers plying on the Hardanger and Sogne Fiords, “to be left till called for,” say, at any of the steamboat landing stages? If so, I should be glad if the proper way of addressing such parcels in Norwegian could be furnished to—Yours, &c., ALIQUIS.

[Pending the publication of a series of articles on photography in Norway, which we have in type, we have to request the favour of an answer to this query from any of our readers who have lately been touring in that country.—ED.]

MONEY PRIZES VERSUS MEDALS.

To the Editor.

SIR,—I think the time has come when one may ask for some expression of feeling among photographers generally as to the desirability of giving money prizes in place of the time-honoured medals? With money entrance and money prizes we shall soon find our way into the sporting arena.—I am, yours, &c., F. C. LAMBERT.

Cambridge, February 4, 1889.

Answers to Correspondents.

J. T.—Received.

J. W. RAMSDEN (Leeds), sends us an adapter for lantern slides, for which we thank him.

H. G.—You can register your design by sending a photograph of it, together with 1s. 6d., to our publishers.

EAGLE.—The only modern work published is a series of articles which appeared in this JOURNAL in the summer of 1883.

J. C.—If you suffer from the fumes of ammonia in the developer, better substitute a fixed alkali such as carbonate of soda.

A. J. CORRIE wishes to know if it is true that in an enlarged photograph the gradations of light and shade are never right.—Reply: This is not the case.

E. HOPKINS.—In order to ascertain whether the water is at fault better try one print with distilled. You might also try a little hypochlorite of potash in the developer.

JOHN HERRON.—Much depends upon the lighting of the studio. You may try from one to six seconds, no stop being employed. It is impossible to convey a more definite idea.

C. TRUSCOTT.—Send them to any auction mart in a town with many photographers.—In London, Stevens, of Covent Garden, makes a speciality of such, and fair prices are realised when the articles are in sound condition.

L. W.—To obviate the fog in your platina prints, try the system that was recommended by Mr. H. M. Hastings, which consists in developing with carbonate of potash solution to which a mere trace of hypochlorite of potash has been added.

JAMES WILSON & Co.—The best arrangements for your enlarging camera will be to place it level on a table and fix a mirror outside the window. This is hinged at the bottom and kept in position by a cord; it can thus readily be adjusted to the desired angle.

J. W. D.—We do not think you can purchase the lecture you require. If it is on the early history of photography, Hunt’s *Manual*, Jabez Hughes’s *Manual*, Harrison’s *History of Photography*, and the early numbers of this JOURNAL, will supply information from which a lecture can be compiled.

A. C. says: “At present I am occasionally using ready-sensitised paper. May I ask if paper thus prepared is considered as permanent in its results as that sensitised in the usual way by the photographer himself? I do not recollect having seen any article bearing on this subject.”—In reply: Yes.

FLORENCE says: “I saw some photographic magic lantern slides coloured the other day; can you tell me how they are done?”—We cannot tell, unless, like you, we saw them done; but copious instructions on the subject were published towards the close of our volume for 1866, to which we refer you.

THOS. W. MARSTERS asks: “If A brings to B a negative to print half a dozen copies, and while in the care of B the negative gets broken (not spoiled, but cracked), so that only vignettes can be got from it, to what extent is B liable to owner of negative?”—In reply: This is a matter on which we invite opinions.

ACCOUNTANT.—The probability is that if you had placed your collodion negatives in paper envelopes before stowing them away, instead of placing them in plate boxes, no cracks would have been formed. Before we can advise as to the possibility of their restoration, we would require to see a sample one, which may be of an average type.

ED. GORRINGE.—The influence of stops upon a lens, so far as concerns exposure, is this—that if you employ one having a certain aperture, say one inch, and it requires two seconds to obtain a good negative, an exposure of eight seconds, or four times the duration, will be required with a stop half the diameter of the previous one, and so on in the same proportion for whatever size you may employ.

W. G. G. inquires: “1. Have the new iris diaphragms any great or decided advantage over the Waterhouse? 2. Will rectilinear lenses take landscapes (pure) as well as single view lenses? 3. Can you tell me a suitable way of blacking the inside of cameras, dark slides, &c.?”—In reply: 1. They possess this great advantage, viz., that being attached to the mount they are not liable to get lost. 2. Yes, if they are so corrected as to give no flare spot. 3. Spirit varnish containing lampblack.

ONE WHO WAS THERE.—The mistake in our contemporary arose, without doubt, from his attempting the difficult feat of reporting a meeting before it took place. Captain Abney was unavoidably absent from the meeting.

HERRBERT WELSHORD writes:—"Will you kindly give me the name and address of any firm from whom I can obtain the necessary materials for working the 'dusting on' process; also the name of any pamphlet or work upon the subject." Mr. John Wenge, 11A, Berners-street, Oxford-street, bestowed a great deal of attention on this process some time ago, and issued a pamphlet devoted to it, together with a price list of the special materials required. Please yourself in communication with him.

A. W. S. writes:—"Is there any dye or substance which will give an intense solution of yellow in cold water or spirit? If so, where can it be obtained? Yellow only gives a pale solution in cold water. Can a spirit varnish other than collodion be dyed with bright crimson which will not turn violet or dark red when dry? I have tried sandarac, mastic, shellac, &c. Why not try dragon's blood or roseine, which to alcohol imparts a strong red? A good yellow is obtained by shaking up turmeric or saffron in alcohol."

AMATEUR (Cornwall). Our correspondent has been reading some articles, or papers, which appeared many years ago relative to the preservative action of collodion when applied as a varnish to silver prints; which, he said, was then spoken of in its favour, but as he has not seen any reference to this of late years, he inquires if it has failed in producing the effect desired and intended. We reply that so far from collodion protecting the picture, it rather favoured its fading; at any rate, a protracted experience with it showed that no advantage was attained by its employment. Hence it was discontinued.

MELANIE writes:—"Being desirous of learning photo-mechanical printing, with a view of adding that branch to my present business, I would feel obliged if you would kindly give me, through the medium of your columns, some hints as to the way I should set about it; or could you refer me to any books on the subject, and where I could procure the necessary material to make a start?"—The only work published in English on this subject, of which we are aware, is that by W. T. Wilkinson, published by England Brothers. Articles on this subject are appearing in this JOURNAL at the present time.

CH. KENNEDY states:—"I have been making experiments with sensitive papers prepared by floating paper upon bromide of potash, and then upon silver nitrate, and then washing away the free nitrate. I have tried developing after exposure with ferrous oxalate well restrained, but results are not A1. Would gallic acid do better? I cannot get good white, as the paper seems so subject to general fog."—We have seen prints with good whites and vigorous blacks which were obtained in the manner indicated, but the paper was sized with a strong solution of gelatine. A very slight excess of bromide will tend to cleanliness.

S. SWALLEY writes:—"1. I have had the misfortune to crack a valuable negative, part of the film being broken, which shows when printed from, mostly in the sky portion. Could not the print be touched up with something?—2. If I made a paper negative would the result be equal to the original?—3. My print washer has rusted where the holes are bored, and some prints have rusty spots. What can you suggest concerning this?"—In reply: 1. By covering the negative with two thicknesses of tissue paper, slightly separated, a print may be obtained in which the crack will not appear.—2. Yes, if properly managed.—3. Why not protect the prints by coating in the vicinity of the holes with a suitable varnish?

G. F. S. has made a quantity of gelatine emulsion, with which he has coated all the plates which he intends using at present; he is loath to throw it away as it is so excellent, and afraid to keep it on account of probable decomposition. He writes to ask if we can recommend any antiseptic by which it can be preserved in good working order until he arrives at Sydney, whither he intends proceeding.—Let him adopt a method that was patented by Mr. Kennett many years ago, which consisted in pouring the emulsion into a large, flat porcelain dish to only a very slight depth, and then drying it to thorough desiccation. This pellicle is then cut up in small pieces and stored in light-tight packages, in which state it will keep good for years. All that remains to fit it for use is to dissolve it in warm water.

RECEIVED.—L. J.; The Elf; G. W. Atkin; G. A. Ure; R. Von Dix; Mug; O. M. These and others in our next.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, February 13, will be on *Lenses*.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The annual general meeting will be held on Tuesday next, February 12, at eight p.m., at the Gallery, 5A, Pall Mall East. Paper by Mr. J. W. Swan, F.C.S., *Hydroquinone as a Developer*.

THE celebrated picture *Nana* was the subject of legal proceedings at Edinburgh on Tuesday. It was stated in court that the profits of exhibiting the picture were nearly 7000*l*. Artists and art critics may draw their own inferences from the fact—and moralists also.

MIDLAND EXHIBITION.—We have received the rules and regulations under which pictures are accepted for this Exhibition, to be held in the Fine Art Galleries, 26, Corporation-street, Birmingham, and remain open from February 25 to March 2. There will be quite a number of medals awarded.

FROM an advertisement in another column, it will be seen that Mr. Cobb, of Woolwich, has severed his connexion with the firm of Mayfield, Cobb, & Co., and has, in conjunction with Mr. F. A. Bridge, of Dalston, organized the firm of Cobb & Bridge, for the manufacture of the "Woolwich" plates. Their factory will be at Woolwich. We wish the new firm every prosperity.

CAMERA CLUB NOTICES.—Thursday, February 14, eight p.m., Lantern evening; members are requested to bring slides. Thursday, February 21, five p.m., Annual general meeting.

YORK FINE ART AND INDUSTRIAL EXHIBITION.—It has been decided to hold a fine art, ecclesiastical, educational, and industrial exhibition at York, in the buildings and grounds of the Fine Art and Industrial Institution, from June to October, 1889. It is intended that the Exhibition shall be of a superior character, especially in respect to the quality of the exhibits, and every effort will be made on the part of the management to exclude such articles as are not strictly appropriate to the objects of, or which might tend to lower the tone of, the Exhibition. Diplomas of honour, diplomas for gold and silver medals, and diplomas will be awarded by competent jurors or experts to such exhibitors in each department or section as may be deemed entitled thereto. The jurors or experts will be empowered to award medals in addition to the diplomas should they deem the exhibit of sufficient merit. The Fine Arts Section will form an important part of the Exhibition, and will be large and representative, including a very valuable collection of oil paintings by the old and modern masters, water-colour drawings, etchings, engravings, statuary, photographs, &c.

AMERICAN PIRACIES.—The *Globe* of Wednesday evening is "hot and heavy" on American piracy—artistic, literary, and photographic. It says:—"A glaring instance of this practice of filching occurs in the new number of *Wilson's Photographic Magazine*, published at New York. The frontispiece is a reproduction of Mr. Luke Fildes' well-known picture, *A Flower Girl*; but the artist's signature is smudged and scratched almost to the point of unrecognisability. In the body of the magazine are two columns descriptive of this frontispiece, under the heading, 'Our Picture,' but there is no reference whatever either to the artist or to the owner of the picture. There is plenty of stuff about Burnet's *Essays* and 'this beautiful photogravure print printed in that rich, warm tone, loved so much by artists,' and the editor even asks his amateur friends to try their hands at photographing the print, and to send him the results; but of the artist who dreamed and agonised and painted the picture, not a word. Mr. Du Maurier, like most other people, suffers somewhat from American enterprise (to give it a gentle name). We saw the other day at the studio at New Grove House a little book—little, but most impudent, which had found its way to England. It was published in America at the number of cents that are equivalent to a shilling, and contained nothing more or less than reproductions of Mr. Du Maurier's *Punch* sketches, with jokes attached. The preface consisted of a skilful analysis of the artist's work, but it was all cribbed from the author of *Daisy Miller*."

THE DUBLIN EXPLOSION.—We are not yet in a position to say definitely how Mr. Bewley lost his life by the explosion of the gas bottle alluded to in our last issue, whether it was by an explosion proper or by the bursting of the bottle by the pressure of the gas inside. Pending an authoritative statement relative to this, we give the following account from the *Freeman's Journal*:—"On Monday a terrible explosion occurred in the city, the result of which was the killing in an instant of a merchant who occupied an extremely high position in commercial circles in the city, and whose name was known and respected all through the country. The victim of the horrible catastrophe was Mr. Thomas Bewley, the senior partner of Messrs. Bewley, Webb, and Co., shipbuilders and manufacturers. The firm has, it appears, a patent for the manufacture of hydrogen gas—a very dangerous explosive—which was used principally for lighting country mansions, and it was the custom of the deceased, Mr. Thomas Bewley, to keep this gas stored in his office at the East Wall. On Monday evening, between four and five o'clock, the unfortunate gentleman was seen by some of his employees removing one of the iron bottles containing this gas from the drawing office to the shop adjoining, where he left it in a place of safety. He was then observed to go back for another, and when he had reached the top of the stairs between the two rooms on his return a fearful explosion took place, causing the utmost consternation and alarm amongst those on the premises, and rendering them for a short time utterly unable to understand what had happened. When the confusion had somewhat abated the awful nature of the occurrence was seen. Mr. Bewley was found lying at the top of the staircase horribly disfigured and mangled, and quite dead. His left arm and portion of his side and face had been blown away, and his body was otherwise gashed and torn in a most fearful manner. The damage done to the offices was very great, the windows and ceiling being completely shattered, and everything around was smashed and broken. Over the walls and portions of the ceiling which remained flesh and blood were spattered in a ghastly and sickening manner, while in the adjoining room was found, some time after the explosion, a hand torn and bloody. Part of the iron bottle which had contained the gas was subsequently picked up in the yard a considerable distance away. The deceased's brother, Mr. John Bewley, who was on the premises when the explosion took place, at once telephoned to Dr. Moore, Fitzwilliam-square, asking him to go immediately to the works. The doctor drove down without a moment's delay, but he saw on arrival that his services could be of no possible use, and pronounced life extinct. Superintendent Toole and Inspector Molloy, of the Dublin Metropolitan Police, arrived soon after, and placed some constables in charge of the body, which was left in the office. The deceased, who was about forty-six years of age, resided at St. Helen's, Avoca-avenue, Blackrock. He was connected for many years with the city of Dublin, and was known and honoured for his business integrity and tact, and his untimely death will certainly be heard of throughout the city and by all who knew him with keen regret."

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1502. Vol. XXXVI.—FEBRUARY 15, 1889.

THE DUBLIN GAS EXPLOSION.

It is quite easy to understand why much disquiet should prevail among photographers in consequence of the bursting or exploding of the gas cylinder, and of which a full account will be found on another page.

Gas cylinders are only of comparatively recent introduction, and their convenience is such as to have rendered them very popular among all users of oxygen or the limelight. Their absolute safety has always been accepted as beyond cavil, and thus while in the very heyday of their prosperity a cloud has been interposed between them and the public.

Fortunately, there is no occasion for the slightest feeling of alarm; the evidence tendered at the inquest sets the matter entirely at rest. The explosion occurred under circumstances as easy to understand as would that of a vessel filled with gunpowder were a lighted match applied. It was simply owing to a misadventure or blunder, and the nature of which was known to the party concerned. When oxygen and hydrogen are kept in separate vessels they are absolutely and entirely safe, but when mixed they form a violent explosive. This comprehends the whole matter.

We are quite at one with those who, when tendering their evidence at the inquest, suggested the desirableness of rendering it penal to place oxygen in a hydrogen bottle, or *vice versa*—that is, to do this commercially. For scientific or experimental purposes it would never do to interpose restrictions of this nature.

If this be done, and it be insisted upon that two well-marked contrasting colours be selected for the two classes of gas bottle—such as blue and red, or black and white—then the most timorous may use them with a feeling of the most perfect safety.

COMBINATION ENLARGEMENTS.

It would take up too much space if we were, in a single article, to attempt to describe all the different ways by which two or more small negatives may be used to produce one enlarged picture, therefore we shall confine ourselves to a description of one method by which it can be successfully accomplished.

Supposing it is decided to introduce, say, a group of figures taken instantaneously on a quarter-plate negative into an enlargement from a 5×4 , or larger size, landscape negative, the work may be successfully carried out by a method based on that introduced many years ago by Mr. T. Edge for double printing.

In the first place, the figures negative must be dealt with, the figures being carefully stopped out by neatly painting round them for about the eighth of an inch with black varnish. The remainder of the negative is then covered with opaque paper, so that if it were printed from in this state the figures only would appear on a purely white background. This done, the landscape negative must now be taken in hand, and have small pieces of gum paper fixed on its two sides, and on the top and bottom, to indicate the amount of subject it is desirable to include in the finished picture. This negative is now put into the enlarging lantern, and the image projected on to a piece of very stout cardboard the size the picture is to be—let us say 18×15 inches. The cardboard should be adjusted and fixed in the following manner:—Two small French nails are driven into the board of the easel for it to rest upon, while a third one is driven at the right hand side to serve as a guide, against which it is placed. A couple of drawing pins at the top will hold it securely in position. Now it is manifest that the cardboard can be removed and replaced in exactly the same position as often as may be required, so, of course, could any other rigid substance the same size.

The image is next arranged to size and focussed, a bold pencil mark being made exactly where each of the four strips of gum paper are shown. The object of this will be seen hereafter. The image being in focus, the place at which the figures should be introduced is determined upon. They are then roughly sketched on the cardboard the size required. The landscape negative is now removed from the lantern, and the figure one inserted in its place, the size and position of the figures being made to coincide with the pencil sketch when the image is sharply focussed.

A piece of bromide paper, 18×15 inches, is next attached to a piece of glass the same size, by means of a few touches of indiarubber solution on the back. The lens is now capped and the cardboard removed from the easel, and the bromide paper fixed in its place, care being taken that the side of the glass is placed in contact with the register nail. The exposure is then made, and the lens capped with a piece of yellow glass, which, while protecting the image from further action, allows it to be distinctly seen. Of course, if the picture were developed at this stage it would have the figures only with a plain white background. We have now to protect the already exposed portion while the exposure is made for the landscape. This we do by painting it over, while *in situ*, with an opaque pigment—Indian ink for example. This is simple done by tracing over the image as projected through the yellow screen.

The bromide paper and its glass are now removed and placed in the dark, and the cardboard again placed in position. The figure negative is next taken from the lantern, the landscape one introduced, and the size of the image adjusted to its original proportions, known by the gum papers on the negative coinciding with the pencil marks on the cardboard. The lens is then capped and the sensitive paper again made to take the place of the card, the precaution being taken that the side of the plate is pressed close to the guide nail. The second exposure is then made. All that now remains is to wash off the colour with water, assisted by a pledget of cotton wool, develop, and fix the picture in the ordinary manner. And, if the work be neatly executed, the juncture of the two negatives will not be perceptible.

In our first two or three essays the Indian ink was removed completely by the cotton wool, but in some subsequent ones, when using a second sample of paper, a slight stain was left on the surface, but this did not interfere with the development; and in the clearing, fixing, and washing, it disappeared entirely.

There are other methods by which the first exposed image can be protected while the second is impressed. Here is one. After the figure image is focussed, take a small piece of bromide paper and expose it and then develop. This picture need not be fixed, only washed and dried. The figures are then cut out neatly, by a pair of scissors or a sharp-pointed knife, and used as a shield instead of the pigment. It may be attached to the paper with a touch or two of indiarubber solution. The indiarubber can be easily removed, when the paper is separated, by gently rubbing with a clean finger.

When a number of enlargements of the same subject are required this plan of masking will be found more convenient than the painting, as the same figure-shield will serve any number of times. The reason why rubber solution is used as a cement is that it causes no expansion in the paper, and is easily removed without injury to the gelatine surface.

HYDROQUINONE AND SULPHUROUS ACID.

The question having been raised of the chemical purity of "permanent" hydroquinone, we have thought it worth while to re-examine the preparation, and now propose to say a few words on the subject of its alleged impurity.

In an appendix to Messrs. Zimmerman's letter a few weeks ago, we said that the sample in our possession was "perfectly" neutral, but the word should have been "practically," for although the ordinary tests for acidity would justify the use of the first term, it is well known that minute traces of sulphurous acid are not to be detected so readily as the stronger acids. Thus, with litmus paper, permanent hydroquinone not only gives no acid reaction, but if anything shows a tendency to restore the blue colour to the previously reddened test paper, although as a matter of fact it actually contains, or rather has mechanically mixed with it, a very minute trace of the acid in question.

The preparation to which the name "permanent" has been applied, differs from ordinary hydroquinone inasmuch as it possesses a clear and distinct yellow colour, whereas the substance in its strictest purity, though by no means in all commercial samples, is colourless. We expressed the opinion, upon first examining the yellow crystals, that the colour was derived in some way from sulphurous acid, though from the rough tests then applied we failed to detect its presence.

Solutions of hydroquinone or of pyrogallie acid containing free sulphurous acid, or what practically amounts to the same thing, an acid sulphite, possess the distinctive yellow colour shown by the "permanent" crystals, though colourless crystals may be obtained from such a solution upon evaporation if but a comparatively small proportion of acid be present.

Upon receiving Messrs. Zimmerman's letter, mentioning the presence of sulphurous acid in permanent hydroquinone, we submitted the substance to more careful tests than we had previously done. A few of the crystals were heated upon platinum foil in order to see if any combined sulphites were present, but the volatilisation was complete, leaving but the faintest mark behind, and that rather a dimming of the luster of the metal than a stain or deposit. Here we may say that in this matter the incriminated crystals behaved better than the strictly pure, simply on account of the presence of the small trace of sulphurous acid that gives them their colour. When heated moderately, hydroquinone first of all fuses, and as the temperature is increased sublimates or volatilises, but from the well-known instability of the pure product a small portion of it is decomposed in the operation, leaving a faint brown or blackish stain, which the presence of sulphurous acid prevents.

If a few of the yellow crystals be fused at a gentle heat upon platinum foil, or in a porcelain dish, and again allowed to cool and solidify, the yellow colour will be found to have entirely disappeared, in consequence of the escape of the loosely combined sulphurous acid. A similar result is obtained by making a hot, strong, aqueous solution, which, upon cooling, will deposit perfectly colourless crystals of beautiful form.

We next tested the crystals quantitatively for sulphurous acid in the free state, and as the average of six trials obtained a result of a little over half a grain in one hundred grains of the crystals, that is to say, one half per cent. instead of "several per cents," as stated. This quantity of free acid represents the equivalent of about two grains of sodium sulphite, a proportion which it is scarcely necessary to say is of no use whatever as a preservative of the hydroquinone in solution; in fact, it may be accepted as powerless for either good or evil in that connexion. It is not, however, useless altogether, for though, as we have said, it is insufficient to exert any preservative action in the solution, and is perhaps equally without effect on the crystals, still, indirectly, it conduces to the purity and stability of the latter, as we shall show.

We have spoken of the fact of the yellow colouration of the solution of hydroquinone in the presence of sulphurous acid, and have stated that when only a moderate proportion of acid is present the crystals will be thrown down without colour; but if a comparatively large quantity of acid be present it is impossible in the process of crystallisation to get rid of the last traces, notwithstanding the nature of sulphurous acid. This, as most of our readers are aware, is, under ordinary conditions, a gaseous substance, very soluble in water and condensable into liquid form at a low temperature. Hydroquinone itself is only moderately soluble in water at the ordinary temperature, so that it is easy to understand how even if a hot solution be saturated with sulphurous acid gas the crystals on cooling will separate almost entirely free from acid, that which remains being only mechanically imprisoned in the mass of crystals. Further than this, when the crystals are separated from the mother liquor and dried, a large proportion of the acid still remaining will be given off with the aqueous vapour, so that the quantity finally remaining will be very small, as analysis actually shows. This last remnant may be got rid of

by recrystallisation, when by its extreme solubility it remains in the mother liquor after the less soluble hydroquinone has separated.

Now, although the proportion of acid contained in the crystals of permanent hydroquinone is both harmless and useless, the presence of the larger quantity of acid during the process of manufacture may be of the greatest value in preventing the decomposition of an always delicate substance. In fact, perhaps the most dangerous stage of the process is when the moist crystals are exposed to the atmosphere in drying, when oxidation proceeds far more rapidly than in solution. At that period the presence of sulphurous acid is of the utmost value in arresting oxidation and enabling the crystals to be advanced to the dry and comparatively stable condition without decomposition. If this result can be attained, and the great bulk of the useless acid liberated as the crystals dry, so as to leave a product that is practically pure, and by no test proved to be in any way inferior to the theoretically pure preparation, there seems to be little cause for complaint.

It has been said that the proportion of acid remaining in the yellow crystals is equivalent in one hundred grains to the SO_2 contained in about two grains of sodium sulphite. When it is borne in mind that in dissolving one hundred grains of hydroquinone for developing purposes a photographer at once adds of his own free will four hundred grains of sulphite, the extent of the injury likely to accrue from the presence of the smaller quantity may be partially estimated.

A NEAT and easy way of mounting photographs in an album is always a boon to the photographer, and it becomes doubly so when a means of interchange of the views is provided. Mr. Zschendorf, a clever photographer, who occupies professionally a high place among the aristocracy of bookbinders, has for some time been devoting his attention to the carrying out of an idea by which these objects can be effected. As a result, he has now produced an album, the leaves of which are fitted with a double hinge, and perforated at the edge to enable them to be fastened in their covers by a silk tape. By this means groups of photographs pertaining to one particular subject may be collated and secured at once in the binding, and their further removal or change can be readily effected. We understand that the albums are to be placed upon the market at very little more than the cost of the mounts themselves. It follows that with one cover one can have a large supply of mounted prints embracing a variety of subjects from which selections may be made to stock the album for any particular occasion. It is a good idea well carried out, and will not fail to be extensively adopted.

HOWEVER desirable it may be, we would not say it is at all probable that the present generation will see the aspirations of Mr. James Glaisher fulfilled. At the first annual dinner of the Society of which he has so long been the esteemed head, Mr. Glaisher suggested the desirability of having a great central hall of their own, and which would also answer for the meetings of the country and metropolitan societies. While such a home would be suitable and desirable for any one Association, it would scarcely answer in London, where the societies are somewhat localised and sprinkled all over the suburbs, some at a distance of several miles from any other society. It is scarcely likely that any of these bodies would care to sink their individuality, especially as regards locality, by leaving their homes and the place of present meetings in their vicinity, to come all the way from, say, Stroud Green, Holloway, Primrose Hill, &c., to a common centre of, perhaps, Charing Cross. As regards the Society's own requirements, there is no reason why Liverpool or Manchester should be allowed to occupy such high vantage ground over London.

MR. J. W. SWAN has set a good example in abbreviating a rather long term, which it is confidently believed will ere long take its place in our vernacular—we refer to hydroquinone—a word which photographers cannot be reasonably expected to give full utterance to every time they have occasion to speak of it. At the Photographic Society of Great Britain on Tuesday evening, Mr. Swan, when reading a paper on the subject, and with reference to the tendencies that photographers have to abbreviate long words, taking example by pyro for pyrogallie acid, hypo for hyposulphite of soda, proposes to abbreviate the name of the new developing agent to quinone, thus omitting the hydro as not being necessary.

It is perhaps premature to announce that at the next exhibition of the Photographic Society of Great Britain the system of awarding medals, suspended last year by way of experiment, will be resumed; but if we rightly interpret such expressions of opinion as were made relative to this at the annual meeting on Tuesday evening, such will most probably be the case. There are many among the ranks of photographers who covet possession of the Society's medal as being the highest honour that can be awarded, and its being withheld for one year proved the *raison d'être* of their ceasing to exhibit on the occasion. The motive may not be a very high one, but we have to do with existing facts. We are, however, inclined to be charitable, and to attribute the non-appearance of old-time exhibitors last year to the terribly inclement summer, which prevented many from being able to go out with a camera.

THE identity of light and electricity has often been guessed at; a perfect parallelism has at last been proved. By means of a, comparatively speaking, simple arrangement, Dr. Hertz, of Carlsruhe, has succeeded in intercepting the ether radiations brought about by an electric discharge, causing them to behave precisely as light radiations would. By means of a parabolic mirror he collected the radiations, by a second mirror he re-collected them to a focus; if the second mirror were rotated through a right angle it lost its converging power on this particular light—polarised it, in fact. He interposed screens, and proved the light to travel in straight lines approximately. The most marvellous power of the radiations is the transparency of various bodies to their motion. The closing of the door of a room was no obstacle—the rays passed through as light passes through glass. Finally, the rays were refracted like light through a prism.

As various "opaque" objects were transparent to these new rays, there was no need for a glass prism, fortunately; the one employed was made of pitch, and had sides of over a yard long. It was set in the path of the rays, and was found to deflect them about 22° out of their path.

THIS is a marvellous achievement, but the account is evidently thoroughly reliable, for two English observers at once set themselves to the task of repeating the experiments, which they did with success. They polarised the rays by reflection, and found sheets of glass to be practically opaque, owing to the magnitude of the vibratory waves causing an action similar to that producing "Newton's rings." The waves are calculated to be about two feet from crest to crest.

WE have on a former occasion alluded to the rumours which have been current as to American intentions in the direction of a large telescope, and form is now given to them by the definite statement that Congress is to be asked to vote two hundred and fifty thousand dollars for the purchase of a refractor of the same (five feet) diameter. We do not know how the estimate as to the cost—which, be it observed, is for the refractor only, no building being mentioned—has been obtained, but when we remember that the producing the glass slabs alone for the Lick instrument, "only" three feet in diameter, was the work of many years, some faint idea of the magnitude of the task of making a five-foot instrument may be obtained. It is open to doubt the feasibility of producing the glass slab alone.

ECHOES.

While accepting Mr. Guttenberg's explanation—so far as it goes—of his flash lamp alluded to in recent *Echoes*, I must remind him of the old saw about the man "who complies against his will;" and whether the apparatus or my description be "all moonshine," whether the "fearful and wonderful" character of the lamp properly belong to it or exist only in my imagination, I beg to announce that I am "of the same opinion still."

In an interesting paper on *Lantern Transparencies*, Mr. Abel Heywood, jun., refers to the method of toning given in a leading article in the *Journal* some weeks since by means of mercury followed by liver of sulphur. This is not as popular or as well known as the beautiful tones it gives should make it; a result probably due in part to the unpleasant character of the potassium sulphide, and partly to the fact of mercury being employed, which is popularly believed to lead to instability of tone.

Whether this be necessarily the case, when proper care is taken, with any form of mercury toning I do not intend to discuss here; but this I wish to say, namely, that of all kinds of photographic images with silver as the original basis, none, in my experience, approaches in permanency to that produced by toning with mercury followed by an alkaline sulphide. When properly washed between the various operations—a precaution necessary for the mere integrity of the picture, irrespective of permanency—a beautiful image is left, which is not only quite permanent under ordinary conditions, but absolutely resists most of the bleaching agents, such as chlorine and iodine, and certain of the chlorides and iodides, which instantly attack the ordinary image.

It is true the sulphides are not pleasant substances to use, nor are they permanent in their character; but there is nothing dangerous to health, as many suppose, in their employment. The danger used to arise, in the old wet-plate days, from the fumes of sulphuretted hydrogen impregnating the atmosphere of the dark room, with the result that plates were fogged, and even baths thrown out of order. But in the modern dark room little such danger exists, and the inconvenience is confined to the unpleasant olfactory sensation produced. A friend of mine, however, asserts that "you soon get quite to like it;" which may indeed be true enough if the improved tones be taken into consideration.

It is a fine, "crusted," old idea that, while for astronomical and telescope purposes the very perfection of optical glass and the highest possible workmanship are absolutely necessary, yet, comparatively speaking, for photographic objectives anything in the shape of "second quality" glass and any sort of manipulation or working will answer. Not so, however, says Mr. Edward Bausch, whose dictum will, I think, cause some little surprise in many quarters. "I have found," he says, "that any lack of perfection which is noticeable in an eyepiece is as pronounced in the camera; and I therefore claim and make this emphatic that a first-class photographic objective requires as much perfection as that in the telescope or microscope, and no work spent upon it to accomplish this result is lost."

Now, while standing out to the utmost for the greatest *needful* perfection in photographic objectives, I am bold enough to venture to differ from so high an authority, who speaks more perhaps from a scientific than from a practical point, as an optician rather than a photographer. I repeat that I am in favour of the greatest *needful* or desirable perfection in photographic lenses; but every one must be aware that a point is reached—far short of that in telescopic or microscopic work—at which higher perfection becomes so much refinement wasted, "and the work spent to accomplish this result" is undoubtedly lost.

To illustrate my meaning I need look no farther than to Mr. Bausch's allusion to the use of an eyepiece. In the case of the telescope and microscope the eyepiece is universally employed to secure the highest degree of magnification, and the most perfect resolution of the finest details of the object. When only the axial rays are utilized, or with lenses of narrow angles, no inconvenience arises from this; but apply an eyepiece to the image produced by the most "perfect" of photographic objectives, including an angle of, say, 46° to 53° , and I rather fancy that the unaided eye view will be preferred. In fact, the photographic image will under no circumstances bear the application of an eyepiece, at least to the extent necessary and usual with the telescope and microscope.

But presuming we have a photographic objective as theoretically perfect in construction and in working as any telescope lens, one, in fact, the image of which will pass the ordeal of the eyepiece, and show faultless definition even to the extreme marginal rays, what becomes of the microscopic definition when the image is viewed on the ground glass focussing screen, especially if the eyepiece be then used? What, again, about the faultless definition when rendered on a modern rapid gelatine film, the grain of which in many cases is painfully distinct even to the unassisted eye? Granted even a perfectly structureless negative film, where is the paper to be obtained with a sufficiently homogeneous surface to reproduce the original integrity of definition? I heard an eminent American amateur declare once: "I consider when I print a negative on paper I spoil it." In fact, the surroundings of photography or of photographs are incompatible with the highest perfection in working of the instruments.

A good workman will have the best possible tools for his purpose, and to secure that end will spare no cost. Technical excellence means the expenditure of cost in labour and material; but where the result is a degree of super-excellence that is really of no use to the workman, he would be foolish indeed to incur the additional outlay for the mere purpose of satisfying the conscience of the scientist who takes a not unnatural pride in his work.

JUNUS.

GAS EXPLOSION AT DUBLIN.

It is reassuring to the users of compressed gas in cylinders to know, as the result of the inquiry into the cause of the explosion at Dublin, that it was not due to over compression, but to a mixture of two gases in one vessel. This, as the merest tyro knows, would be dangerous whether in a bag, glass vessel, or cylinder, if sufficient quantity of hydrogen and oxygen were contained therein. All who use the limelight, or are interested in it, will feel grieved at the calamitous result of a disregard of one of the most ordinary cautions; and your readers will all, I am sure, join with me in expressing heartfelt sympathy with the relations and friends of the late Mr. Bewley who so unfortunately lost his life through his belief in his own judgment in opposition to practical proof of the dangerous nature of the contents of the cylinder.

As there is not the slightest doubt from the evidence adduced that the explosion was caused from ignition of two *mixed* gases, it naturally occurs to one what can be done to obviate a similar occurrence, and make a certainty of the safe use "of oxygen and hydrogen." *First* and foremost, the two gases must be kept *separate*, and to this end the vessels containing them should be distinctly marked. *Second*, a test must always be applied before using to see that each gas is in no way mixed. *Third*, the pressure exerted on the vessel must never be nearly equal to its bursting limit. *Fourth*, the pressure for the delivery of the gas must be sufficiently equal (or at any rate so great) that by no possible means can one gas be driven back into the other vessel.

Now, as regards the separate vessels, if they are cylinders (and by common consent the days of gas bags, at least in Great Britain, are numbered), if they are distinctly painted—oxygen, *black*; and hydrogen, or house gas, *red*—by no possible means, without gross carelessness, could one be used for the other, and if they were, the error would be soon discovered by the test now suggested. This test may be made in one or two ways, but on my representation of the importance of the subject, Dr. J. A. Fleming, Professor of Electrical Engineering in University College, London, has designed a little apparatus that any one can use in a few minutes and satisfy himself that he is working with pure or known gas. It consists of a little metal tank or open-top box, six inches high, and about one and a half inches wide and deep, having a second compartment about half the height and the same width and depth as the other. The long one is open at the top, and the short one is closed by a light indiarubber cap. An inlet tube, fitted with stopcock, passes from the outside of the larger compartment along the inside base and into the second compartment, while an outlet pipe, with stopcock and fine-drawn orifice, is fitted to the smaller compartment. Perforations are made in the side connecting the two chambers, so that when water is poured into the open end of the large chamber, it may find its level in the other; or when gas is allowed to pass into the second chamber, it shall displace the water in it and cause the water to pass through the perforation and rise in the first chamber. The test is applied by connecting the gas vessel with the inlet pipe (after first filling the vessel up with water until it reaches the top of the indiarubber-capped aperture, and turning off outlet stopcock), and then turning on the gas from cylinder, bag, or other

vessel. As soon as this is done the water will commence to rise in the open compartment, and when it reaches to within half an inch of the top, or when bubbles commence to rise, the gas is turned off again by the inlet stopcock, and from the vessel. Gas will now be in the second compartment instead of water, and if it is supposed to be oxygen a piece of brown paper can be lighted and blown out, then held at arm's length opposite the jet with small orifice, so that when the tap is turned on the gas blows on the glow. If it fans into a flame and continues to burn satisfactorily, it may be known to be pure oxygen, but if with small explosions, then the gas should not be used but be at once allowed to escape in the open air. Supposing it was the worst kind of mixture of gases for exploding, the only result would be a small explosion in the little compartment of the test apparatus, blowing off the indiarubber cap and spilling a little water. If the gas is hydrogen, or house gas, it should burn with a steady flame, just in the same way as the hydrogen does when turned on at the lantern jet; but if it is mixed it will snap or perhaps cause a small explosion, as previously described. In case of doubt the experiment should be repeated.

This little "test apparatus" is the subject of a patent, and will be sold by Mr. J. H. Steward, London; but the price will be very low, so that every one may be in a position to satisfy themselves and reassure the public at a moment's notice. It goes without saying that the vessel must be emptied before a different kind of gas is tested. As regards "the pressure of the gas on the vessel not being nearly equal to its bursting power," no one should use a steel or iron cylinder without it has first been marked as "tested," or a guarantee given of the number of pounds pressure to which it has been subjected before filling with gas.

The one that exploded at Mr. Bewley's office was, no doubt, iron, and having been filled to what the scientific experts considered well within its strength, there need be no anxiety about the improved steel cylinders as made for the last two years or so, which are tested hydraulically to one and a half tons pressure before any gas is put in them.

A great safeguard to the public is that all cylinders filled by Brin's Oxygen Company, and which can be sent through any of their many agents for the purpose, are tested in this way—the steel to pressure stated above, and iron to forty or sixty atmospheres, or about 900 pounds pressure to the square inch, and then filled to thirty or forty atmospheres. By this means no risk is run by the users of gas from compression, for those that are faulty burst harmlessly in the water when tried.

Then, as to the fourth consideration, "the prevention of mixing of gases through unequal pressure or a suckback." I consider the fact of there always being so much pressure behind in the cylinders is their great safeguard, and from the evidence that no harm came to the operator who first tried the cylinder containing mixed gases for lantern purposes, it would, in my opinion, never have exploded if attached to a lantern jet, for the user would have had indication of something being wrong before the explosion occurred, which really happened, I understand, in Ireland, and the cylinder was sent back to Mr. Bewley marked "mixed" gas. If Hearle's automatic small size regulators are used the pressure on both hydrogen and oxygen is absolutely the same, and a constant and uniform pressure kept up until the last foot of gas is used; and should one gas give out before the other there is no possibility of their mixing or entering the other regulator, for the springs exerting the pressure on the small bellows connected with the valve eccentric being alike, one cannot be raised by the other, and without it is raised the gas cannot enter the bellows, and consequently cannot enter the cylinder. This being so, the use of the limelight can be considered perfectly safe as long as ordinary precautions are taken. It may be interesting to mention as instance of the strength of the steel cylinders of best make, that their lowest bursting pressure is twenty-eight tons to the square inch, and the limit of elastic pressure (that is, before they begin to bulge or bend) eighteen tons. This, combined with the fact that they are tested to one and a half tons pressure before filling with gas, should allay any anxiety both on the part of the public and the operator as to their use.

G. R. BAKER.

COMPRESSED GAS IN CYLINDERS.

During the last seven or eight days I have received no less than a dozen letters from amateur lanternists in various parts of the country, and as many others have personally called upon me, all inquiring if I could give any opinion or explanation for the terrible and fatal explosion which occurred in Dublin on the 23rd of last month, and by which Mr. Bewley was "blown to pieces." Many of my friends and correspondents have adopted the use of compressed gas partly by my

advice, and some of them (and at the present time there may be others) are so greatly excited and "scared" as to declare they will never again use compressed gas. I feel, therefore, that something ought to be said on the subject.

Respecting the Dublin explosion, I have no information except that which has appeared in the newspapers, and from what I read, it was not in using the compressed gas that the explosion occurred. It seems, therefore, to be simply an excess of pressure for the cylinder in which it was contained, or, in other words, the cylinder was not strong enough to withstand the pressure to which it was subjected. If this be so—that is to say, if the published reports in the papers are correct—then neither hydrogen or oxygen have anything to do with it, so far as their explosive or dangerous (?) properties are concerned, for air compressed to the same pressure would have burst the cylinder just the same, and, in all probability, would have produced the same disaster (except, of course, the fire which subsequently occurred, but which was as nothing to the bursting of the cylinder).

But now that the "scare" is so universal, we may reasonably consider the importance of precautions for the future.

Compressed gas has recently become so popular that several firms are making and supplying high-pressure cylinders in iron and steel, and there exists a strong competition in price. This, in a matter where the quality (good or bad) cannot be detected by the purchaser, is highly conducive to the supply of inferior articles, and notwithstanding it is said that they are all tested to a pressure greatly in excess of that at which they are intended to be used, we have no proof that the "test" was a real and satisfactory one.

I have personally known cases in the testing of a steam boiler by hydraulic pressure where an inspector would insist upon, say, two hundred pounds per square inch being applied before delivery, but the boiler maker, considering the test too severe, has "doctored" the pressure gauge, and whilst satisfying the "inspector" that two hundred pounds per square inch was applied, as a matter of fact not more than 150 pounds was applied; and other instances have come under my personal experience, where, through defective appliances and not by intention, less than half the pressure indicated was really applied.

These facts (well known to engineers and scientists), and the seriousness of the case as manifested by the Dublin disaster, point to the fact that each cylinder should be subjected to a Government test (as in the case of gun barrels), and I should not think there were many who, when purchasing a cylinder of, say, three or four pounds in value, would object to pay a few shillings extra for a Government test, and stamped accordingly. Indeed, it is a matter that ought to be enforced, and I should be very pleased to hear of the President of the Manchester Photographic Society, Sir Henry E. Roscoe, M.P., bringing this subject before Parliament.

But apart from the liability to accidents through excessive pressure, there is another matter to consider which might prove even more serious, that of the mixing of the gases, i.e., hydrogen and oxygen, in the same cylinder. At the present time, these cylinders are to be had on hire by any one, and may be used by any one, and goodness only knows how "some people" use them. There is no distinction between the hydrogen cylinder and another containing oxygen, except perhaps an ordinary luggage label is tied to the neck of the hydrogen cylinder.

Now, what assurance have the general public that a cylinder which contained hydrogen, and was returned only part empty, is not refilled with oxygen, and vice versa? It may be the custom of the manufacturers of compressed gas to empty the returned cylinders before refilling; but suppose the custom be for once neglected by the workman employed! the result might be too fearful to contemplate. The fact is, as things exist at the present time, we are working in the dark, and our lives, and scores of other lives around us, are at the mercy of somebody else's carelessness or carelessness, and this ought not to be, for there is no necessity for it.

I take it that the manufacture and supply of compressed oxygen is almost exclusively in the hands of the Brin Oxygen Company, and this fact alone gives them the power to keep the supply of hydrogen in their own hands too. Well, then, if the Brin Oxygen Company would adopt some system by which the gas could not be filled in wrong cylinders, and rigidly take their stand at that, they would establish a confidence with the public which has never yet been enjoyed. First of all, they should refuse to fill cylinders that were not officially stamped, or of known manufacture; every hydrogen cylinder should be painted white, and the oxygen cylinders black; the words "hydrogen" might be painted in large black letters on the white cylinder, and "oxygen" in white letters on the black cylinder; but in addition to this, and best of all, the screw ends for the unions should differ in size—let us say one inch diameter for the oxygen, and one and a quarter inches diameter for the hydrogen. Then the plant

or machinery used in filling or compressing should be constructed for these sizes, and in other, thus making it impossible for a workman, however careless, to fill oxygen in a hydrogen cylinder, and *vice versa*.

This simple system might have been adopted at first, but it is not too late now, and the sooner it is done the better, and the sooner will public confidence be established.

There is no more danger in using compressed gas for limelight purposes than when taken from bags and pressure boards, indeed not so much. The danger lies in the gases becoming mixed in one cylinder, and the higher the pressure of gases so mixed the more danger there would be. Oxygen and hydrogen mixed in one bag and exploded would be a mild affair compared with the same gases exploded under a pressure of one hundred and twenty atmospheres, or about three thousand times the pressure usually contained in a bag; indeed, if a charge of gunpowder loosely placed in a paper bag were exploded, and a similar charge very tightly rammed up in an iron box and exploded, the comparison would be a mild one.

Then the matter is too serious to be passed over quietly.

There are scores of cases, even for home use, where during the present season the oil lamps of single lanterns have been put aside in favour of "blow-through" jets, and a cylinder of oxygen with coal gas taken from the house main has been highly appreciated, not only for the superior light obtained, but the absence of the objectionable smell caused by all oil lamps, more or less, greater convenience, less trouble in many ways, and, in my own opinion, quite as safe, *if the oxygen is pure*.

In conclusion, I hope this subject will receive the consideration due to it, and that the public may obtain the satisfaction at present required.

W. I. CHADWICK.

PHOTOGRAPHIC OBJECTIVES.*

FACTS AND FALLACIES REGARDING THEM.

There is one point which I have not yet touched, and which is of the utmost importance, and that is the sphericity of surfaces. To simply grind and polish a lens is exceedingly simple; to do so and obtain spherical surfaces is extremely difficult. Instead of being spherical, a surface may be and often consists of a series of elevations and depressions. They may be in the shape of rings, or may be confined to spots or radiate from the centre, in which way I have seen them as pronounced as the spokes in a wheel. Heat, even when moderate, when applied to a certain portion of the lens, causes the same effect. There are optical tests by which you can easily see the expansion of glass after the finger has been allowed to rest upon it for a moment. The same effect may be obtained by fixing the lens in the mounting.

I have often examined lenses which were so distorted by the pressure exerted on them in the mounting that it seemed almost impossible that they could form even a fair image. What is the effect when these conditions exist? First of all, there is a lack of sharpness over the plate and then depth of focus. An elevation on the lens will give a shorter focus for all those rays which fall upon it, because of its shorter radius than the focal point for the entire surface; whereas a depression will cause a longer focus, so that instead of all the rays combining in one point there are a series of focal points. When depth of focus is caused by reason of this fault, it is to be condemned, because it is at the sacrifice of definition, and any lens possessing it cannot be rated as good. Depth of focus when caused in this manner is one of the qualities which can be determined without comparative tests, and every lens purchased should be tested to this end. A good means to determine the proper correction of the surfaces is by the use of a diaphragm. Focus for a sharp image on the ground glass by means of a magnifier with a full opening of the lens, and note this point in the camera. Then rack out of focus and insert a diaphragm sufficiently large that the image can just be distinguished, and again focus by means of the magnifier. If the objective is perfectly corrected, this point will coincide with the first, and if not it is, as stated before, a serious fault, because there will be a different focus for each diaphragm.

Depth of focus and speed are incompatible, inasmuch as both qualities depend on the aperture of lenses, assuming, of course, a relatively large diaphragm and focal length. While the former decreases with the increase in the aperture, the latter increases. Depth of focus is, no doubt, a very desirable quality, but to obtain it in a legitimate way with high speed is simply impossible. In two lenses of similar construction, of the same diameter and focus, it will be exactly similar, and the ratio of depth will increase with the decrease of the diaphragm. In view lenses depth of focus can almost

* Concluded from page 56.

always be obtained by the use of diaphragms, and this is also true in objectives specially made for portraiture; but in these the same is obtained by placing two systems farther apart or varying the distance of the individual lenses, which means nothing more or less than the production of spherical aberration.

The extent of flatness of field and distortion in lenses are variable quantities, and, although depending to a certain extent on the diameter of lenses, exist to a greater or less degree in one or the other lens, according to the amount of skill and care of the optician. The tendency almost since the first use of lenses has been the increase of speed and consequent increase of aperture of lens, and although the advance has been and is slow to the uninitiated, it means an enormous amount of work to the optician. Every degree of increase represents a considerable outlay of mental and manual labour, and can only be maintained by correspondingly greater attention to the minutiae of work. Each individual reproduction is to him a source of pride, and he works with love and ardour over every step of his work. Outside of this, however, he is fully aware of the detrimental influence of imperfect work, and his ambition is not only to accomplish the highest result, but to maintain it after it has been reached. The actual work of grinding and polishing is comparatively trifling, as is shown in the cheaper form of lenses, where the cost of glass is just as high, but wherein the lenses are used whether good or bad, unless they have faults easily noticed. The time-consuming and worrying work is that of continually testing and correcting the lenses. When we remember that the best, although none too good, involves the amount of work I have endeavoured to portray, you will no doubt feel that the optician does not ask for much remuneration for it.

Now, as to the homogeneity of glass. A disc should be of the same consistency throughout. When it is not, it possesses either impurities or air bubbles, which are usually easily seen, or so-called striae—which are not so discernible, but of greater importance. These are caused by the unequal consistency of the glass or unequal annealing, and have a similar appearance to a glass of water when strong sugar water is poured into it and is not well mixed, or heated air as it rises from a stove or hot ground. All glass not specially made for optical purposes has them, and can be easily seen by looking through it edge-wise, even in the best plate. Of course no disc is used which shows them, or air bubbles, or impurities on a preliminary examination; they often appear before the lenses are completed, and work then ceases, but very often they cannot be detected until the lenses are finished. Air bubbles can easily be seen by any person, and when they exist the optician must judge whether they are sufficient to impair the saleability of a lens.

If, however, a man who has a reputation to guard permits it to pass—and I would add that it is as hurtful to his eye as to any person—then the purchaser should not be hasty to condemn it, for it then usually possesses merits which far outweigh this disadvantage. Take, for instance, an air bubble as large as a pin's head in an ordinary size lens. Its area is so infinitesimally small as compared with the area of the lens, that it is of no account whatever, and does not effect the lens in the least. Although it may sound strange, I would, for my part, select a lens containing an air bubble in preference to one without it, provided they were from one reliable firm.

Striae, however, which are difficult to detect, are positively injurious when existing to any extent, inasmuch as they refract the rays passing through them in different directions, thus preventing them from combining to form the image, and they sometimes may cause a false light. They often pervade an entire lens and occasionally can be seen with the naked eye, but as a rule not. An easy method of looking for the most glaring is as follows:—Unscrew the systems and examine each separately. Place one in the camera or on the table in an upright position, and back of it, at any distance, a lamp or gas jet. Look for the focal point by means of a white paper, and get the eye in the same position, which can be easily done after a little practice. The lens will be found brilliantly illuminated, and the striae will stand out as dark shadows. When a few small knife edge threads show, they are of little moment, but when in a circle of light there is a wavy appearance it is generally indicative of other striae which are injurious, but cannot be determined in this manner.

I have shown how some of the faults may be determined by almost any person, but others, such as definition, distortion, and amount of speed can only be judged by a comparative test or by a person of wide experience. Comparing a lens with one of known excellence is the only reliable manner, but then the following points, among which I recapitulate those already mentioned, should be observed. Determine coincidence of visual and chemical foci. Determine coincidence of ground glass and plate in plateholder. Use flat plates when ground glass is flat; if this is not flat, use plates corresponding with it. Determine spherical correction by means of diaphragms.

The two lenses should be for the same size plate, and of about the same aperture and focus. Lenses should always be tested first with full aperture or large stops of the size, as small stops correct spherical aberration in good lenses as well as poor ones. If desired, they can be done with small stops later on. Make comparisons under the same conditions of light. For spherical aberration and distortion, focus on printed matter or on a map fastened to a screen, and have the lens square with the objective and within two or three times the equivalent focus of the lenses, as they are then under the most strained conditions. For depth of focus use stationary objects which have thickness, or a view. Always focus the lens on the same point, and never make a comparison without the use of a magnifying glass for focussing as well as for examining the negatives. Last, but most important, make the comparison in the spirit of arriving at the truth, and do not permit your judgment to be biased or influenced by your feelings.

EDWARD BAUSCH.

SPHERICAL ABERRATION IN PHOTOGRAPHIC LENSES.

The following is a simple method by which the spherical aberration in photographic lenses may be measured. If I am addressing any photographers who are not conversant with optical terms, spherical aberration may be illustrated by focussing an object on the ground glass with a small diaphragm in the lens, such as $\frac{1}{8}$; on the diaphragm being removed, the ground glass will have to be racked nearer the lens, in order to bring the same object again in focus. The distance it is so racked is termed the longitudinal spherical aberration of the lens. In performing this experiment, a small object in the centre of the field should be chosen, and the result will be better seen if a circular patch of paper be stuck on the centre of the lens, when no stop is used. Spherical aberration must on no account be confused, as it often is, with curvature of image.

Longitudinal spherical aberration being the distance the ground glass must be moved to keep an object in focus when the centre or a marginal zone of a lens is used, a measure of this distance would be a measure of the longitudinal spherical aberration. It is, however, not easy to measure this distance, especially if it is small, with an ordinary camera without special apparatus. The following is a simple manner in which it may be accurately done with ordinary means:—

A small piece of printed matter is placed in front of the lens to be tested, at a distance equal to about ten times the equivalent focus of the lens. The image is now carefully focussed on the ground glass, the lens working with its full aperture (a focussing glass $\times 10$ should be used). The distance between the paper and the lens (optical centre, strictly; practically, the lens of a single and the diaphragm of a doublet) must be accurately measured. A small stop, say $\frac{1}{8}$, is placed in the lens; if the printed matter be now examined at the ground glass, it will probably appear not nearly as sharp as it was. In order to get the image as sharp as it was before, without disturbing the distance of the ground glass from the lens, the slip of printed matter will have to be brought nearer the lens. When the image is again precisely sharp, the new distance between the paper and the lens must be accurately measured. All that is now necessary is to refer the difference between these measures to the conjugate focus by the following formula:—

$$L = \frac{f^2 (d - d')}{d d'} \text{ where}$$

L is the longitudinal spherical aberration; f the equivalent focus of the lens; d the distance, less the equivalent focus of the lens, between the paper and the lens when the full aperture of the lens was used; d' the distance, less the equivalent focus of the lens, between the paper and the lens when the lens was stopped down.

Example: $f = 6$ inches. The distance between the printed matter and the lens in the first instance = 60 inches, and in the second = 45 inches.

$$d = 60 - 6 = 54$$

$$d' = 45 - 6 = 42$$

$$L = 36 \frac{(54 - 42)}{54 \times 42} = \frac{12}{63} = \frac{1}{5} \text{ inch nearly.}$$

Therefore an object which had been focussed with the full aperture, and photographed at $\frac{1}{5}$, would not be sharp on the plate with the above lens.

The effect of focussing with a large aperture and photographing with a small one is to draw the focus nearer the lens on the object side, and consequently to send it farther from the lens on the plate side.

Thus, if the object were a carved church door with a railing two or

three feet in front of it, the carved door being focussed with a large aperture and photographed with a small one, the railing would come out the sharper on the plate.

EDWARD M. NELSON.

COLLODIO-BROMIDE EMULSIONS.*

In the *Photographic Times* of September 4, 1885, Mr. Levy thus describes his method of working.

I will explain the manipulations in the way I think is the most practical, and by following them closely success will be certain; for fifty-four ounces of emulsion mix the following:—

A.

Bromide of cadmium	618 grains.
Alcohol (absolute)	18 ounces.
Iodide of ammonium	161 grains.
Cotton (Hance's cream)	586 "
Ether (concentrated)	27 ounces.

In another bottle:—

B.

Nitrate of silver	600 grains.
Alcohol	9 ounces.
Nitric acid	270 drops.
Distilled water	360 "

Pour A into B and leave exactly ten hours, then add ninety-nine grains of green chloride of copper.

The excellent flowing qualities of any emulsion, its sensitiveness, &c., I ascribe, first, to the minimum quantity of water I put into it, and also to the correct measurement and timing.

First, I would advise to weigh out the required quantity of bromide of cadmium, and then desiccate this in a porcelain capsule on a gentle heat. It will first soften and boil, and the heat must be applied so that the bubbles do not blow out any of it and change the quantity, however small the loss, as every particle is closely calculated. Then it will form in a lump (I forgot to say that during this evaporation the bromide should continually be stirred with a strip of glass, so as to prevent its adhering and consequent burning), when, by continuous stirring, it will granulate, and this should be pushed long enough until the granulation is fine enough and powdery, showing that all the dampness has gone. This powder, well scraped out of the capsule, is put into one half of the given quantity of alcohol and shaken until well dissolved. The iodide of ammonium is now added. This should be of a light yellow colour. When this is melted add to it the cotton and shake well, after which the ether is added and another good shaking given. This first operation in one of the bottles previously well cleaned. It is well to have the bottles about twice as large as necessary, as it allows better shaking, and, of course, mixing.

In the second bottle put the nitrate of silver and the water (which must be counted by actual drops, and not measured), the actual amount of which must dissolve the silver; but as it will not do it while cold, it must be gently heated until the required result, when the second half of the alcohol is added. On a small quantity the addition of the alcohol leaves the solution transparent, but on a larger quantity the silver is precipitated. This does not in any way affect the result. All of these manipulations may be performed in full daylight, but the subsequent ones must be done in the dark room.

After having well shaken the silver solution, add to this the collodion in small quantities of four drachms to an ounce at a time; shake very well at every new addition, until all is transferred. The emulsion is now almost finished, and should be shaken occasionally during ten hours (exactly, neither more nor less), when the chloride of copper is added, giving a thorough shaking again, so as to dissolve it well, and also for other reasons.

Before adding the chloride of copper it must be put in a capsule and well evaporated. This can be easily perceived by the colour, which must be thoroughly brown when fully dried. Contrary to the bromide, the chloride should and must be weighed after the drying process is gone through. I may add that the dried chloride will keep very well in that condition if placed in a well-closed glass stoppered bottle. If it gets green it must be again evaporated.

Filtering is now advisable through Japanese filtering paper or cotton when the emulsion is finished. The preservative composed is as follows (preservative for forty-four ounces):—

Tincture nux vomica	100 drachms.
" scilla	42 "
" cochineal	120 "
Honey	20 ounces.
Acetic acid	20 drachms.

Of the above take twenty-two drachms and add sixty-four ounces on water. After coating the plate, allow the film to set well, and the rinse in water before applying the preservative.

On reference of the above to Dr. Higgins, to whom, through a perfected formula, the honour of the commercial introduction of dry plates in this

* Condensed from page 89.

country is due, he endorses it as in the main correct, the time for the introduction of the nitric acid and its effect. A very important matter is, however, wanting, as also other details necessary to its successful making. These the Doctor has promised to give in a practical demonstration before our Society of the art of emulsion making to the utmost minutiae, so that any one with ease and certainty can make a reliable and satisfactory emulsion.

Dr. J. J. Higgins also gives me his formula for developing the above plates, as follows:—

Carbonate soda.....	4 pound.
Ammonium bromide	640 grains.
Honey	2 ounces.
Water	1 quart.

The above is strong for extra cases. When diluted one half it forms the usual normal developer. To half an ounce of the above add a mustard spoonful of dry pyro previous to applying to the plate.

It will be observed in these various formulae that considerable restrainer is added to prevent fogging, which is quite different in the case of the gelatine plate. If the alkali and pyro are poured on a collodion plate without containing a restrainer, the film will darken almost instantly. Very little practice is required to obtain excellent results, and I hope the reviving of this subject may lead to further improvements, especially when it is noticed that collodio-emulsions for ortho-chromatic work is being suggested.

F. C. BEACH.

THE CONSTRUCTION OF PHOTOGRAPHIC LENSES.*

LET US now retrace our steps. You will remember that refraction is due to the fact that the wave length of light is altered by passing from one medium into another of different density. This light, however, does not consist of one vibration but of a series of vibrations, each with a different wave length, and it is a fact proved by experiment, and accounted for by theory, that these vibrations have their wave lengths altered in passing from a rare into a denser medium in a different manner.

We have shown that it is possible to construct an optical system which will refract a bundle of parallel rays to a single point, but in doing so we have assumed that the light was caused by vibrations of the same length, namely, that it was of the same colour. The rays, however, have not the same wave length.

This defect, namely, that a bundle of white light entering a lens does not come to the one point owing to the fact that light of different colours is refracted to different extents, is called chromatic aberration, and the correction of this error is one of the most important of the optician's duties. The amount of the difference between the refraction of the extreme colours when passing through a glass is called the "dispersion" of that glass. Glasses can be made which have different refracting powers, and with the difference of the refracting power the dispersion generally varies. If the dispersion of these glasses were always in the same proportion to their refraction, it would be impossible to correct for this aberration, for suppose we have a convex lens which has a dispersion one-tenth that of its refracting power, by which I mean that if it brings the violet portion of a bundle of parallel rays to a point nine inches from the lens, it will bring the red portion to a point ten inches from the lens, and suppose we place a concave lens in front of this convex lens, which will give us exactly the same difference in the refraction of the different colours (but being concave it will be in an opposite direction), then, if the amount of the dispersion of this glass is also one-tenth of its refraction, we shall, in order to neutralise the dispersion of the convex lens, require a concave lens of exactly the same focus, and shall also neutralise the refracting power of the combined pair, and the compound lens no more acts as a lens, but as a parallel plate of glass.

It is found, however, that glasses can be made which have different degrees of dispersion in comparison with their refracting power. In general the more highly refractive glasses have a higher proportional dispersion. We might perhaps find, for instance, that a glass had a dispersion equal to one-fifth of its refraction, instead of one-tenth part.

If, then, we make our convex lens of a glass that has a dispersion only one-tenth of its refracting power, and make our concave lens from the glass which has the higher dispersion equal to one-fifth of its refraction, we shall find that the latter will only require to be half as powerful in order to correct the dispersion of the original lens, and although it will have neutralised by one-half the original refraction, there will still be left remaining a power equal to half that of the convex lens. Thus, for the correction of chromatic aberration, it is important to note that the proportional to the relative dispersion. If one glass has a dispersion of one-tenth of its refraction, and the second glass has a dispersion one-fifth of its refraction, and if we make a positive or magnifying lens out of the first glass, and a negative or diminishing lens out of the second glass, provided the first lens has a refracting power double that of the second, the chromatic aberration will be corrected, no matter what the shape of the lenses, and it is evident that by altering the curves of the lens, but always having the same balance between the two curves, either of the lenses may be made in many different shapes, and yet give the focus

required. Thus the correction for achromatism depends not upon the shape of the lens but on the foci of the two component lenses, while, as we saw before, the correction for spherical aberration depends not upon the foci lenses but upon their relative shapes. There is therefore no difficulty in correcting for both spherical and chromatic aberration in the same pair of lenses.

The formula, the conditions of which must be fulfilled in order to obtain an achromatic pair of lenses, is a simple one and runs as follows:—

FORMULA A.

$$\phi_1 = \frac{(\mu - 1)}{\Delta\mu} \quad \phi_2 = \frac{(\mu - 1)}{\Delta\mu} \quad \phi_2 = \frac{(\mu - 1)}{\Delta\mu} \quad \phi_2 = \frac{(\mu - 1)}{\Delta\mu}$$

When $\phi_1 \phi_2$ are the refracting powers of the two lenses, and—

$$\left(\frac{\mu - 1}{\Delta n} \right)_1 \left(\frac{\mu - 1}{\Delta n} \right)_2$$

the relative dispersions of the two glasses in use. Let us take an example where the relative dispersions in two glasses are 43.3 and 36 respectively, the equation then becomes—

$$\phi_1 = \frac{36}{43.3} \text{ or } \phi_1 = .87 \phi_2.$$

From this it will be seen that, by assuming the focus of one lens, we are able to find the focus that the correcting lens must have. I think it would be as well to mention that, owing to the fact that the dispersion of a glass is never proportional, the complete correction for achromatism is less simple than this would lead one to suppose, but for the purpose of illustration it is not at present necessary to further discuss this point. We saw that with a pair of lenses it was possible to correct for spherical aberration. The mathematical formula which must be satisfied in order to do so is by no means simple. I give it below without attempting to indicate the steps by which it is obtained. Any one interested in the matter will find it fully discussed in Herschel's *Light*.

FORMULA B.

$$O = \left\{ \begin{aligned} & \frac{\phi'}{\mu'} \left\{ (2 - 2\mu'^2 + \mu'^3) \rho'^2 + (\mu' + 2\mu'^2 - 2\mu'^3) \rho' \rho'' + \mu'^3 \rho''^2 \right\} \\ & + \frac{\phi''}{\mu''} \left\{ (2 - 2\mu''^2 + \mu''^3) \rho''^2 + (\mu'' + 2\mu''^2 - 2\mu''^3) \rho'' \rho''' + \mu''^3 \rho'''^2 \right\} \\ & - \frac{\phi' \phi''}{\mu' \mu''} \left\{ (4 + 3\mu'' - 3\mu'^2) \rho''' + (\mu'' + 2\mu'^2) \rho''' \right\} \\ & + \frac{\phi'^2 \phi''}{\mu'^2 \mu''} \left\{ 2 + 3\mu'' \right\} \end{aligned} \right\}$$

where

$\phi' \phi''$ = refracting powers of two lenses;
 $\mu' \mu''$ = refractive indices of the two glasses;
 $\rho' \rho''$ = curvatures of first lens;
 $\rho'' \rho'''$ = curvatures of second lens.

Suppose, now, we wish to make up a system of two lenses out of two given glasses, and to correct it for spherical and chromatic aberration by means of these formulae. We will assume the focus of one lens, and from formula A for achromatism we shall obtain the focus of the second lens. We therefore know $\phi' \phi''$ and $\mu' \mu''$. What, then, are the unknown quantities in formula B? The four curvatures of the two lenses $\rho' \rho'' \rho'' \rho'''$.

In the construction of photographic lenses we always endeavour to have as few reflecting surfaces as possible, in order that no large proportion of the light which enters a photographic lens may be reflected back again. Thus, in making an achromatic pair of lenses we endeavour to make one curve of each lens the same, and to cement the lenses together. That is to say, we make $\rho' = \rho''$. This considerably simplifies the equation (B), we have only three unknown quantities, and, moreover, we have from the following two equations connecting them:—

$$(\mu' - 1) (\rho' - \rho'') = \phi'. \quad (\mu'' - 1) (\rho'' - \rho''') = \phi_2.$$

Thus we can reduce our formula to a form where only one unknown quantity exists. It is true it is an equation of considerable complexity, but when we have inserted the known quantities it is merely a matter of arithmetic to simplify it. Now arises a point of some interest. The solution of this equation will give us the shape of the lens that must be made in order to obtain a compound lens free from both spherical and chromatic aberration, and a lens of a shape that will not satisfy this equation will not be accurately corrected. It would therefore appear that for any two given kinds of glass, the lens would have to be made of one particular shape and no other. But if we examine the expression in B more closely we shall find that when simplified out it becomes a quadratic equation, and that it has in general two roots—that is to say, with most kinds of glass two shapes of lenses can be made, each of which will give perfect correction for spherical and chromatic aberration.

There are glasses which, however, we generally avoid, whose refraction indices and dispersions are such that the roots of the equation are imaginary, and we find that with these glasses it is impossible to obtain

* Continued from page 89.

a system of this nature of any shape whatever that shall give a perfect correction for the aberrations. We shall find that in this case we must make lenses whose curves are not the same, which cannot therefore be cemented.

I have sketched the necessary shapes of the two forms of lens given by two kinds of glass which are in constant use, and it will be found that most of the glasses that have until recently been employed will give for their corrected lenses shapes that are more or less similar to the two forms figured.

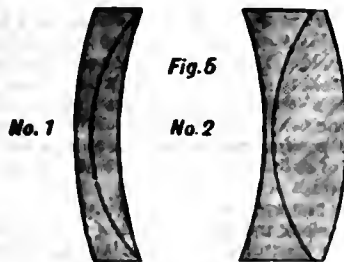


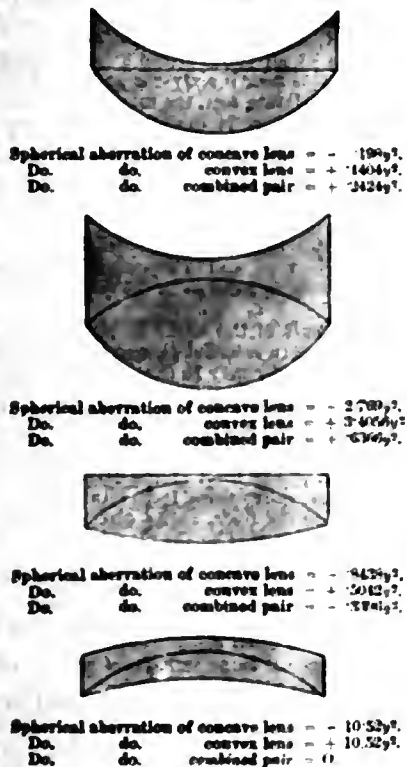
Fig. 5

It is interesting to note that the form No. 2 is that generally employed for telescopes, as the curves are less sensitive to slight alterations, while the shape No. 1 is that which is employed for a large number of photographic objectives, on account of properties which this form of lens possesses that I shall have again to allude to. In order to make this point more clear, I have sketched a series of lenses all made of the same two glasses, all corrected for achromatism, but in which only one is corrected both for spherical as well as chromatic aberration.

There are many ways of combining the lenses so as to correct one or other of the aberrations, but, as we have seen, in general only two for correcting the two together.

Fig. 6.

SERIES OF ACHROMATIC COMBINATIONS SHOWING DIFFERENT DEGREES OF ABERRATION.



We have so far only considered that bundle of rays which passes through the centre of the lens, and forms the centre of the picture; and, as we have shown, it is necessary, in order that this portion of the picture should be sharp, that there should be no spherical or chromatic aberration. The question next arises as to what method is employed in order to obtain sharp pictures at the margin of the photographic plate; that is to say, by what means a bundle of rays passing through the lens obliquely may be brought to a single point.

Now, a good plan undoubtedly would be to make a globe of glass, and use a spherical plate, except that the achromatism would be difficult to correct, and it would be difficult to use different apertures or stops. For it is evident that a bundle of rays passing through a globe would be affected

in an exactly similar manner, whether they passed straight through or at an angle. But the globe is impracticable; it has been tried, and has been discarded for many reasons.

Another plan which would work equally well is, that the complete lens should be two portions of a hollow globe, of which the surfaces are concentric—thus. Here, also, you will observe the oblique rays would pass through a similar set of surfaces to the central rays, and although a certain alteration would take place, we may say that practically the oblique rays would be refracted to a single point, provided central rays were refracted to one point.

Now, what are the ways in which opticians have hitherto corrected for the aberration of the oblique rays, which is called astigmatism? The globular lens was tried, and found unserviceable, and though hitherto the concentric lens has been an impossibility, we have reason to believe that in the future this form of lens will be made. The method of correcting for this astigmatism has been by making the lens as nearly as possible of the concentric form. If it were quite concentric the lens could not, with our usual glass, be made of the required refraction, so that we have been obliged to make lenses which are far from being concentric, but which, being made in the form of as deep meniscuses as we can make, somewhat approach the concentric form, and thus improve, but in no way annihilate, the astigmatism.

Let us suppose we are anxious to make a lens to cover a plate that subtends an angle of, say, 30° to 40°, and that shall have an aperture one-eighth of the focus. Suppose the focus of the lens be ten inches, then the bundle of rays that enters the lens from any point of the object must be ten-eighths, or one and a quarter inches. The lens cannot be smaller, therefore, than one and a quarter inches, and it is found for other reasons that it must be at least one and a half inches. The deepest curve we can conveniently make of that diameter is, say, nine-tenths of an inch, or thereabouts, and this limits the convexity of the meniscus that can be used. Well, we know that in order to correct astigmatism we require the lenses to be as deep as possible, and as nearly parallel as possible, so we decide to have our lenses of such curves that the deepest is about nine-tenths of an inch. We decide to have a pair of symmetrical lenses in order to have no distortion, and that they shall be placed in a position to give as nearly as possible the form of a hollow sphere. Now comes the point—What glass shall be used? We observed before that with every two kinds of glass the lenses could only be made of two shapes. Thus, we must look through our glasses to see which pair will best give us this deep meniscus form. We shall find that for a lens of the type I have mentioned, the glasses known as light and heavy flint combined together will give the nearest approximation to the shape required. That is to say, in order to be able to make a lens with these very deep curves we must use two glasses, whose refractive indices and dispersions are unusually close together, otherwise the adequate corrections cannot be obtained. For a lens with a larger aperture than one-eighth of its focus the lenses must be larger; it is then no longer possible to employ so deep a curve as nine-tenths of an inch, as it would be more than a hemisphere and could not be made, and the curves must of necessity be of a flatter form. We must again look through the kinds of glass at our disposal, and we shall find that glasses with a greater difference between their refractive indices and dispersion must be selected.

This will have, I hope, indicated very roughly and briefly some of the general defects of a simple lens, which we, as opticians, endeavour to correct. For portrait lenses we devote ourselves beyond everything to the correction of the spherical and chromatic aberrations of the central rays, because large apertures are necessary in order to make the lenses rapid, and the larger the aperture the more the defects in the aberration show up. That is to say, in portrait lenses we devote ourselves to the central definition of the lens. In rapid and wide-angle doublets, although the central aberrations must be carefully attended to, the corrections for astigmatism and distortion are the most important. Again, with single landscape lenses a certain amount of distortion is tolerated in order to obtain better marginal definition. In order to describe all the different details of construction, it would not require a single paper but a series, and I doubt if any but opticians would be interested. I have been unable to touch this evening on many points of special interest.

The flare-spot and its causes and modifications in various kinds of lenses would be a subject that, to be fully treated, would require considerable time. Wherever light meets a polished surface of glass a portion of the light is refracted and a portion is reflected, and thus with every lens a certain amount of light enters the camera which has not passed straight through the lens, but has been reflected backwards and forwards from the various surfaces of the combination before entering the camera. The amount of this light is exceedingly small, compared with the body of light which passes through the lens, and if it is diffused over the whole of the photographic plate, it has no appreciable effect. It, however, sometimes happens in a carefully adjusted lens, more usually of the doublet form, that the greater portion of this light thrown into the camera by internal reflections is concentrated upon one part of the plate, and forms a patch of light called the flare-spot.

Another interesting point is the special chromatic correction which has to be made—owing to the irrationality of the spectrum—in order to make the focus coincident for the chemical and visual rays. In this connexion, you will no doubt expect me to speak of the new optical glass which has recently been made at Jena. I think it has sometimes been supposed

that the advantage that would be gained by the use of this glass for photographic objectives would be mainly due to the destruction of the secondary spectrum. I anticipate no improvement worth mentioning from this cause. Those who are familiar with that beautiful optical correction of a telescope object-glass, and who have compared it with the correction of the best photographic objectives which are purposely imperfectly corrected in that direction, will realise that the correction of the secondary spectrum is of very little consequence in the construction of photographic lenses. There are now being turned out from the glass factory at Jena over ninety kinds of glass, and some of these possess very remarkable qualities, such, that I think it not impossible that we may be able to make in the future a doublet lens that is absolutely concentric, and in which the covering power is thereby largely increased. There are many serious difficulties in the way, and although the firm of which I am a member have been for many months working in this direction, the investigations are not yet sufficiently complete for me to be able to give you any definite information as to their results.

I will not to-night discuss the much debated point as to whether it is legitimate to leave a lens more or less imperfectly corrected for aberration in order to obtain the so-called "depth of focus." All such points as these may appear to be of secondary importance, but they must nevertheless be carefully considered in the construction of photographic lenses.

In concluding this paper, I hope I may be excused if I make one or two remarks on the methods of constructing optical instruments. When the principle of achromatism was discovered, the achromatic telescope was made by Dolland largely from practical experiments. The achromatic microscope was worked out by Lister and others by practical methods, and even at the present time many things are done in practice which are not even known of by theoretical men. I believe I am correct in saying that there is no book which gives a correct representation of a high power microscopic object-glass, and most of the figures which are to be seen in books are entirely misleading.

There can be no doubt that in certain branches of optics the practical man formerly led the way, and it was only afterwards that his methods were theoretically explained. This naturally produced among opticians a certain contempt for theoretical work, while the theoretical men were somewhat sceptical of the rule of thumb mode of inquiry often employed by the instrument maker. Thus it comes to pass that we find in England, except in rare instances, very little combination of practical and theoretical men in the production of optical instruments. Practical men are realising that although the improvements that have in past years been made in optical instruments have been in a great measure due to the empirical method of inquiry, now that the science is more completely worked out, and the conditions have become less simple, the advances that will in future be made will undoubtedly be due more or less to theoretical research. Now we opticians are men of business, who have not only to make optical instruments, but also to make a living out of them, and have not so much time as we should like for theoretical work. What, then, is our annoyance when we find, on entering the study of the subject, that the books are now written, not that they may be of practical use, not that they may advance the science, but that the student may have simple formulae and dodges to pass examinations. The pure mathematician is apt to be so impressed with the necessity of having a formula that is of a pretty and symmetrical form and easy to cram for examinations, that he sometimes arranges his signs and terms in a manner such, that in order to make practical applications of the same the formula has to be entirely reconstructed. Is it not a disgrace to our literature that in optical text-books the thickness of a lens is generally neglected or merely mentioned as a corollary? It is only within the last year or so that any accessible English book has treated adequately of aberration since the time of Herschel. The investigation of oblique pencils is generally left almost untouched, and the question of signs is in a chaotic condition. If theoretical men will combine with us practical men by writing books by which we can educate ourselves in the direction we require, there are many improvements in optical instruments which, in the not distant future, we may hope to accomplish.

CONRAD BECK.

(Discussion in our next.)

THE LARGEST CAMERA IN THE WORLD.

[A Communication to the Photographic Society of Philadelphia.]

THE recent completion of the great Lick telescope, and the success which has attended its use for general astronomical purposes, have been subjects of interesting discussions, both among astronomers and mechanicians, and an examination of the photographic features of the instrument may not be without interest to photographers. Before entering into a description of the attachments of the telescope which are particularly devoted to photography, a brief general account of the instrument may be necessary in order to make clear the arrangement of the parts.

As the vital point in a camera is the lens, so the objective is the great point in a telescope, and the objective of the Lick telescope, the last and greatest work of the veteran Alvan Clark, is the first and most important part of the instrument. The clear diameter of the lens is thirty-six inches, and it is composed of two discs of crown and flint glass respectively, both discs being cast by Feil, of Paris, and ground and figured by Mr. Clark, at Cambridgeport, Mass.

The production of a satisfactory and homogenous disc of glass, free from waves and striæ of unequal density, is a most difficult matter, and in the case of the disc of crown glass a satisfactory casting was secured only after nineteen failures. The crown glass lens is a symmetrical double convex figure, both faces being worked to curves of 259.52 inches radius, and the double concave flint disc has its front face worked to a radius of 239.59 inches, and its back face is curved to a radius of 40,000 inches. The discs are not cemented, but are mounted six and a half inches apart, the combination having a focal length of 678 inches, or 56 feet 6 inches.

This lens, the largest in the world, is mounted in a tube of cast-iron and steel, the tube being four feet in diameter in the middle and tapering to three feet at the ends. This is mounted equatorially, and some idea of the weight and solidity of the parts may be obtained from the fact that the polar axis is a steel spindle ten feet long and twelve inches in diameter, and it alone weighs 2700 pounds. The weight carried by this axis is about 20,000 pounds, and in order to relieve the spindle as much as possible, a series of anti-friction rollers are placed just beyond the first bearing to take a portion of the weight.

The instrument is mounted on a hollow cast-iron column, built up in sections, the driving clock and regulator being placed in the column, and connected by electric control with a standard astronomical clock, and with the chronograph.

The control of the telescope in all its movements is effected by the numerous handles which are gathered around the eyepiece and upon the top of the column. The instrument is intended to be controlled by the observer and an assistant on the column, although for rapid movements in right ascension and declination help may be given by an assistant on the floor. The various handles and attachments for the use of the observer are mounted on a large ring around the eyepiece, which carries the handles for clamping the instrument or giving slow motion in right ascension or in declination, and also carries the reading microscope and finders, and a small sidereal clock. Electrical switches are also provided by which the driving clock can be started or stopped, and the illumination of the divided circles controlled.

It has been customary in large telescopes to provide a chair for the observer which followed the motion of the eye end of the instrument, but the inconveniences of this method increase with the size of the apparatus, and in the case of the Lick telescope it was decided to adopt the method proposed by Sir Howard Grubb, of making the entire floor of the dome rise and fall to bring it at all times within a convenient distance of the eyepiece. As this moveable floor is sixty-one and a half feet in diameter, and has a rise and fall of sixteen feet, the magnitude of the task is apparent. The motion of the floor is caused by four telescopic hydraulic rams operated by a differential valve provided with an indicator which may be read in the dark. A hole in the middle of the floor provides space for the column of the telescope and for a staircase, and the entire motion of the floor is accomplished upward in less than nine minutes, and downward in five minutes.

The great dome is also controlled by hydraulic power through the medium of an endless wire rope, and in this manner the unusually heavy parts are kept as completely in hand as in the case of smaller and lighter apparatus.

The most interesting part of the outfit to photographers lies in the accessory apparatus for use in celestial photography, and as the telescope when arranged for photography may be considered the largest camera in the world, some of its details in this direction are worthy of especial notice. In the first place the objective was figured and corrected solely for visual purposes, and was therefore unsuited for photographic work, and in order to provide the necessary correction an auxiliary corrective lens was made to be mounted in front of the original lens. This corrective lens is of crown glass, thirty-three inches in diameter, and may be seen, in the illustration on the floor, on its carriage which has been provided for handling it. When this lens is placed in front of the regular objective, it not only makes all the corrections necessary for photographic work, but also shortens the focal length of the entire combination ten feet, thus making the position of the plateholder come some distance within the eyepiece. This permits the entire apparatus about the eyepiece to remain undisturbed when the telescope is used for photography, the holder and its attachments being introduced into the tube through an opening in the side.

Within the tube at this point is a carriage composed of two rings of about the inside diameter of the tube, these rings being connected together by four rods. On these rods the sliding portion of the carriage is fitted, and by means of screws the frame may be moved and adjusted in any desired position. As the rays of light from celestial objects are practically parallel, the camera is of fixed focus, and when the proper point is once determined, there is no use for any focussing screen, and the screw motion which acts on the carriage is provided with a pointer which indicates the exact focus. This pointer traverses past an index which is graduated for various degrees of temperature, for the expansion and contraction of the great tube would otherwise destroy the sharpness of the image.

The plateholder, twenty-three inches square, carries a plate 20×20, and slides into grooves in the carriage, where it is held by a spring. The holder is provided with shutters which are operated from without the tube, so that exposures may be made in that manner.

When an enlarged image is desired, the holder is not slid into the carriage, but in its place is put an enlarging lens of two inches aperture and twelve inches focus. This magnifies the image formed by the large objective, and projects it toward the eyepiece, which is then removed, and a small camera substituted to receive the enlarged image. This enlarging lens is fitted with a time and instantaneous shutter, operated from without the tube, so that enlarged photographs of the image formed at the focus of the telescope may be made direct, without being reproduced as in ordinary methods of enlarging.

Although the telescope as a camera has been in use such a short time, some very satisfactory work has been done, and the great light-gathering power of the thirty-six-inch objective will doubtless reveal detail in the photographic work that a smaller instrument would be unable to secure.

Great credit is due to Messrs. Warner & Swasey, of Cleveland, Ohio, for the skill which they have displayed in the designs for the mounting of the telescope, and for the care with which the work has been executed; and the success of the great camera is due quite as much to the designer of the mechanism as to the maker of the lens.

HENRY HARRISON SUTLEE.

DUTCH RIVER SCENERY FOR THE CAMERA.

IN TWO PARTS.—PART II.

Of the curious country, Holland, with which we have now to deal, one of the best brief descriptions I have seen was given in an old guide-book, which, after describing how nearly the whole country consists of land most industriously recovered from the sea, sets forth that the sea is higher than the land, sometimes to the extent of twenty-four or thirty feet; in no other country do the keels of the ships float above the chimneys of the houses, and nowhere else does the croaking frog look down upon the swallows on the house-tops. Cows' tails, says our author, in Holland grow upwards, instead of downwards, for, to promote cleanliness, each tail is tied up to a ring in the roof of the stable. Beckford, the author of *Fatrick*, writes that every flower which wealth can purchase blossoms on one side, and every stench a canal can exhale poisons the air on the other. The people live like frogs; "very slight authority would persuade me there was a period when Holland was all water, and the ancestors of the present inhabitants fish. A certain oysteriness of eye and dabbiness of complexion are almost proof sufficient of this aquatic descent; and pray tell me for what purpose are such galligaskins as the Dutch burthen themselves with contrived but to tuck up a bouncing tail, and thus cloak the deformity of a dolphin-like termination? In Holland the stork is revered as if it were a sacred ibis; cart wheels are sometimes placed for it upon the roofs of the houses, that it may build its nest thereon rather than block up the chimney.

One essential for making the long journey through Holland on board a Rhine steamship of any value for a trip with the camera is fine weather; nothing can be more dreary for paddling through a flat country than unbroken rainy weather. Another somewhat important requisite is that there shall be plenty of masses of cloud about, and that the plates used, combined with skill of the operator, shall render those clouds visible in the negative. Orthochromatic plates are said to be somewhat better than others in this respect, and the system of developing used by Mr. Payne Jennings, as described in Mr. Cadell's paper read at a meeting of the Camera Club, is successful in the rendering of the clouds in the field of view at the time of the exposure. With a flat river bank on each side, half of each plate exposed will be a perfect blank, so far as pictorial interest is concerned, unless the photographer secures picturesque masses of clouds, or goes to the trouble of printing them in afterwards. It is to be hoped that the time is at hand when the photographic world will not tolerate lantern slides representing landscapes without natural clouds, but will smother all such by universal consent after they have intruded their visages upon the screen. A day of rapid changes of sunshine and cloud, such as may be expected sometimes in April, is the day for the lower reaches of the Rhine. Should the weather not be suitable for photographic work of the kind described when the tourist arrives at Rotterdam, he had better stay there or thereabouts for a few days until a suitable morning arrives for giving him good cloud backgrounds.

What will he have in his foregrounds? Barges and ships, Dutch and German chiefly, of every size and description, some of them with wooden houses and small farmyard on deck, with the family linen drying on lines, the lady of the house doing the steering or other hard work, and a fat Dutchman, her lord and master, asleep over a pipe. Fancy a picture like this, with the rippling Rhine in the foreground, the cloud back ground, and the flat country stretching away into infinite distance. Some of the gigantic barges have what appear to be nine masts in sets of threes; there is the central mast and two others which spring on either side of it from the same part of the deck, but incline outwards as they rise, like the two arms of the letter V. These two additional masts are not really masts, but cranes; the long arms can be let down in any direction, and by suitable adjuncts pick up unconsidered trifles, such as small haystacks, and deposit them on deck.

Then there are the Dutch towns and villages which here and there adorn the banks of the river, with the houses internally and externally scrupulously clean: as seen from the river they might be set scenes from a

theatre, rather than real "practicable" houses used by real men and women. I saw one spotless house set as in a gilt frame; a band of gilt tracery about two feet wide, extended up both sides and along the top and bottom of the front. In the good old-fashioned Dutch towns and villages eternal rubbing and scouring are going on, with no litter in the streets, and everything as clean as a new pin. It is said that a pedestrian is liable to be deluged by a shower of water, and on looking up he sees the housewife at an upper window, where she has been surveying the front of the house above the window, and seeing, or fancying she sees, a speck of dirt on a brick, discharges a pail of water at it, of which the incautious ambulator below accidentally receives most of the benefit.

About the most interesting old-fashioned Dutch town on the Rhine visited by me was Nymwegen, where the boat arrived after dark and was moored for the night against a long and spacious quay, with the electric lights blazing from the tops of tall poles lighting up the nearest row of houses in the distance facing the quay; these houses, in all their brilliancy and cleanliness, looked like ideal dwellings constructed to adorn a theatrical scene. The Cathedral, lined nearly all over inside with clean, white, glazed tiles, was unlike any ecclesiastical edifice I had previously seen. One might almost venture to sit down anywhere in the streets without danger of soiling the garments, and ornamental articles in shops devoted thereto were specially bright and sparkling. The town looked like a place in which the intrusion of a spider would so excite the inhabitants that they would all turn out to give chase to the venturesome insect. In 1799, the Rhine rose here seven feet in one hour and nearly overran the province, owing to a vigorous thaw in the far away Swiss mountains.

Off most of the smaller towns or villages the steamer pulls up in the middle of the river, and passengers are taken on or off by means of a small boat. Here, then, are exactly the conditions the photographer wants; the steamer at rest off a picturesque Dutch village, and the vibrations of the engines stopped.

Should he be interested in large railway bridges he has every variety of them, some of them on small local lines, others on lines of international importance, such as some of those between Berlin and Belgium, or Western Holland. When he passes the Dutch frontier, and reaches Dusseldorf, he will find a bridge of boats, its elements composed of pairs of barges, with a section of a plank cart road across the tops of them. Some of these sections are furnished with steam engines, enabling them to quit their normal position in the line of barges, and to leave a gap through which the river craft can pass. Near one end of the bridge is a square, with an equestrian statue of John William, the Elector; this statue is said to descend from its pedestal and trot round the town on Walpurgis night; it is also said by the wise to be stuffed with treasure. Nearly under its shadow, and within hearing of the murmur of the mystic Rhine, Mr. Hubert was born, the romantic legendary surroundings of his youth doubtless have much to do with those flashings of genius with which he ever and anon irradiates photographic literature.

At Dusseldorf the tourist finds evidence of Germany being armed to the teeth, and scarcely anything but soldiers or officials of some kind, with gold lace about their hats, in all directions. I am told that the whole country is like one huge fortification under iron rule. A German launched out at me at one of the *cafés* there, in relation to England, that people who did not own the land on which their houses were built, but had the results of their industry taken from them by occasional rises in rent, were not a free people but slaves. This was not a polite remark to a foreigner, whatever truth there may be in it, and would not have been made by a Frenchman. I mildly asked whether Germany were not taxed to death, and young men forced into the army to the neglect of more useful pursuits. He admitted that taxation was heavy, but, he said, when a German has paid all his dues and performed all his duties to the State, all he gets by his industry is his own; no man can take it from him. He added that a few years' service in the army taught a youth the benefits of discipline and order, and made a better man of him. Another German subsequently denied this to me, and said that the service in the army had a thoroughly demoralising effect on the individual.

In Dusseldorf, as in many other continental towns, there is an English colony, said to number about a hundred all told. The residents in these Continental colonies are mostly persons of fixed and somewhat limited incomes, who live abroad because it is less expensive than living at home; also because education of children is much better and cheaper, and in some places the climate is better. I remember, with much pleasure, the kindness of reception in Dusseldorf given me by Dr. Liesegang, Mr. H. Schnus, Messrs. Otto Brothers, and some new and old acquaintances among the English residents.

A statement in my last needs correction, to the effect that the Rhine steamboats of the Dutch Company start from the same side of the river at Rotterdam as that at which the Harwich boats arrive. They start from the opposite side, and I was thinking of the head offices of the directors at the time of writing.

W. H. HARRISON.

BOLTON PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THIS Exhibition, judging from the report in a local paper, seems to have been a good one. It remained open for only a brief period, and closed last Saturday. Medals were awarded as follows, although all the exhibits were not entered as competing:—

Competition No. 1 (for members only).—For the best six photographs taken since last exhibition: First prize, a silver medal with gold centre, John Johnston, M.D.; second prize, a silver medal, Walter Staton.

Competition No. 2 (for members only).—For the best six photographs: First prize, a silver medal with gold centre, Walter Staton; second prize, a silver medal, John Lomax.

Competition No. 3 (for members only).—Prize for the best and most artistic photograph entirely the work of the competing amateur, preference given to print from untouched negative, won by J. Johnston, M.D.

Competition No. 4 (for members only).—For the best series of six lantern transparencies, size, 3½ square: First prize, a silver medal with gold centre, Walter Knowles; second prize, a silver medal, James Leach. William Laithwaite was highly commended.

Competition No. 5 (for members only).—A gold medal given by Mr. John Taylor for the best six prints taken by members who have not practised photography more than three years, won by A. L. Entwistle.

Competition No. 6 (for professionals).—A silver medal with gold centre for the best series of six portraits, won by B. Wyles & Co., Southport.

A silver medal for the best landscape or marine view (also for professionals): W. A. Skill, Lincoln.

In this professional competition, J. P. Gibson, of Hexham, was highly commended.

The judges were Mr. A. W. Beer, Mr. W. A. Watts, and Mr. R. Crowe, all of Liverpool.

THE LATE EXPLOSION AT THE EAST WALL, DUBLIN.

THE INQUEST ON MR. BEWLEY.

THE City Coroner, Dr. N. C. Whyte (the 6th instant), resumed the adjourned inquest on the body of Mr. Thomas Arthur Bewley, who was killed on the 28th ultimo by an explosion of a gas cylinder.

Mr. Meldon, Q.C. (instructed by Mr. T. Overend) represented the next-of-kin.

Mr. Louis Meldon, solicitor, appeared for the Brin's Oxygen Board of London. The Coroner said that on the last day he was obliged to adjourn the inquest in order to communicate with her Majesty's Inspector of Explosives. Since then, aided by Mr. Semple and Sir Howard Grubb, he had collected a mass of information upon the subject as to how the explosion occurred, and whether it was likely to occur with a sufficient amount of caution. He wished to thank those who had come from a distance to help to elucidate the matter.

Mr. Meldon said that, appearing for the next-of-kin and also for the surviving partner, he would, if permitted, put before the jury the evidence which would demonstrate fully the nature of the cause of the explosion. Mr. Bewley carried on a large shipbuilding business, and, in addition, he manufactured certain gases. When it was required to make a powerful light, ordinary coal gas or hydrogen was used in conjunction with oxygen, the oxygen to make the flame much more powerful. In using these two gases when they came out of a nozzle there was no danger. Mr. Bewley supplied these gases to places of public entertainment. They were kept in cylinders—hydrogen in bottles painted red, and oxygen in bottles painted black. This rule was invariable. On the 27th December, Mr. Chancellor sent for a bottle of oxygen, and Mr. Bewley told him that he had not an empty black bottle then, but he supplied the oxygen in a red bottle, which should be used for hydrogen. He sent it to Mr. Chancellor, and it was not used then, but was returned on January 15. Afterwards Mr. Lawrence sent for two bottles, one of hydrogen and another of oxygen. Mr. Bewley forgot, and put in a small quantity of oxygen, thinking it was oxygen in the bottle, and sent it in as a bottle of hydrogen. This was discovered by Mr. Lawrence's assistant, for by putting a light to it there was a kind of explosion. He knew what was the matter, and put it aside and labelled the bottle "mixed gases." Mr. Lawrence wrote to the deceased saying that a mistake had occurred and that an accident might happen. Two days after the bottle was sent back to Mr. Bewley, and it was placed in the "drawing room," and remained on the table until the explosion occurred. Before that he told his foreman, named Ruthven, that the quantity of hydrogen was so small that there was no danger, and that he would himself use it, and on Monday, the 28th instant, he experimented with small quantities. Afterwards the explosion occurred.

After some further remarks from Mr. Meldon as to how the accident occurred, The Coroner said the important matter was, so far as he saw, whether the explosion was caused by friction. That point closely concerned the public, for those gases were used at theatres and public places of amusement, and while they did not want to cause anything like a panic amongst the public, it was their duty to inquire if any danger existed, or if such a result would be likely to occur again.

Sir Charles Cameron said he attended as Local Inspector of Gases. The Coroner announced that he had a communication from Major Kundel, one of the chief inspectors at the Home Office, with reference to the inquiry, and he said that the case did not come under the Act. When the Explosives Act was passed the compression of gases was not contemplated.

Mr. John Bewley examined, deposed that the deceased, Thomas Arthur Bewley, was his brother. Witness was in an office adjacent to where the explosion took place about 4.25 p.m. on the 28th January. He heard a slight report and crash of glass, and he immediately rushed out, and saw his brother lying on his back he was dead. There was nobody in the room with the

deceased. He used this room for drawing, but had no mechanical appliances in it.

By Mr. Meldon: The deceased told him that he had put oxygen into a bottle ordinarily used for hydrogen and sent it to Mr. Chancellor. Witness said it was wrong to do so without painting the bottle of a colour that would indicate that it contained oxygen.

By the Coroner: For some months past they had not manufactured any oxygen, but had imported it. They made the hydrogen.

The Coroner invited several scientific gentlemen to put questions to the witness, and in reply to questions he said that there was a gas jet in the room where the accident occurred.

By Mr. Meldon: Steel cylinders were used for a much greater pressure than iron ones.

In reply to another inquirer, the witness said they were accustomed to put seven hundred and fifty pounds or eight hundred pounds of pressure in the cylinder, while they might safely put two thousand or even two thousand five hundred in them without in any way injuring the material. The particular bottle which burst was carefully examined, and no flaw discovered in it.

The Coroner said that they had now got over the question of pressure being the cause of the explosion. *Prima facie* it would appear that fire caused the explosion, and he would like to hear something about the friction or light.

Mr. F. Scarr deposed that he was cashier and book-keeper to Mr. Bewley, and as an additional duty he had charge of those bottles coming in and going out. He dealt with them only as merchandise, and had nothing to do with the filling of them. About twenty of those bottles went out every week. There were two regular assistants, one of whom was a scientific man. He received the bottle back from Mr. Lawrence referred to by the last witness, on the 10th January. A proper oxygen bottle was afterwards supplied to Mr. Lawrence. A bottle of hydrogen was also supplied. The oxygen bottle which was received from Mr. Lawrence was left in the drawing room.

By the Coroner: Two or three long bottles of about one hundred feet in each went to the Leinster Hall every day during the Christmas season.

John F. Ruthven, a labourer in the employment of Messrs. Bewley, deposed that up to a short time ago he assisted in filling bottles with gas; on the Saturday before the accident he saw a red bottle in what was known as the drawing room at the North Wall. He told Mr. Bewley to allow the gas to escape as it was mixed. Mr. Bewley explained that before Christmas-time, having no oxygen bottles, he took a hydrogen bottle and filled it with oxygen for Mr. Lawrence, believing that it was to be used that night. Forgetting there was oxygen in it he put in hydrogen to bring it up to the required pressure. The bottle came back marked "mixed," but he said there was so little hydrogen in it that it was not dangerous, and used experiments to prove to witness that it was not dangerous. He explained that, as in the case of this bottle, when there was a small quantity of one gas mixed with a great quantity of another kind of gas there was no danger. He transferred some of the gas to another bottle and equalised the pressure, which in each case was four hundred pounds. He intended to use one of the bottles at an entertainment that night. When filling one bottle from the other there was some difficulty in making the connexion with the tube. When witness left Mr. Bewley in his room about two o'clock there was a branch of gas lighted, but the light was very low. Mr. Bewley was very careful in handling the bottles.

Archibald M'Williams, a labourer in the employment of Messrs. Bewley, gave evidence also.

Mr. Lang deposed that he was giving a magic lantern entertainment at Naas for Mr. Lawrence. He brought down the bottle which subsequently exploded for the purpose of the limelight. He attached it to the hydrogen pipe and applied a light. An explosion took place, blowing off a pipe of the lantern and blowing out a candle. He tried to light it again, and there was another explosion. He got a new cylinder and went on with the entertainment.

Professor Barret, who gave evidence as an expert, stated that having heard all the facts as deposed to, he had no doubt that the true cause of the explosion was the mixture of the oxygen and hydrogen gases. He did not think that friction would cause the explosion, and he could explain it in no way except that the gas jet in the room was possibly lighted. He explained that there was no serious explosion when Mr. Lang lighted the magic lantern jet by the fact that the cold mass of metal stopped the flame from entering the cylinder. When pure oxygen, hydrogen, or coal gas were kept in separate bottles, and used with a jet such as had been used by Mr. Lang in this case there was no danger. He suggested, however, as the compressed gases are coming into general use at the present day, it is most desirable that the Government should recognise the fact and appoint an official, whose duty should be—(1) from time to time to inspect the arrangements for compressing the gases; (2) certify that the cylinders are able to bear at least twice the pressure to which they were charged; (3) see that some distinctive, uniform, and indelible mark is attached to the hydrogen or to the oxygen cylinder; and (4) pass a short Act rendering it penal (for commercial purposes) to compress oxygen in a hydrogen cylinder or vice versa.

Professor Hartley stated that he inspected the scene of the occurrence. He agreed generally with what Professor Barret had said. He came to the conclusion that this accident was the result of the detonation of the gases within the cylinder. He believed the rupture to be caused by a chemical combination of the gases. The gases within the bottle might explode by other causes than the application of external flame; a little oil or rust might have caused the

rupture. Chemical combinations could by various means be brought to an explosion.

By the Coroner: He did not consider that there was any danger in storing hydrogen, but it should be understood that it was hydrogen, and not mixed with oxygen. To preserve such a combination was unwise. He did not fear any danger from preserving oxygen alone under pressure. There should, in his opinion, be no chance of allowing oxygen to be put into hydrogen bottles, or vice versa. As a precaution against such an occurrence, he would suggest that the screws for the bottles should be of a different size. He did not see that the public had any cause for alarm when ordinary precaution, such as suggested, was exercised.

Mr. J. V. Robinson was examined. He was present at the charging of the cylinder that burst. The pressure was eight hundred and eighty pounds, and he believed that the pressure caused the explosion. He believed that the iron was not in a good condition. He had a thorough knowledge of the bottle as it was made from a bottle the model of which he introduced.

Mr. Mellon pointed out that it was tested up to a much higher point.

Dr. Myles deposed that the death of Mr. Bewley was due to injury to the skull and spinal cord. Death was instantaneous. It was not possible, as suggested, that the gentleman's watch could have been blown into his body.

Sir Howard Grubb was examined. He deposed to having examined the place where the accident occurred. He came to the conclusion at the time, and had not changed his opinion since, that the accident occurred by the ignition of mixed gases. In the face of the facts before them, as to the bottle of mixed gases at low pressure, and Mr. Bewley having announced his intention of experimenting, there being a light in the room, he thought they might go no further.

The Coroner said there was no evidence that there was a light in the room at the time of the explosion.

Mr. Goggle, of London, deposed that he was conversant with the use of these cylinders containing gases. In the establishment he represented they were used as in Mr. Bewley's. He believed that the cylinder was capable of sustaining four hundred pounds pressure.

The Coroner, in his remarks to the jury, said that no blame could be attached to any one. There was a mistake committed in mixing the gases, and as suggested by one of the scientific witnesses, he thought that a mixture of them should be made penal.

The Jury returned the following verdict:—"We find that Thomas Arthur Bewley was killed instantaneously on the 28th January, 1889, at the yard of Messrs. Bewley, Webb & Co., East Wall, by the accidental explosion of a gas cylinder, used for the purpose of limelight, and we are of opinion that the accident was caused by the mixing of the two gases, oxygen and hydrogen—how exploded we have not sufficient evidence to show; and we are further of opinion that the authorities should take steps to protect the public against similar accidents by affixing a Government stamp on all cylinders used for such purpose."—*Irish Times*.

Our Editorial Table.

GAEDICKE'S MONOCHROMATIC DARK-ROOM LAMP.

A MONOCHROMATIC light is proverbially a safe one in the dark room. Up to the present time no simple and efficient lamp has, so far as we are aware, been introduced for giving such a light and for such a purpose.

Herr Gaedicke has devised one, or more correctly two lamps, one burning with gas, the other burning with alcohol. Both are respectively shown by the adjoining cuts. The one which we have examined, however,



is for gas, and as such we will attempt its description. A Bunsen burner of small dimensions is surmounted, at a little distance from its orifice, by a holder containing a ring of asbestos. This is adjustable in every direction.

To prepare the lamp for burning, this asbestos is moistened with water and a little finely crushed common salt sprinkled upon it. It is now ready for lighting. The flame is protected by a brownish-coloured

chimney, and when the lamp is ignited it emits a considerable volume of light. Provision is also made for interposing a plate of coloured glass between the flame and the object to which it is to be directed. The asbestos requires to be dipped in water and sprinkled with the salt once in every ten hours it is burning. It is, indeed, an effective little dark-room appliance, and we can readily understand how the German Photographische Association awarded a diploma for it last year.

Marion & Co., 22 and 23, Soho-square, London, are the sole agents in this country.

TRADE CATALOGUES.

Mr. H. H. SHARLAND, Thavies-inn, E.C., sends us his wholesale and export list of all kinds of optical and mathematical instruments. Its 146 pages, quarto, are literally crowded with engravings of the various objects manufactured or supplied by this firm. Telescopes, microscopes, binoculars, levels, barometers, polarising prisms and appliances, and everything pertaining to the optical trade are here to be found. It is, however, a private wholesale list for the trade only.

The catalogue of Nadar, Paris, which pertains exclusively to photographic appliances, is very comprehensive. Being intended for French readers, it is printed in that language. It partakes very much of the nature of our own catalogues published in this country.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1925.—"Improvements in or relating to Tailboards of Photographic Cameras and Means of Attaching Body of Camera to same." H. HERBERT.—*Dated February 4, 1889.*

No. 2181.—"Improvements in Photographic Camera Pinions." J. C. BARNES.—*Dated February 7, 1889.*

PATENTS COMPLETED.

NEW OR IMPROVED ARRANGEMENTS OF DRAWERS, OR ARTICLES OF FURNITURE, FOR EXHIBITING AND HOLDING PHOTOGRAPHS, CARDS, PICTURES, AND THE LIKE.

No. 2975. HARRY HEATE, 8, Kingamead road, Oxtou, in the county of Chester.—*February 25, 1889.*

IN place of having a simple album to contain photographs, &c., I form a revolving stand with two, three, or more sides, or even a cylinder.

Each side of the stand, or small arc of the cylinder, is formed of a door or doors having a panel or panels containing the photographs or other articles to be exhibited, both inside and out. These doors are formed in two or three layers, on one of which the photographs or other articles are attached, while the outer one (or ones) form a framework round the photographs, so that they can be seen, as it were, encoined in a frame.

The two or three layers can be fastened together by ornamental screws or otherwise, or in the case of innermost doors they can be simply fastened by a spring catch or otherwise.

It will be obvious that there can be a large number of these doors one behind the other, until nearly the centre of the stand is reached.

The case preferably revolves on a pivot on its stand, and this stand can be either a flat board for standing on the table, or tripod, or even a small chest of drawers, or box for containing articles, or it can be arranged as an open cupboard or whatnot in which music and other things can be placed, the photograph case swivelling on a pivot on the top.

The doors of the photograph case can be of ornamental wood, plush-lined, or any other fancy material that may suggest itself to the designer.

In some cases electric or other lights can be fixed behind the photographs so that transparencies can be used, the article of furniture then becomes to some extent a lamp.

The way I prefer to arrange the doors is as follows:—If the article is a pyramidal shape the lower half of the door turns on hinges on its lower edge and falls horizontally, being prevented from falling further by tapes or chains. The upper half can be formed in one or two doors opening sideways on hinges.

IMPROVEMENT IN PLATE-LIFTING APPARATUS FOR WORKING METAL SHEATHS UNDER A BAG IN CONNECTION WITH DETECTIVE AND OTHER CAMERAS.

No. 4145. SAMUEL WHITE BUNCH, 180, Strand, London.—*March 17, 1888.*

THIS invention has special reference to my patent, No. 6613, dated May 5, 1887, in which photographic plates were transferred from front to rear after being impressed with a latent image.

But I now reverse this order and lift the plate from the rear to the front, the appliance for doing so being affixed to the back cover of the reservoir, instead of being in the body of the camera as formerly. This secures, among other advantages, that of being enabled to apply any of the rapid class of shutters which are formed for working immediately in front of the sensitive plate.

The method by which I effect this is as follows:—A metallic or other lever is placed in the back of the reservoir, preferably sunk into it, and covered up by an inner lining of wood; one end projects outside of the reservoir, the other end is bent at a sharp angle, and is left sufficiently long for the last or rear plate of the series to rest upon. On depressing the outer or exposed end of the lever, the other end, which rests at the bottom in a recess and upon which the

posterior plate stands, is raised, and carries upwards with it that plate to a certain determinate height, the plate being prevented from falling downward again by means of a spring catch. On releasing the outer end of the lever it immediately resumes its former position by the agency of a spring. The plate, which is half raised up, and is reposing upon the spring catch, is now taken hold of by finger and thumb through the opaque suede leather or other bag, as described in my former patent, and is transferred to the recess in front of the reservoir, and upon being pushed down is in the focussing plane ready for being exposed; after which, by depressing the lever and repeating the process just described, another plate is transferred from the rear to the front, and so on in succession.

The reservoir with the various fittings may be made distinct and separate from the body of the camera, and fitted with the usual slide in front. This enables me to provide any number of such reservoirs to any one camera, so that a photographer may go on a tour provided with such a number of these, all stored with sensitive plates, as to be practically illimitable.

(Here follow references to drawings.)

What I claim is—1. The mode of transferring the plate from back to front by the lever, as herein set forth. 2. The spring for ensuring the retention of the plate after being raised. 3. The return of the raising lever to its normal position by means of a spring. 4. The separate reservoirs fitted with the appliances described as distinct from the camera, and capable of being attached to or inserted in the camera the same as an ordinary dark slide.

AN IMPROVED FORM OF CAMERA FOR OBTAINING PHOTOGRAPHS OF MOVING AND OTHER OBJECTS.

No. 4248. FRANCIS NOWLAN, 17 Soho-square, London, Middlesex.—
March 20, 1888.

A PHOTOGRAPHIC camera, the plate carrier of which is in the form of a drum, capable of carrying a number of plates, which plates are held in position inside the said drum by a series of flat spokes and made to rotate on an axis. The face of the plate when in position being at right angles to the focal axis of the lens.

By turning a small knob on the outside attached to the axis the plates can be brought in rotation to face the lens, their true position being automatically registered by a spring, such as in use on rotating lens stops.

A shutter is arranged inside the drum and actuated from the outside which, when desired, covers the opening in the periphery of the drum in connexion with the lens. The sides of the drum complete the exclusion of light; one side of said drum may be attached to the shutter and revolve with it, the other side being removable, to enable the plates after exposure to be taken out and fresh ones put in. The removable side has an opening in its centre to allow a continuation of the axis forming the knob to project through, by turning which knob the plates inside are brought into position after every exposure, light being completely excluded by a slight shoulder surrounding opening for knob.

On the outside of the periphery of the drum is an opening corresponding in dimensions with photographic plates carried inside. To this opening is fitted a telescopic neck to carry the lens. The neck may be either round or square, square by preference. Through said neck the rays of light passing through the lens reach the sensitive photographic plate inside the drum.

To insure that the object to be photographed shall be accurately projected on the sensitive plate a finder or sight of a novel type is attached to the camera as near lens as possible, and may be fastened either to the neck holding the lens or to the inside of the knapsack case which encloses the whole apparatus. The said finder consists of a small mirror, either flat or convex, the convex by preference as it may be selected of such a curvature as will give reflections corresponding in size with image projected by the lens on the sensitive plate, the said mirror thrown back to an angle of 45° is placed immediately behind two cross wires and reflecting their intersecting point. Any object in front of the camera visible in mirror in conjunction with intersecting wires and viewed from the proper angle in relation to reflecting surface of mirror will be on the plate in camera should a photograph be taken, the intersecting point of wires representing the exact centre of the sensitive plate.

To enable the operator to view mirror from the proper angle an eyepiece or rim of wire is placed in such relation to the mirror that when the operator's position is correct he can see the reflection of cross wires central with the solid eyepiece. The operator need not place his eye in close position, but may be removed from finder as far as his eyesight will allow him. No screening of the surrounding light is necessary, it being simply a reflection in a mirror having the correct angles regulated by a combination of a solid eyepiece with reflection of cross wires.

This arrangement allows the operator to obtain photographs of objects on either side of him without turning his head or body in the direction of the object to be photographed, and to follow such objects about, keeping them constantly in position till he finds the pose or action suitable.

Any existing instantaneous shutter may be used for exposing the plates in the ordinary manner.

The knapsack case enclosing all having openings to face the lens and view meter. A small spirit level will also be necessary. When focussing is necessary for change of lens or any special purpose the drum containing sensitive plates can be drawn out. The telescopic neck being in two parts, one sliding inside the other, the forward portion carrying the lens being fixed to front part of knapsack case, the drum and remaining portion of neck drawing away along regulating grooves and out through opening at back of knapsack. When the drum is removed for focussing a ground glass is suspended inside knapsack on the same plane which the sensitive plate will occupy when the drum is returned to position. The necessary focus obtained, the drum is replaced. A block secured in position while focussing registers the position of the drum in regulating grooves and secures plates in focus.

The claims are:—1. In photographic cameras a multiple plate carrier or drum carried within a second or surrounding drum and adapted to hold a given number of plates and to present them in order to the lens opening substantially as described. 2. In photographic cameras a view meter or finder, consisting

essentially of a mirror and cross wires or lines adapted to be reflected thereon, and secondary wires or lines acting as an eyepiece or point of view, the parts being so arranged that the portion of an object reflected on said mirror where the secondary wire appears to coincide with the reflection of the front cross wires will be also in line for transmission to the centre of the plate substantially as set forth. 3. The general arrangement and construction of parts forming the improved multiple plate camera substantially as and for the purposes described.

CERTAIN IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 18,026. WILLIAM CHANNING GIBBS, 303, California-street, and GEORGE WILLIAM DORNIN, 215, Sansome-street, San Francisco, California, U.S.A.,
December 11, 1888.

Our invention relates to the class of photographic cameras; and our invention consists in the novel construction and arrangement of the inclosing case, box, or frame, whereby its back and front plates, when dropped to expose the operative parts of the camera, are made to serve as the supporting bed, and the focussing platform, respectively; in the novel adjusting or focussing carriage; in the adjustable support for the finder; and in details of construction and arrangement, all of which we shall hereinafter fully describe.

The main object of our invention is to provide a photographic camera which needs no separate box or case, having within itself parts which, ordinary essential to its operation when in use, yet have the further function of completing a perfect case or box, so that the camera is self-contained.

Other objects are to provide improved constructions for focussing the lens, and supporting the finder. After referring to certain drawings, the patentees state their claims as follows:—

1. In a photographic camera, a plate which, when closed, forms one end of the camera-frame, and so hinged thereto as to adapt it to be dropped down to expose the camera end, and turned under to form a bed or support for the camera-frame, substantially as described. 2. A photographic camera having a body-frame with a hinged back plate adapted to be dropped down to expose the camera back, and turned under to form a bed or support for the body-frame, substantially as described. 3. A photographic camera, having a body-frame with a hinged back plate adapted to be dropped down to expose the camera back, and turned under to form a support for the body-frame, and a proper fastening for holding the plate steady under the body-frame, and a fastening under said plate for the tripod, substantially as described. 4. In a photographic camera, an open-ended body-frame, a plate forming one of its ends and hinged thereto, adapting it to be turned down to expose the camera-end and form a focussing platform for its adjustment, and a second plate forming the other end of the body-frame and hinged thereto, adapting it to be dropped down to expose that end of the camera, and turned under the body-frame to form a bed or support therefore and for the other end-plate, substantially as described. 5. In a photographic camera, an open-ended body-frame, a plate forming one of its ends and hinged thereto, adapting it to be turned down to expose the camera end and forming a focussing platform for its adjustment, a second plate forming the other end of the body-frame and hinged thereto, adapting it to be dropped down to expose that end of the camera, and turned under the body-frame to form a bed or support therefore, and for the other end-plate, an automatic catch-connexion between the two plates to hold them firmly together, and a fastening for holding the second plate solid under the body-frame, substantially as described. 6. In a photographic camera, the adjustable support for the finder, consisting of the plate secured to the finder, and having opposing shoulders by which its movement is limited, and the arm pivoted to the front board of the camera and to the finder-plate, and having a pin for coming in contact with the shoulders of said finder-plate, substantially as described. 7. In a photographic camera the focussing or adjusting mechanism, consisting of the carriage frame on which the camera front is mounted and adapted to slide, the fixed tracks on which the carriage frame moves, the notches in the tracks, and latches on the carriage frame for holding said frame to the position to which it is adjusted, and the pinion shaft on the camera front, and racks on the carriage frame for adjusting the camera front on said carriage frame, substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 19.....	North London	Myddelton Hall, Upper-st., Islington
" 19.....	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
" 19.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 20.....	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 20.....	Bury	
" 20.....	Burley and District	Meehan's Institution.
" 20.....	Hyde	
" 20.....	Manchester Camera Club	Victoria Hotel.
" 20.....	Edinburgh Photo. Club.....	5, St. Andrew-square.
" 20.....	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 21.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

Last Tuesday night, at the annual general meeting of the above Society, held at 5A, Pall Mall East, London, Mr. James Glaisher, F.R.S., President, occupied the chair.

Mr. W. S. BIRD then read the report of the Council, which set forth that during 1888 the problem of modifying the sensitive film in the direction of securing orthochromatic results from coloured objects has been diligently studied, and some comprehension of the chemical reactions by which certain

dyes combining with the silver haloids of the sensitive film tend to restrain the actinism of the violet end of the spectrum, and to increase it in the yellow and red rays, is being gradually acquired. The effect of the interposition of coloured screens has been considered, and the use of coloured light in connexion with this problem has been essayed, and has helped to throw upon it some intellectual light. That the practical outcome of these researches has enabled photography to translate the colours of nature and of art into monochromatic effect, much more in accordance with the visual impression of such colours than formerly, cannot be doubted, but much has yet to be done to attain perfection. Two members of the Society, Captain Abney and C. H. Bothamley, have done notable service in placing orthochromatic photography on a scientific basis. The optical conditions of the art-science have not been neglected by the Society during 1888; stereoscopic and binocular vision, depth and diffusion of focus, and optical lanterns, have received considerable attention at its meetings. The following is the analysis of the 1888 Exhibition:—There were one hundred and fifty-eight exhibitors, comprising one hundred and three members and fifty-five non-members. There were five foreign exhibitors (America one, France one, Germany two, Belgium one). The one hundred and fifty-eight exhibitors comprised seventy-five professionals and eighty-three amateurs. Five hundred and eighteen frames were hung, containing one thousand and ninety-eight separate photographs, consisting of three hundred and twenty-three portraits, one hundred and nineteen figure subjects, six hundred and eleven landscapes and architectural subjects. There were twenty-five marine views and twenty animal subjects; these, with photographs on the table (including one hundred and eighty-two transparencies), made up a total of one thousand three hundred and thirty photographs. These figures show a falling off in the number of professional exhibitors about one-third less than in 1887, and also a considerable reduction in non-member exhibitors; the total result showing a diminution of nearly one-fourth in the number of exhibitors as compared with the previous year. The apparatus exhibits were few, but they included some interesting examples of the ingenious application of mechanical skill to facilitate the growing capabilities of dry-plate work.

Mr. JOHN BRILLER moved, and Mr. WILLIAM ENGLAND seconded, the adoption of the report.

Mr. T. HANFELS remarked that there had been a falling off in the number of the exhibitors and of members. The report did not give the opinion of the Council as to the effect of the abolition of donations of medals for the best work on view at the exhibitions. He had expected some reference as to what the Council would do in this matter in the future.

The President replied that at that moment the Society had no Council, as decided by the new rules, and the old Council could not say what the new Council might do.

Mr. HANFELS added that it might nevertheless give the new Council the benefit of its experience.

Mr. WILLIAM BEDFORD thought that that general meeting of the members might express an opinion for the guidance of the new Council. He hoped that in future non-members would not have to pay for wall space at the exhibitions, which should be free and open. He welcomed the increasing number of photographic exhibitions on a commercial basis, but the Photographic Society should be in a position to hold itself superior to such considerations.

Mr. BIRD said that the main question was one for the members rather than for any Council to decide.

The President stated that several members of the Council, who had voted for the abolition of medals, had expressed to him their disappointment at the result. The report was then adopted unanimously.

Mr. BIRD, Hon. Treasurer, then read the Treasurer's Report, which stated that despite a falling off in 1888 of over 50% in the value of subscriptions, and a diminution of nearly 24% in the receipts by admission to the exhibition, the capital of the Society has increased by 138*l.* 12*s.* 6*d.*, by far and away the largest on record, the balance in favour of the Society being now 665*l.* 12*s.* 11*d.* The total expenditure of 1887 amounted to 786*l.* 11*s.* 6*d.*, and that of 1888 to 73*l.* 11*s.* 9*d.* less. Of this diminution the exhibition cost less by about 50*l.*, and the difference was saved on smaller items. 150*l.* will be added to the Society's investment in Consols. The account of receipts and disbursements given results not entirely satisfactory, in consequence of the diminution on account of entrance fees and subscriptions, and a smaller yield by admissions to the exhibition. The latter item is subject to fluctuations from various causes; but diminishing number of members, commencing in 1887 and continued in 1888, can only be regarded as a sign of weakness. The great development these two years of photographic societies and clubs, both in London and the provinces, has perhaps something to do with the fact, but if as it only teaches the lesson that the Parent Society must be true to its history and strive to keep the lead in all matters of photographic science and art.

Mr. H. M. SMITH asked if the Society could not affiliate provincial societies; many would be glad to join.

The President replied that he had been urging that plan for some little time. No doubt the question would come before the new Council.

Mr. T. SEBASTIAN DAVIS moved the adoption of the report, and thought that the suggestion of their Yorkshire member should be considered by the new Council. The Society was in a flourishing condition, with more than 900*l.* in hand, which would be 2*l.* per member if ever they had to divide.

Mr. W. K. DENKHAM seconded the adoption of the report.

Mr. J. W. SWAN, M.A., then read a paper on *Hydroquinone as a Developing Agent*. [We shall not spoil the completeness of Mr. Swan's paper by giving a synopsis of it, especially as it will appear next week with the author's annotations.]

At the suggestion of Mr. COWAN it was agreed that the negatives should be examined and considered at the next technical meeting of the Society.

Mr. A. MACKIN asked why the samples of hydroquinone exhibited differed so in tint and appearance.

Mr. SWAN replied that they were commercial samples, and he could not answer the question.

Mr. WELLINGTON would like to see prints from the negatives; he thought that some of the worse-looking ones might just last.

On the motion of Mr. FRANK GREENE the discussion was adjourned.

THE first annual dinner of this Society took place in the Café Royal, on Monday evening, which was also that of the monthly dinner of the Solar Club, with which it was amalgamated for the occasion. Although there was a fair attendance (seventy-eight gentlemen and six ladies), many old and leading members of the Society were "conspicuous by absence." Mr. Glaisher, F.R.S., as representing the Society, presided, the vice-chair being occupied by Mr. John Procter of the Solar Club. Following the example of some of the provincial societies, the menu card was illuminated by a portrait of the President.

After the loyal toasts came that of the "Photographic Society of Great Britain," proposed by the President.

Having alluded to the new rules that had been drawn up recently for their guidance, he said this may be considered the jubilee year of the photographic art, as fifty years had elapsed since Daguerre's time. Their own Society had been in existence for thirty-six years, and he was sorry to say they had been without a home all that time. It would be exceedingly desirable that they should have such a home, and he hoped that all photographers would unite and have one in common.

In proposing the toast of "Kindred Associations," the President said that this Society had all along held out its hands to them; whether those at home or abroad they had their very best wishes. He would like to see them all connected with this Association by way of affiliation or otherwise.

Messrs. G. DAVISON, FRANK GREENE, and L. WÄRNERKE, responded, the last speaking of the value that would accrue from the establishing of a photographic college.

Messrs. J. TRAILL TAYLOR and C. W. HASTINGS responded to the toast of "The Press."

In giving the toast, "Their President," Mr. J. R. DALLMEYER said that all felt and appreciated Mr. Glaisher's untiring energy and devotion to their interests, and considered him as the backbone to the Society, and hoped he would be spared to them many years.

Mr. GLAISHER made suitable acknowledgment of the toast.

The toast of "The Ladies" was given in a humorous manner by Mr. COWAN, jun., and responded to by Mr. W. S. BIRD.

There were the usual sprinkling of songs, recitations, &c.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

On Thursday night, last week, at the ordinary weekly meeting of the above Association, held at the Masons' Hall Tavern, City, London, Mr. P. Everett presided.

Mr. C. H. COOKE wished to know how to make the best transparencies for enlargement by means of the camera; he found those on paper to be generally hard or else of a bad colour; he thought a slow bromide plate to give as good a result as obtainable by the carbon process.

Mr. W. E. DENKHAM said that as carbon tissue when wetted expanded in one direction more than in another, distortion was introduced; he thought that the best transparencies he had ever made were by printing out on chloro-chloride in gelatine.

Mr. A. HADDOX stated that if he wished to enlarge from a 10×8 or 10×12 negative the use of a condenser would be out of the question; what would then be the best method of procedure?

Mr. DENKHAM believed the placing of several gas jets behind two sheets of ground glass; the coarsest sheet of ground glass should be near the lights and the finest sheet near the picture.

Mr. J. TRAILL TAYLOR thought that the best plan. Three gas flames would be sufficient.

Mr. A. COWAN had found very even illumination to be given by lighting up the surface of a sheet of card; the waste of light thereby was not seriously expensive.

Mr. HERBERT STARNES remarked that a friend had asked him whether he could rig up a water condenser by means of a flat sheet of glass on one side and the glass cover of a clock face on the other side, cemented together at the edges and filled with distilled water.

Mr. TAYLOR replied that clock glasses were of a lunette form, and rarely segments of a sphere, and that the more salts the water contained the better, to shorten the focus.

Mr. DENKHAM said that salts of mercury in solution in the water would be good.

Mr. J. B. R. WELLINGTON had made as good enlargements from collodion-bromide as from carbon transparencies, and could work by gaslight.

Mr. W. BEDFORD said that with carbon almost perfect contact with the negative was obtained, and that in enlarging diffused light was necessary because of the defects in the glass.

Mr. DENKHAM asked why specially prepared collodion-bromide films on paper should not be used.

Mr. COWAN said that the collodion-bromide film was excessively tender and required care in manipulation.

Mr. WELLINGTON responded that a little practice overcame that difficulty.

Mr. COOKE had found collodion-bromide plates to harden with a day's keeping; they should always be prepared a day in advance, otherwise scratches are almost sure to be produced in working them.

Mr. HADDOX questioned whether warming the fresh plates would not give the same result.

Mr. COWAN thought that carbon tissue for the purpose should be prepared on plate glass covered with a film of collodion to obtain a true surface.

Mr. TAYLOR said that a better plan than using fluid condensers was to get a sheet of glass nicely bent and silver it, then use it as a reflector. Some years ago he made large burning mirrors by grinding the upper edge of an iron vessel like a saucer quite flat, rubbed Canada balsam over the rim, placed the glass over it and exhausted the air. Amongst other means to effect a vacuum, he put a little lighted paper in the saucerpan then quickly put a sheet of glass over all as a cover; as the heated air inside cooled a partial vacuum was produced, and at the end of the operation the glass was beautifully curved. The piece of glass had been previously silvered.

Mr. HADDON stated that that plan had once been suggested for the manufacture of astronomical mirrors; he did not know whether they would then be sufficiently true.

Mr. STANNIS remarked that when transparencies required "dodging" the collodio-chloride printing out process was good; it gave a fine range of tone, and the operator could see what he was doing. The plates could be prepared by means of a mixture of calcium chloride, collodion, and silver nitrate, and then dried at the fire. The presence of no organic salt is necessary. In dull light the nitrate of calcium formed in the film may have time enough to get clumped and stick to the negative; the process is one for fine weather.

Mr. DEBENHAM thought that chloride of strontium should be substituted for chloride of calcium in making the emulsion.

Mr. TAYLOR remarked that there was a theoretical, although perhaps not a practical, objection to the carbon film for enlarging; different parts of the picture varied in thickness, causing refraction at the edges of high lights.

Mr. HADDON added that, therefore, the film itself acted as a lens.

Mr. DEBENHAM said that when the light was powerful it was not a bad plan to put ground glass in front of the condenser.

Mr. F. A. BRIDGE said that sometimes ground glass was placed between the lenses of a condenser, and it was said that that plan would enable good work to be done with a bad condenser.

Mr. DEBENHAM remarked that in reproduction operations the faults of the original were reproduced and fresh ones added. Some faults, however, could be removed by enlarging; for instance, in those cases in which the negative was too intense or not intense enough.

Mr. BRIDGE had found that negatives for enlarging should be rather thin and full of detail, then the light should be modified to suit the negative. With a slow bromide paper it is more difficult to get a good result with a dense negative, and increasing the exposure will not get over the difficulty.

Mr. HADDON said that negatives for enlarging could hardly be too thin.

Mr. HADDON stated that more than twenty years ago direct enlarging was done upon common albumenised paper by means of Van Monckhoven's apparatus.

Mr. STANNIS questioned whether in the action of light upon photographic salts some inertia had not to be overcome and that a certain power of light was necessary to initiate action.

Mr. HADDON thought all developers to be imperfect, and that those imperfections had to be compensated by increased exposure.

Mr. DEBENHAM did not agree with those who said that as bright a picture could not be obtained with a smaller stop and longer exposure; a weak light acting for a long time would give the same result as a strong light acting for a short time, all other conditions being the same.

Mr. BRIDGE did not think so; he had not found it to be so in enlarging.

Mr. DEBENHAM also did not believe that there was any advantage in printing a weak negative in the shade instead of in direct sunlight. On the same sheet of paper and with a thin negative he had printed one image in sunlight in one and a half minutes; another image he had printed indoors, in deep shade, in one and a half days; and a third image in two and a half days; the results were so much alike that most people could not tell which was which. A strong light means also heat, and when the paper gets hot there is a tendency to yield weaker print.

Mr. COOK had a yellowed print which required copying. Would an orthochromatic plate be best for the purpose?

Mr. DEBENHAM replied that it would, and that a yellow screen should be used. The latter was apt to interfere with sharpness.

Mr. WELLINGTON had not found patent plate covered with a stained film to interfere with sharpness.

Mr. TAYLOR said that Mr. Beck, after his lecture before the Society of Arts, had suggested the use of a yellow glass cover to the lens cemented in optical contact therewith.

Mr. HADDON stated that a newspaper report now before them of the inquest on Mr. Bewley, at Dublin, did not seem to throw much light on the cause of the explosion itself. The bottles may have been of mild steel; they were tested up to two thousand pounds per square inch, and the pressure of the gases in them was from seven hundred and thirty to eight hundred pounds per square inch. One bottle had hydrogen in it, and they then compressed some oxygen into it, although the bottles were distinctly marked. Mr. Haddon, after giving a synopsis of the published report of the inquest, added that the velocity with which compressed gases come out of such iron bottles is so great that it prevents flame passing backwards into the bottles; this had been proved by experiment. Perhaps when turning the tap to diminish the rush there may have been a back flow, as with the ordinary Bunsen's burner when it is turned too low. If once flame found its way inside the cylinder the pressure of the gases there would not prevent an explosion; in ordinary gas engines, for example, the gases are always fired under pressure.

Mr. HADDON considered it to be almost an insult to scientific men to make, as a witness had done, the suggestion that it should be made penal to try experiments with the mixed gases.

The CHAIRMAN was of the same opinion; the bottles in the instance before them had both been tested and marked with distinctive colours, so two of the conditions prescribed had been complied with.

Mr. DEBENHAM was of the same opinion as the two preceding speakers.

Mr. TAYLOR said that one of his correspondents in Dublin arrived at the conclusion that Mr. Bewley knowing of the two gases being mixed in the bottle, proceeded to let them escape, forgetting that there was a light in the room, and the question was whether the ignition would extend into the remainder of the gases under pressure. Once Professor Piazzi Smyth had an explosion with the mixed gases, after which he (Mr. Taylor) tried experiments and found that the gases could be exploded through the grain of wood, also through a piece of tube several inches in length filled with the very small leaden shot known as "snipe dust;" through "Hemming's safety jet" the ignition would pass with the utmost ease.

Mr. J. J. BRUGESHAU said that once there was a small scratch in the slide of his gas engine, through which at last flame found its way; there was then a violent explosion, and the place filled with suffocating smoke.

Mr. TAYLOR described how, by means of a miniature gas bag attached to spiral springs, he had provided the means for sucking back the mixed gases while burning, so as to cause an explosion under desired conditions.

Mr. HADDON remarked that, as well as he remembered, an explosion travelled in mixed hydrogen and oxygen gases at a speed of one thousand eight hundred feet per second.

Mr. TAYLOR suggested that the meeting might pass a resolution to the effect that the two gases as now supplied commercially to the public in iron bottles are perfectly safe to use.

The HON. SECRETARY was of the same opinion, but that the bottles were not sufficiently distinctively marked; all the oxygen bottles ought to be painted one bright colour all over, and all the hydrogen bottles another bright colour all over. He had heard that not alone was this done in America, but the rooms in which the compressing was done at the works were painted all over of the same distinctive colour as the particular bottles to be filled therein so that if a bottle found its way into the wrong room the mistake was palpable at once.

Mr. W. H. HARRISON said that a mixture of oxygen and hydrogen could not be exploded all at once; the heat brought the force of dissociation into play, and some uncombined gases escaped.

Mr. HADDON, in the course of a short discussion on explosive mixtures which followed, said that once a man was pouring a few grains of fulminating silver from a bottle into his hand, and the resulting explosion blew the bones of his hand through the wood of the table.

Mr. TAYLOR spoke of the explosive properties of iodide of nitrogen, and observed that in the removal of photographic stains they should not be removed from the fingers by means of ammonia and iodine, the photographer was at no great distance from danger. Chloride of nitrogen was more dangerous still; he had seen a minute drop of it explode and indent an anvil. Some of these explosives were so violent that it was almost dangerous to utter their names, even in a whisper.

Mr. A. COWAN asked what was the best rule to adopt to photograph two heads to match each other as companion pictures, the one being that of a man with a bald head and great beard, the other that of a woman with an immense chignon towering high above her head. If they were done actual life size they would not look like pairs; the woman would look twice as big as the man in the finished picture, and the latter would look ridiculously small by comparison.

Mr. BRIDGE went by no measurements in such cases. He projected the two images side by side upon a screen, until their relative dimensions were such as to please him. He then exhibited to the meeting some heads enlarged to greater than life size, which he had taken upon Marion's bromide paper by means of the limelight, and a condenser with twenty-five seconds' exposure. He used the ferrous oxalate developer. The weather at this time of year was so bad, he said, that he often took portraits as well as made enlargements by the aid of the limelight.

WEST LONDON PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held at the Addison Hall on Friday, the 8th instant, the President in the chair, when Mr. J. D. ENGLAND read a paper upon *Flash Light Photography*.

The lecturer said that although he purposed giving them a demonstration on taking portraits by flash light they must not be led to suppose that he was *au fait* in portraiture, and that his experiments were principally confined to testing plates. He had, however, recently made many trials with the various flash lights, and believed there was a large field open to amateurs and professionals and a new source of pleasure to the lovers of photography generally. Two years ago Dr. Piffard, of New York, first announced the result of his experiments in this direction. He succeeded in taking instantaneous photographs by means of a mixture of magnesium powder and guncotton, and since that time, thanks to the improvements in the necessary apparatus, instantaneous portraiture had become possible under what would a few years ago have been deemed impossible conditions. The use of flash light photography had been invaluable in aiding scientific research. Julius Sach had obtained photographs showing the successive stages of the development of the buds and flowers of a certain cactus. In the studio it had also been of service to the photographer, for portraits were constantly taken evidencing the fact that good work could be done by its aid. The light might be obtained, firstly, as introduced by Dr. Piffard, by means of exploding a mixture of guncotton and magnesium; gunpowder might be substituted for the guncotton, but was not quite so effective; and, secondly, by using several expensive mixtures containing powdered magnesium as one of their constituents. These preparations, however, were of a dangerous nature, and the experimentalist should exercise caution in using them; and, further, where sulphide of antimony is used the fumes given off by combustion were very dangerous. With some samples of magnesium the lecturer was unable to obtain a flash; this occurred when old powder was used. The standard flash light as generally used was procured by throwing magnesium powder through a flame. The important feature of the production of the light was the size of the particles of powder, which ought to be as fine as possible, to insure perfect and sudden combustion. Sufficient attention was not generally paid to this point. Oxygen might be thrown through the tube instead of atmospheric air, but the advantage in doing so was not great. The quantity of powder necessary would vary, but five to ten grains was sufficient, with a rapid lens and a rapid plate, to produce a fully exposed negative. In portraiture the light should be placed high, to the right or left of the camera, at a distance of five or six feet from the sitter. The plate and lens should work as rapidly as possible, so that a small quantity of magnesium might be used, thereby shortening the exposure and not allowing time for the sitter to move the eyes. A great many articles on the subject stated

that the gas should be turned down before the exposure was made; this the lecturer thought to be a great mistake, and tended to produce a startled expression. A reflector or white screen should be suspended about two or three feet from the sitter on the shadow side, and if the sitter be placed four or five feet from the background a sharp shadow will be avoided. A good background might be improvised by suspending a woollen blanket, while a linen sheet would make a good reflector. If what he had said that evening resulted in inducing others to take up an extremely interesting department of photography which he had brought before their notice he should feel amply repaid for any little trouble he might have incurred.

At the conclusion of the lecture, which had been illustrated by many beautiful experiments, Mr. England exhibited a variety of flash lamps by James, Hinton & Co., C. C. Veyers, and Horne & Thornthwaite.

Mr. J. A. HODGKINS said, as the information might be useful to members, he would ask Mr. England which he considered the best form of lamp to use.

Mr. ENGLAND said there were many forms equally satisfactory, but, personally, he used Hinton's, which produced a large luminous flame.

Mr. HARGREAVES wished to know whether the fumes of burning magnesium were injurious to picture frames and similar articles.

Mr. ENGLAND thought no injury need be apprehended; any deposit could easily be removed with a light dusting brush.

Mr. F. W. HART then proceeded to give a description of his lamp and demonstrated its action.

The PRESIDENT then informed the meeting that Mr. Bonnetto had been unable to complete his promised paper in time for that evening; he had, however, very great pleasure in introducing to them a gentleman whose name was a household word among photographers—Mr. Warnerke, who was now on a visit to this country.

Mr. L. WARNERKE (who was received with enthusiasm) said when he received their President's request to make some communication to the new Society he had only just returned from Russia, and, consequently, he had not had leisure to prepare an elaborate paper for the occasion. However, he had brought with him a flash lamp which he had used many times on his journey, not knowing that the subject for discussion that evening was to be *Flash Light Photography*. The lamp was devised by a Russian gentleman (M. Gratcheff), and although it was not so elaborate in design as some which he had been shown, it was capable of doing good practical work. Its remarkable feature was its extreme portability. As they saw, it could conveniently be carried in the pocket. In shape it was like a small metal pill box about two inches in diameter, a small elbow tube passed through the side, to one end of which was attached a tube with pneumatic ball, the upright portion of the tube received the magnesium; the box was then filled with asbestos, and a disc of wire gauze completed the apparatus. Although the principle of this lamp was the same as many others, it had some special points; the quantity of magnesium required was extremely small—as much as would lie on the end of the nib of a pen was sufficient for ordinary purposes. This was a great advantage when using the lamp in a small apartment. Many lamps, on account of the quantity of smoke they produced, were very objectionable. Two lamps judiciously placed would be found to give the best results and would prevent heavy shadows. (Mr. Warnerke then, by means of a detective camera and two of his lamps, took a portrait of the President and the two Secretaries.) The speaker then exhibited another form of lamp with which a succession of flashes could be obtained without recharging. He said this lamp would prove very useful in photographing dark interiors and similar subjects where one flash would not give sufficient exposure.

The PRESIDENT inquired whether the flash light had been used for portraiture in Russia.

Mr. WARNERKE said it had already been used for that purpose. He considered that it would be an immense boon to the amateur, who had not often the means of properly lighting portraits and groups. He thought amateurs ought to derive greater pleasure from taking portraits of their friends, as in the future such photographs would prove to be of far greater interest as reminiscences than any landscape photograph. Mr. England had said that it was better to leave the ordinary light burning in order to avoid startling the sitter by the flash, but a little judgment on the part of the operator would avoid that. He had seen a theatrical group of about one hundred persons taken successfully on a 12 x 10 plate; the lighting was quite natural. Such an exposure could not have been made by daylight. Flash light preparations containing chlorate of potash were very objectionable and dangerous. When his firm were exhibiting at the late Exhibition at St. Petersburg a serious accident happened to one of his assistants, who, when operating with the powder, incautiously left the lid of the jar containing the mixture open, and the result was a serious explosion.

The PRESIDENT said it would probably be conceded that flash light photography was a most important subject, and one which deserved the attention of both amateurs and professionals, and he was gratified to see such a large attendance of members; he could say, without exaggeration, that the present was the most important meeting upon the subject which he had yet attended.

Mr. Hodge then exhibited a new form of lamp just introduced by Sands & Hunter, the design and workmanship of which were much admired.

On Friday, the 22nd instant, Mr. T. Stafford Hazen will read a paper on *The Autotype Process*. Visitors are invited.

CAMERA CLUB.

On Thursday Mr. J. E. Austin read a paper on *Enlarging*. Mr. E. Ferrero occupied the chair.

The lecturer illustrated his remarks by reference to large diagrams showing the operations with the solar camera, and daylight enlarging to the sky and to reflectors. Mr. Austin held that mirrors were greatly to be preferred to opal and white paper reflectors. He further exhibited a series of direct enlargements on Alpha paper enlarged from whole plates up to 30 x 24.

In the discussion which followed several members took part.

A detective camera sent by Messrs. Hinton & Co. was exhibited, also some enlargements sent by Messrs. Fry & Co.

The subject on Thursday, February 21, will be *Films*, when communications on the subject from Messrs. Tolley, G. Mansfield, H. H. O'Farrell, and Captain Barnes, will be read or given at the meeting.

LEWES PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held at the Glee Room, Cliffe, on the 5th instant. The President occupied the chair.

The evening was devoted to a discussion on *The Making of Lantern Slides*, and some good slides by the President, and Messrs. Foxall, Conder, and Morris, were exhibited.

The President also showed some commercial slides for comparison with those of the members, and it was the general opinion that those of the members were equal to the others.

In the discussion on the developer the merits of both pyro and hydroquinone were put forward, but the latter seemed to find favour with most of the members.

On March 5 Mr. Foxall will read a paper on *Carbon Printing*, with demonstrations.

DEVON AND CORNWALL CAMERA CLUB.

A MEETING of this Club was held on the 6th instant,—Mr. R. Murray in the chair.

Mr. A. A. CANNELL gave a demonstration, *Contact Printing on Bromide Paper*.

He informed his audience that, as they were all aware, during the winter months great difficulty was experienced in printing on ordinary sensitised albumenised paper. The variations in daylight were such that on dark days the negative might sometimes be left in contact with the paper for considerable periods of time, with the frequent results of curious stains and markings, ruining the negative as well as the silver print. He intended, therefore, showing them a simple, easy, and cheap way of overcoming this difficulty by using bromide paper. Of this there were several varieties, and he had heard good accounts of, among others, those prepared by Eastman, Morgan & Kidd, Hunt & Thornton, Fry, &c. But he especially intended to bring to their notice two papers prepared by the Ilford Company. These were Alpha and Ilford slow bromide. He produced two negatives; one dense, the other thin but full of detail, and he purposed making two prints from each negative on both Alpha and Ilford bromide; developing one set with ferrous oxalate, and the other with hydroquinone and caustic potash. He had only tried the latter developer for the first time a few days back, but he already much preferred it to any other. The gas having been turned down, the lecturer proceeded to give exposures, varying from four seconds for the slow bromide paper under the thin negative, to thirty-five seconds for Alpha under the dense one. These were successfully developed, the general opinion being in favour of hydroquinone. In reply to questions, the lecturer stated that he thought printing on bromide paper during the winter months quite as cheap as by the ordinary way on silver paper, taking into account the damaged negatives and spoilt prints occasioned by the latter process. With the Alpha paper, which he strongly recommended, one could get any colour, from dull olive green through pink to black, by varying the exposure and toning, which latter could be done at leisure after development. The hydroquinone could be used five or six times, and thus an entire batch of prints could be developed in the same solution; he therefore considered it cheaper than any other developer.

Some conversation took place as to the possibility of making experiments with the magnesium flash light, and it was eventually decided to hold a meeting for that purpose on the 29th instant; a committee being appointed to make the necessary arrangements, provide draped models, &c.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

THE usual fortnightly meeting of the above Society was held in the Institute Bealey, on Friday, February 8. The President, Mr. Pringle, in the chair.

Messrs. Clare and Denipsey were elected members of the Society.

Mr. Hawkins exhibited some photographs taken with a hand camera.

Mr. Reeves showed negative and prints.

Mr. Pringle showed some specimens of a new variety of collotype printing. They were characterised by extreme sharpness and delicacy of detail.

Prints to the club album were contributed by Messrs. Pringle, Hawkins, and Jones.

Mr. PRINGLE then continued his address on *Practical Photography*, this time referring to various printing processes. In the course of his address he compared the relative merits of platinum and bromide printing, and maintained that as good results could be obtained with the latter as with the former. Not only this, but bromide had one great advantage over platinum, inasmuch that weak negatives properly managed would give good prints, an impossibility with platinum.

The next meeting, on the 22nd instant, will be a lantern evening.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on February 6,—Mr. President Andrews in the chair.

The most important business for consideration was the question of the formation of a lantern section, and Messrs. Sturmer, Ambrose, and Dew (Secretary), were elected a sub-committee to take charge of the lantern work of the Society. With a view to putting the section on a working basis, and increasing the interest taken in this branch of photographic work, it was

decided that at the next meeting an exhibition of slides by the members should be held, to which friends should be invited.

Mr. W. D. WILSON then read a paper on *The Lantern at Home*. He commenced by briefly recapitulating the manipulations necessary for the production of the slides, and, treating the subject in a humorous manner, went on to describe how the optical lantern could be made the means of giving amusement, pleasure, and instruction combined, at a family or other evening party, laying particular stress on the necessity of keeping the audience and spectators interested, which could be done by an adroit mixture of fact and fiction in the narrative. Slides illustrating "Child Life," "Scenes on a Farm," and other subjects treated in the paper, were shown on the screen.

Some slides by Messrs. Ambrose, Owen, and Dew, were then shown, a group of the officers of the Society for last year, by the last-named, being received with applause.

After discussing and answering the queries found in the question box, the meeting terminated.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of the Association was held in the Philosophical Society's rooms on the 7th inst., The President, Mr. William Lang, jun., F.R.S., in the chair.

The minutes of last meeting having been read and approved of, Messrs. W. A. Bryson, W. J. Finlayson, George S. Henry, William B. Smith, H. M. Breche, H. McDowall, and A. Bulloch were admitted as members of the Association.

THE PRESIDENT spoke of the loss the photographic world had sustained in the death of M. Buissonnas, of Geneva, whose instantaneous photographs of children attracted so much attention in the International Exhibition.

THE SECRETARY then read the report of the proceedings of the Society during last session. On the whole this was considered satisfactory. The roll showed an increased number of members, and the papers read had been of most interesting and varied character.

The Treasurer's report was also read.

It was decided to have the reports printed.

MR. LANG then read his paper entitled *Fifty Years' Photography, 1839-89*. This was illustrated by a series of lantern transparencies, among which were portraits of Porta, Niepce, Daguerre, Sir Humphrey Davy, Talbot, Mungo Ponton, and Sir John Herschel. The lecture was also illustrated by a number of old and rare books by Porta and others, which Mr. Lang exhibited. As the paper proved to be of considerable length the second portion of it was held over till another meeting.

A series of lantern transparencies were shown on the screen, and a number of specimens of Lichtdruck printing were also exhibited.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

REGULAR monthly lantern slide exhibition. The Committee on papers and publications send us the following report:—

The exhibition took place on Friday evening, January 25, at the rooms of the Society, 122, West Thirty-sixth street, and was largely attended, there being as usual a great many ladies. The first half of the exhibition included about sixty slides contributed to the American Interchange by the Philadelphia Amateur Photographers' Club, and represented the work of twelve different members. The work of this Club is much superior to that formerly exhibited. A brief intermission followed, then about fifty slides made by members of our own Society were shown. They represented various subjects, in style of views near and in New York.

The lantern slide Committee has under contemplation the collection of a special set of slides illustrating *Interesting and Picturesque New York*, and asks the aid of members in furnishing slides.

Correspondence.

Our Correspondents should never write on both sides the paper.

SPOTS IN NEGATIVES.

To the Editor.

SIR,—I send you a negative which has been ruined, as far as I can tell, by magnesium powder. When I placed the negative in the fixing bath there were no spots or stains on it. Being at a loss to know what had occasioned them I examined the bath and discovered several specks in it, which I concluded must be magnesium; so looking to the vessel containing the hypo crystals, I saw that it had been lying uncovered close by where I had been working and experimenting with blow-through lamps; consequently, some of the unburnt powder had fallen on the surface of the hypo, and then been carried to the bath.

In subsequent research I found that about half a grain or less of magnesium powder in six or seven ounces of hypo solution after fixing leaves a thick muddy precipitate. Perhaps some of your readers will be able to throw some light on the subject.—I am, yours, &c., ALBERT URE.

Hope Park, Bonnybridge, N.B., February 6, 1889.

[The spots are owing to a reduction of the silver in the hypo bath, caused by the particles of magnesium.—Ed.]

RA. BRIGHTON PHOTOGRAPHIC SOCIETY.

To the Editor.

SIR,—I think some explanation is due to the professional photographers who, through my instrumentality, joined the Society in question. Some

time ago I conceived the idea that a photographic society or club was a Brighton necessity, and you, Mr. Editor, are aware of the steps I took towards this object. I called on many amateurs and professionals, and got promises of support from nearly all of them, when I afterwards found some one else attempting to form a society. I immediately called on him, and heard partly what had been done. I then threw in all my energy with them. I spent two days in canvassing. I informed each candidate that he would receive an invitation to the next meeting, which would take place on the 7th instant. Mr. W. H. Rean, the Secretary *pro tem.*, did not send those gentlemen notices, "as," he said, "they were not elected." Now my idea was that no regular society had existed previous to the meeting which took place on the 7th (see note enclosed on the form of application). Judge of my surprise, when attending the meeting on the 7th, to find that the rules had been drafted, and were to be discussed and finally disposed of at once. I proposed, and it was seconded by Dr. Dawson, "that these rules be submitted to all the members, at a meeting called for that purpose, for their approval." An amendment in opposition to mine was carried by a majority of eight to five out of a total of seventeen persons present.

I am supposed to be an original member, although I was not called to attend any meeting before the 7th. I presume I was invited out of courtesy, and I thank those gentlemen, whoever they may be, for the honour. I was told that the Brightonians were "critical;" no, let me give it the proper name—"cliquish." Per example, a well-known gentleman, who in one breath told me he was not the least proud, the next moment said he would not sit beside one of the gentlemen interested, as he was his inferior in intelligence. I took the trouble to look up the Medical Directory, and I find that the gentleman of "inferior intelligence" has one more qualification than the other. But the truth leaked out—one was a homoeopathic practitioner. I explained in vain that the Society was not a medical one. The intelligent individual was cornered when I asked him if he could or would get up a society where the subscription would be at from 2l. 2s. to 21l., as he objected to the annual subscription of 5s. and that beach photographers would be eligible. I draw the line at the beach. Oh! ye fellows of the Royal Society, why do you not come to Brighton to fill your ranks, where there are men of such broad and liberal views? I sincerely hope that, in spite of these extraordinary proceedings of the Society, it may be useful and successful in every way. I have promised, and will do my level best for it, although personally it will not help me much, as it is "Open Sesame" to me with all the professionals.—I am, yours, &c., A. L. HENDERSON.

Argyle Mansion, Brighton.

P.S.—Of course, when the rules of the Society are published, members can retire or have them altered. I asked if they provided for an emergency that might occur, viz., the leaving of the chair by the president, and the resignation of the council.

[The circular enclosed reads as follows:—"The Opening Meeting of the above Society will be held at 36, Vernon-terrace, on Thursday evening, February 14, at 8.30 o'clock.—Faithfully yours, W. H. Rean, Hon. Sec. (*pro tem.*) Agenda: Election of Officers, General Business."—Ed.]

VIENNA SCHOOL OF PHOTOGRAPHY.

To the Editor.

SIR,—Last year, during a visit to the principal photo-mechanical establishments of Germany and Austria, I spent a week at the Vienna School, and in answer to "G. A. Grove" in your issue of February 1, forward answers to the inquiries.—1. The school is open to ladies over eighteen years of age. 2. It will reopen in February. 3. Certain classes can be joined at any time. 4. The terms depend upon the classes the pupil attends.

I can give "G. A. Grove" every particular with regard to the classes, fees, &c., if communicated with direct.

I should also be pleased to communicate with "Mechanic" who wrote you last week.—I am, yours, &c., EDWIN C. MIDDLETON.

Stannmore-road, Birmingham.

PHOTOGRAPHING IN NORWAY.

To the Editor.

SIR,—Your correspondent "Aliquis" will find no difficulty whatever in sending on parcels of plates or anything else in Norway from place to place. I have travelled and photographed, during the past four years, over the greater part of the country, and never experienced the slightest difficulty in having parcels sent to any places where the steamers touch. In fact, I once left three dark slides in an hotel at Vik-i-Eidfjord, and they followed me all over the country, and I finally found them safe and sound here on my return home. "Aliquis" need only address his plates to himself at whatever hotel he intends calling at, and leave the parcel at the steamship office in Bergen or wherever else he may happen to be, and he will find it safe in the hotel-keeper's charge on his arrival. If he goes to Mr. Bennett, either in Bergen or Christiania, he will send anything anywhere to await his arrival. The charges for sending parcels by steamboat are ridiculously small. I sent a portmanteau, which I did not

wish to take with me across the country, all the way round from Bergen to Christiania for the insignificant sum of 5d.!

Almost all the hotel-keepers and the captains and stewards of the coasting and fjord steamers speak English, so on the main routes "Aliquis" will experience very little difficulty from not being acquainted with the language; but even in out-of-the-way places, where travellers seldom go, he will find that he will get on capitally with the natives if he takes with him a copy of *Bennett's Phrase Book*.

As one who has taken hundreds of negatives, both on plates and paper, in Norway, I would suggest to him that if he wants to photograph the country with ease, comfort, and rapidity, he should take with him an Eastman's roll-holder, and use the stripping film.—I am, yours, &c.,
St. Leonards-on-Sea. A. M. MacDONA.

To the Editor.

Sir,—In reply to "Aliquis" (*THE BRITISH JOURNAL OF PHOTOGRAPHY*, page 95, February 8, 1889), little encouragement can be given to any idea of sending on plates in advance with practical advantage in Norway. In illustration whereof the following anecdote sets forth alike the honesty of the Norwegians and their want of organization. A traveller sent his luggage by sea, say from Molde to Christiania, whilst he travelled overland. Six months passed away and he saw nothing of the luggage; but on sending a friend to investigate, the luggage was found still on the deck of the steamer on which it had been placed at Molde, where it had remained, travelling up and down the coast, as safe as possible but undelivered.—I am, yours, &c.,
February 8, 1889. G. A. K.

TWO WAYS OF DOING BUSINESS.

To the Editor.

Sir,—Some time ago an amateur brought me a pretty little quarter-plate camera of the pocket type and asked me if I would examine it, as do what he would he could not get a picture with it, good, bad, or indifferent. I tested it and found that a negative could only be secured by removing the instantaneous shutter with which it was fitted, and giving an exposure of two or three seconds. I advised the amateur to return it to the makers for examination and report, as the fault seemed to be with the lens. This he did, and shortly afterwards received a note from the firm stating that the camera was all right, and that he need not trouble any one about it as they had sold it to a gentleman who was going abroad. I pity the purchaser! Contrast this with the following: Last summer I sent a quantity of residues to be reduced, and in due time received a cheque for an amount considerably less than I anticipated it would be, but thinking it was owing to the depreciation in the value of silver, and having confidence in the firm, I duly acknowledged the receipt of the cheque and then the matter ended, as I thought. Early this year I received a note from the firm stating they had discovered an error in my account, enclosing a corrected one with a further cheque of over three pounds as due to me. No comment is needed.—I am, yours, &c., W.

SORTING LANTERN SLIDES.

To the Editor.

Sir,—Having read Mr. York's letter on the above subject, I should like to say a word in reply. Even since I commenced to make slides I have used a red-surface paper for binding; on each mask I have placed two spots, and on each spot an initial with indiarubber-faced type, consequently they have been sorted instantaneously. There are an immense number of tints to be procured; they are easily gummed in the sheet, ruled, and cut to size afterwards. Supposing two persons happened to have the same tint, the initials would rarely be the same. By Mr. York's plan the face of each slide must be examined, i.e., if the black binding continues in general use. If the number could be placed securely on the edge, in my opinion it would be far more convenient to sorters. I am glad to see several members of the Photographic Club have adopted the coloured binding, and have found the benefit of it when the show is over and they want to catch a certain train.—I am, yours, &c.,
Colebrook, North Finchley, N. LEWIS MEDLAND.

THE PHOTOGRAPHIC CONVENTION.—A DEALERS' SECTION.

To the Editor.

Sir,—May I suggest for the consideration of the Convention Council the advisability of forming a dealers' section, and allowing them an opportunity of discussing photography from their point of view upon one or more occasions during the meeting in London in the forthcoming summer? There are many matters of importance to the trade which require careful and united consideration, and where can a better opportunity present itself than at the Photographic Convention of the United Kingdom?—I am, yours, &c.,
20, John William-street, Huddersfield. HERBERT M. SMITH.

COMPRESSED GAS IN CYLINDERS.

To the Editor.

Sir,—My remarks on this subject, written last week end and posted on Monday morning, were, as stated, based upon the information which had appeared in the newspapers. But this morning (Wednesday) I have seen (for a few minutes only) a report of the official inquiry into the "Dublin explosion," wherein it is stated, as a fact beyond doubt, that the explosion was not due to excessive pressure, but to the use of mixed gases in one cylinder (mixed with a full knowledge and intention by Mr. Bewley himself).

I also read in the report a statement to the effect that the Brin Oxygen Company supply oxygen in black cylinders and hydrogen in red cylinders; but this is not an absolute rule, for personally I have had a dozen black cylinders containing hydrogen for one red, and I maintain that where there is no absolute rule there is liability to mistakes.

I also read in the same report the suggestion which I made advocated by one of the professors engaged in the inquiry, i.e., to make the screw necks of the oxygen and hydrogen cylinders of a different size.

However, a full report of the inquiry has doubtless reached the office of this JOURNAL, and will be published in the next issue. But, as already stated, my article was written before I had seen the report.—I am, yours, &c.,
W. J. CHADWICK.

February 13, 1889.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange silver watch, "Boston lever," for 5x4 rapid rectilinear.—Address, ROBINSON, Photographer, Abertillery, Mon.

Will exchange C.D.V. by Janin for good half-plate landscape camera.—Address, C. E. BRIDGES, 594, Harrow-road, London, W.

Wanted, half-plate camera, one or more double slides, tripod, with or without lens; exchange, silver lever hunter, cost 6l.—Address, S. TAYLOR, 140, Battersea Park, Battersea Park.

Dallmeyer's quick-acting stereoscopic doublet, special, for views and portraits; wanted, whole-plate wide-angle rectilinear, by name or Ross. Difference adjusted.—Address, WATSON, Oakland-road, Hanwell, W.

Will exchange good cabinet burnisher, by Veyers, for whole-plate doublet standard slide and carrier, or whole-plate and half-plate ditto. Must be sound and light.—Address, BOWEN, Photographer, St. Germans, Cornwall.

A 12x12 Dallmeyer studio camera, vertical and horizontal swing back, Spanish mahogany, endless screw, &c., will be exchanged for rapid rectilinear of six inches focus, any make.—Address, R. H. HUGHES, 3, Boley-hill, Rochester.

Will exchange 12x10 folding camera, three holders (single), and Dallmeyer's rapid rectilinear lens (together or separate), for backgrounds, accessories, or optical lantern and burnisher.—Address, HENRY BROTHERS, The Spot, Derby.

For exchange, James's triple flash lamp, Marinn's embossing press for cabinets and cards, four dies, cushion, and oval, two backgrounds (one interior, one exterior), Cowan's changing box for 10x12 plates and under, two large glass dipping baths; wanted, tricycle by good maker.—Address, THOMAS WERN, Prospect, Swindon, Wilt.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

T. B. HICKS.—Thanks.

W. A.—Box of negatives received. Thanks.

WRIGHTS.—Your weights will do well enough.

URANIUM.—A personal interview would be necessary.

VICTOR.—We do not know, but inquiry will be made.

ROBERT STEWART.—Hart's lamp will answer the purpose.

EAGLE.—The articles will probably be reproduced in book form.

J. C.—Your picture is very good for a beginner, its chief fault is over exposure.

J. C.—You may use either of the developers on pages 625 and 629 of the ALMANAC.

R. V. D.—The silver stains cannot be removed without ensuring the destruction of the negative.

TEX ERY.—You will find a description and drawing of the shutter you mention in our volume for 1861.

- INK.**—See our *ALMANAC* for the present year, page 638, where you will find the particulars for making the ink for rubber stamps.
- A. A. A.**—Excellent photography, but totally wrong in the placing of the background. The horizon is two and a half feet lower than it ought to be.
- OMMA.**—Methylated spirit can be decolorised, but the excise laws will not allow it to be done. The methyl does not interfere in any way with the varnish.
- M. WILSON.**—Inks and varnishes suitable for photo-lithography may be obtained from Messrs. Hughes & Kimber, Fetter-lane, or from Winstone, Shoe-lane, E.C.
- ROSE** inquires how some red pictures she has seen on "porcelain" are made? They are made by the carbon process in the ordinary way, using a tissue containing a red pigment.
- O. N. M.**—Muffle-furnaces, suitable for burning-in enamels, are supplied by Messrs. Boulton & Co., Lambeth. Messrs. Fletcher & Co., Warrington, also supply them. The latter firm has a form to be heated by gas, which is very convenient.
- A. M. M.**—The crystalline marks on the negative are due to hyposulphite of soda, which, from insufficient washing, has been allowed to remain in the film. No articles have been written on this subject, but the same story has often been told in this column.
- PERFUMED** cannot get his gelatine plates dried free from dust, and asks for a cheap means of drying them in a box into which the air can be filtered.—One method of effecting this is to set the plates in a box of which two of the sides are composed of a cotton fabric.
- JACOBS** asks if when we undertake the registration of photographs we necessarily publish the fact, and if so, in what papers? also the cost?—Reply: By sending 1s. 6d. to our publishers any picture will be immediately registered, and notification thereof made in this column.
- BRITISH.**—In fitting your new studio, have two sets of blinds, both fitted on spring rollers, one at the top and the other at the bottom. In this way you will be able to secure any effect of light. The American photographs that you so much admire were taken in a studio fitted in this manner.
- A. WIGWAM** asks if there is any negative varnish that can be poured on the plate while it is cold without its chilling as it dries, and if so, how is it made?—Dammar varnish, that is, dammar resin dissolved in benzole, may be applied cold. From ten to fifteen grains of the resin in each ounce of the solvent is a good proportion.
- J. C. (York)** inquires how he can get ordinary water colours to adhere to albumen prints. He says that the surface of the paper repels the colour as if it were greasy.—If the surface of the picture is highly repellent, a little dilute oxgall washed over the picture will cause the colour to "take." Lacking the surface with the tongue is also a remedy.
- A. Z.** says: "On adding the iron solution to the oxalate of potash solution it at once becomes turbid and brown, instead of remaining clear, as I am told it should do." He asks the reason.—The reason is, probably, that too much iron is added for the quantity of oxalate present. The latter solution should be a saturated one. Either strengthen the oxalate solution or use a smaller proportion of iron solution.
- H. K.** writes, asking: "Will you please inform me whether, after making an application for a patent, one is deterred in selling the article from the date of such application or whether it is necessary to wait till the patent has been sealed?"—In reply: The sales may be commenced as soon as notification of acceptance of the provisional specification has been made, although, when convenient, it is better to defer this until the final specification has been lodged. The protection, however, commences with the date of the first application.
- A. V. Z.—1.** Equally as good and permanent results can be obtained with gelatino-chloride as with gelatino-bromide plates. It is merely a question of manipulation.—2. Try B. J. Edwards, The Grove, Hackney, E.—3. It is desirable that the camera should have an extension twice the focus of the lens, as this enables you to copy a picture its own size. Numerous advertisements of extra long focus are to be found in our *ALMANAC*.—4. We can give no estimate of the weight the camera ought to be; no two of ours are alike in this respect.
- G. BACKHAM** complains that, recently, when he took some prints out of the fixing bath and put them into water they suddenly became covered with small blisters. He wishes to know the cause, as he has never seen anything like it before. The paper employed was ready sensitised, double albumenised.—If our correspondent has never met with this experience before he is certainly very fortunate, as most workers are more or less familiar with it. The best way of avoiding the difficulty with paper which blisters is to have the fixing bath the same temperature as the washing water, and, instead of transferring the prints direct from the hypo into the water, to first immerse them in a weaker solution. Blisters, with some papers, are generally formed when the prints are suddenly transferred from a dense solution into plain water.
- MRS. WILSON** writes: "I have a toning trouble. I use ready-sensitised paper which prints nicely and tones well, but on immersion in the hypo the prints turn to the well known unpleasant brown and remain so. I have tried hypo of different strengths, and immersion of different lengths, with much the same results. Can you assist me?"—2. A shop window I have steamed so much when the gas is lighted as to render the goods almost invisible. Have you a remedy?"—In reply: 1. Probably the toning has not been carried to a sufficient extent. There are many sensitised papers which tone with great difficulty; one such sample on which we experimented lately was found, by the simple act of fuming with ammonia, to acquire very rich purple tones.—2. To prevent your shop window from steaming, try the effect of rubbing it over with glycerine and then very nearly wiping it all off. This is said to prove a remedy.

A WOULD-BE AMATEUR asks: "What is the cost of a complete set of photographic apparatus for taking pictures?"—A "complete set" may be had from one guinea to several hundreds of pounds. Without knowing the size of picture required, or the quality of apparatus desired, it is impossible to answer such a question as this. Our correspondent had better obtain catalogues from some of the houses whose advertisements appear in the columns devoted to the purpose.

NOTTINGHAM AMATEUR PHOTOGRAPHIC ASSOCIATION.—Last Monday evening a smoking concert was held. A large programme was gone through, and a most enjoyable evening spent.

ROYAL SCOTTISH ACADEMY.—On Monday, at a general meeting of the Royal Scottish Academy, held in Edinburgh, Mr. William B. Hale and Mr. Robert McGregor were elected academicians, in room of the late Mr. Robert Herdman and Mr. Norman Macbeth.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, February 20, will be on *Lantern Matters*. This is a lantern night instead of the 27th, which will be devoted to the exhibition of photographs by the members and the reading of a paper by Mr. W. Cobb.

PARIS UNIVERSAL EXHIBITION, 1889.—In response to an urgent appeal from Sir Frederick Leighton, the Chairman of the Committee, over 9000 have been subscribed for the Fine Arts Section, and it is hoped that this amount will be largely increased by private liberality. The Council of the British Section have also set aside from their general revenues a sum of 15000. for the Fine Arts, so that there is at present between 21000. and 25000. available.

LIMELIGHT EXPLOSION AT AN ENTERTAINMENT.—The other night, during the performance of the pantomime "Robinson Crusoe" by the members of the Chorley Amateur Dramatic Club, in the Town Hall, Chorley, Lancashire, the limelight apparatus exploded. The gas lights were extinguished, and a panic ensued among the audience, children screaming and great excitement prevailing. A rush was made for the doors, and it was a wonder no one was hurt, but Mr. H. N. Whittle and other officials promptly appeared on the stage and calmed the audience, and the performance was resumed. The only damage done was the smashing of several plate-glass windows.

THE ARCHBISHOP OF YORK ON RETOUCHING.—Speaking at the Sheffield School of Art *conversazione* on February 12, on "modern art," his Grace remarked.—In the shop windows, nowadays, one saw the portrait of an elderly statesman, who in reality had furrows on his face, which were the wounds of life's battle, the marks of victories won and conflicts gone through; but the photographer took out all the wrinkles, and touched up the negative, until at last the face was reduced to the condition of something boiled. He (the Archbishop) declined to part with the wrinkles—(hear, hear)—they were the character of the man; and he really thought there should be some protest against the misuse of this power of the photographer to retouch his pictures; but as long as there were mothers, and children, and wives, the protest would never be made, the wrinkles would still be objected to, and we should go on paying for what we vainly supposed must be real, because in a photograph, while there was not a square inch of truth in any part of it.

LIVERPOOL AMATEUR PHOTOGRAPHIC SOCIETY.—A highly successful move has been made by the members of the Liverpool Amateur Photographic Society in securing a local habitation of their own. A name they have already. The members are reasonably proud of the fact that theirs was the first strictly amateur photographic society established either at home or abroad. With advancing years the Liverpool Society apparently grows in health and vigour. Under its auspices was held last year probably the most successful all-round exhibition of photography yet witnessed. A very handsome surplus was derived therefrom, and the members of the Society feel now justified in establishing themselves in comfortable club quarters, instead of having merely, as heretofore, a place of meeting for one evening each month. In future the members will be able to fraternise daily, to consult their library and periodicals any afternoon or evening, and moreover to enjoy facilities for carrying out special photographic work such as have not previously been at their disposal. In their new club premises in St. George's-terrace North, they will be able to do their work of development, to change plates, to use the big club lantern, and to give demonstrations. In addition, the members, of course, will have the pleasure of more frequent social intercourse, implying a plentiful exchange of ideas, a comparing of notes, and a general strengthening of the bonds uniting the Society. The "comfortable quarters" in Colquitt-street, which some of the members are spoken of as leaving with regret, were only visited for a few hours once evening in each month, and the Society never in any sense had a home there such as it will in future possess. So popular, indeed, has the new move proved, that there has been a considerable increase in the Society's roll of membership, and the body promises to become more than ever qualified to maintain the reputation of Liverpool in the photographic world.—*Liverpool Daily Post*.

NOTICE.

ALTHOUGH we have given eight columns extra of text matter this week (forty columns in all), yet have we been compelled to leave over many interesting and valuable articles which we hope to overtake in our next.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1503. VOL. XXXVI.—FEBRUARY 22, 1889.

PYRO DEVELOPERS *VERSUS* GELATINE PLATES.

Those who have worked at photography continuously since Mr. Bennett first showed what potency for rapid work was the possession of gelatino-bromide—his negative of a lady pouring water from a jug is of historic interest—will have noted the gradual alteration which has taken place in the characteristics of the solutions recommended as the best for developing the plates of the period. In those early days, weak developers with little or no bromide were first introduced, to be superseded in turn by developers of considerable strength, and containing larger proportions of bromide, which again are gradually giving place to solutions of more economical character, from the paucity in the amount of pyro made use of. We believe that the platemakers themselves have not thoroughly taken their proper place in regard to *ex cathedra dicta* as to the best developer to use. Many plates have been issued with printed instructions for development, which, with the particular plate, were a complete farce to those who knew how to test them, and yet when suitably treated the negatives were not to be surpassed. A manufacturer ought to know, often does know, but not infrequently is ignorant of the best mode of treating the plates he makes. We make these preliminary remarks that our own observations may not be rejected untried on account of their opposition to some makers' own formulæ, though, unfortunately, the ridiculously intricate way in which these formulæ are put together renders any ready comparison of one with another entirely out of the question, until a number of compendious calculations have been made. We do not intend to let this particular absurdity retain its rampant absurdities without continual protest.

Taking now the strength of pyro, we find various proportions, running from about one to three grains per ounce, while the bromide present also varies considerably. The ammonia, most important of all, is recommended in proportions varying from about one minim to three per each grain of pyro, which mode of representing in a comparative manner the amount of this chemical present is the only correct one.

Now we unhesitatingly say that in a very large number of cases, if the stated amount of ammonia be employed, the best class of results will not be obtained; and, further, that if such quantities as recommended as a maximum be used, the plates in every respect—brilliance, rapidity, density—will be inferior to those treated with a smaller proportion of ammonia. Our present remarks, it is to be noted, bear only upon development with pyro and ammonia with sulphite; the fixed alkalies we do not now treat.

The true function and working qualities of ammonia in the developer are frequently not realised in practice, and as fre-

quently not understood. It was a long time before the majority of workers found that an important mode of obtaining extra density was to be found in increasing the proportion of ammonia used. Stronger pyro was, at an early date, recommended, and more bromide added to the developer was also said to confer additional density; but it was rare to find ammonia credited with this power. To this day large numbers of workers are ignorant of the part that ammonia plays in this connexion. Are we to account for this by the outrageous amount of ammonia some makers' formulæ contain, and the consequent working at a maximum itself erroneously great, preventing a due conception being obtained of the controlling power possessed by this alkali? Be this as it may, every photographer ought to be aware that greater variations in the density can be obtained by the addition of ammonia up to a certain point than by any other means.

This being thoroughly understood, we are about to make an observation that will be almost paradoxical. We call especial attention to the fact that with many modern plates the addition of ammonia beyond a certain proportion very largely interferes with the attainment of density, and, so far from assisting to force, as it is termed, an under-exposed plate, it has the very opposite effect when that limit is passed. The usual plan during development, when under-exposure is signified, is to add more and more ammonia, and this is quite right, as we say, up to a certain point; beyond that point it will produce not the anticipated effect, but an opposite one. We cannot, at the moment of writing, call to mind one single paper in which attention has been drawn to these two points—first, the over-stated maximum of ammonia to be permitted with many brands of plate; second, and most important, the greatly injurious effect as regards density and rapidity that an excess of ammonia will produce. Stress was laid upon this subject in a communication by a professional photographer of our acquaintance, who uses a very large number of plates in a year, and in the plates he sent us, and in others tried with the like object in view, the makers being among the foremost for quality and price, the effect of adding ammonia in preventing the attainment of density, in injuring the character of the image (apart from questions of fog), and, finally, the rapidity, was unequivocal and incontestable.

EXPOSING TRANSPARENCIES.

Much attention is devoted on all sides to camera exposures, that is to say, rather, to negative exposures, but comparatively little appears to be given to the exposure of transparencies, whether made by contact or in the camera. The

carelessness or apathy exhibited in this respect does not extend to other kinds of positives produced by development, such as bromide prints upon paper or opal—for the reason, probably, that any serious departure from the proper time of exposure makes itself clearly palpable at once, either in over-powerful contrasts, or in flatness and heaviness of results.

Now, with a transparency there is, so to say, no standard with which to compare the lights. A print upon paper or opal has the necessary standard in the colour of the support itself, and the eye naturally and instinctively ranges the gradations of the image alongside this standard. In the transparency, however, this standard is, if not entirely absent, at least replaced by another of a less reliable character, namely, the highest lights of the picture itself, from which all other values have to be taken.

Like a print on toned paper, a transparency may present to the eye, when examined alone, the most perfect gradation, and convey altogether a satisfactory impression, though its highest lights are represented by a veil of some density; but if such a print be compared with another from the same negative, in which the lights are represented by clear glass, the difference will be so marked, and so greatly in favour of the latter, that the beauty of the first will entirely disappear.

There are, of course, transparencies and transparencies, or rather there are different purposes to which the transparent positive can be put—as, for instance, for lantern slides, for window or other decorations, and for stereoscopic pictures, each and all of which permit of, if they do not require, different treatment. Take the lantern slide, for instance; here we require absolute transparency in the highest lights, and a delicacy and translucency in the general gradations that alone give it its value for the particular purpose to which it is to be put. For hanging in windows, or for framing in screens or lanterns, or other decorative purposes, the same transparency of the lights is desirable in order to sustain that sparkle that gives the great charm to a transparency; but the general strength or density must be greater. For stereoscopic work a result similar to the last is equally effective, but for this purpose the absolute “clear glass” lights are not so firmly to be insisted on, since a very faint veil gives a softness and solidity to the combined picture that are scarcely secured with slides possessing greater “sparkle.” Here, however, much must, of course, depend upon the subject, and we are far from recommending indiscriminate veiling as a means of securing artistic effects.

How best to secure the precise qualities required in a transparency, for whatever purpose required, should, therefore, be the study of all who practise this branch of the art, though—except, perhaps, in connexion with lantern slides—too little attention is given to the matter. Exposure is, of course, an all-important point in the calculation, far more important, indeed, than many even “old hands” recognise. In negative work we are accustomed to claim the advantage of more or less “latitude” of exposure, as it is termed—that is to say, of committing more or less error in the calculation of the time, without suffering to any great degree for the offence. But where the operator makes a practice of availing himself of this power or latitude, it is almost certain that the character of his work suffers, and that if he were to expend a little more care in timing, his general results would be of better quality.

Where transparencies are in question, however, the case is quite altered, for the so-called latitude almost disappears where

the very highest class of result is expected. Latitude does exist, truly, as in the case of negatives, but only in connexion with inferior results, either harsh in contrast from under exposure, or, what is more likely, heavy and wanting in sparkle from the reverse.

With gelatine plates the general fault is almost invariably that of over exposure, whether in the camera or by contact in the printing frame, for it is difficult to get some people to credit the exquisite sensitiveness of such plates to direct white light. With collodion films, however, the tendency is in the opposite direction, owing to the wide difference in comparative rapidity between the two classes of plates; but with collodion, fortunately, there is sensibly more room for varying the exposure, so that it becomes possible to *fully* expose within reasonable limits without overdoing it.

It is in camera printing that under exposure is most likely to be met with, since, even to gaslight, collodion films are sufficiently sensitive to enable a full impression to be obtained in a reasonable time. In camera work, therefore, with such plates, we should always counsel an exposure of at least a little more than is judged to be absolutely necessary. A difference of twenty-five or thirty per cent. in excess of the really accurate time will do no harm; in fact, in a bad light, two or three times the proper exposure will often not ruin the picture, where, with gelatine, the case would be hopeless.

In printing by contact by gaslight there need be little fear either of under or over exposure, nor any difficulty in calculating the time, since the latitude is sufficient to cover any reasonable error with this most convenient form of lighting. But if daylight or magnesium be used, then the danger of over exposure is magnified, and especially if thin negatives are employed. In such cases it is desirable to expose at as great a distance from the light as convenient: from the far side of a room, opposite a window if daylight is in question, and some feet from the flame in the case of magnesium. With very thin negatives, as an additional precaution, a sheet of ground glass or tissue paper may be laid over the frame.

In the Royal Commission, now sitting, photography is being more extensively made use of than in any previous proceeding in the Law Courts. Indeed, photography may be said to be largely instrumental in originating the Commission itself. The copies of letters which appeared in the daily papers in the first instance, and which gave rise to so much controversy at the time, were all printed from phototypic blocks. All the most important documents which have been produced in Court have been, or are to be, reproduced by photography. A number of photographs of signatures—genuine or otherwise—mounted in juxtaposition are much more convenient for comparison, or reference, than when they are on separate pieces of paper.

When photography is utilised, as it frequently is, in the detection of forgeries or tamperings with documents, a more pronounced result may often be obtained by copying the writing by transmitted light. By this means erasures, or chemical manipulation with the ink, will often be rendered more palpable in the photograph than when the negative is taken in the usual manner. In all cases of suspected forgery by erasure, or chemical means, two negatives should be made; one by a strong transmitted light, and the other by reflected light. Results may sometimes then be secured in one copy which are not discernible in the other, and *vice versa*.

SOME little time back we alluded to the fact that a large number of photo-mechanical prints had been arrested by the Customs' authorities, under the Trade Marks Act, for not bearing an imprint indicating the

place of printing. The Act, it appears, has had a material influence on the business of some foreign houses who have, hitherto, sent a large amount of work to this country. A considerable number of plates and blocks, used in illustrating English publications, have been made on the Continent, although they have borne no indication of the fact. The same remark applies to large numbers of collotypes which are supposed to have been of home production.

FINDING their English business being so much interfered with by the new law, more than one German firm, we are given to understand, have brought over their plant, appliances, and men to this country, and intend to work here. Hence the work, though executed in England, will, after all, be done by foreign workmen. Whether the competition, thus continued, will be keener than when the work was done abroad remains to be seen. Although labour may be cheaper on the Continent than it is here, it is somewhat doubtful if the foreign workmen, when they are here, will be content with less pay than their English *compères* receive.

THE question is often put as to which is the best reflector to use when enlarging by diffused daylight—a mirror of silvered glass or a white screen, such as opal glass or white paper? On this point opinions are somewhat at variance, even amongst practical men. As a matter of fact, however, the reflector, which is really the best, depends entirely upon the character of the light at the time of using. If the sky, for instance, be of a light blue, with plenty of white fleecy clouds about, then the silvered glass reflector will be the best. But if, on the other hand, the sky be of a deep blue, with an absence of white cloud—a “cloudless sky”—then a white reflector will afford the best means of illumination. In the latter case, the necessary exposure will be but a little more than half that which would be required if the mirror were employed.

AT a recent meeting of one of the photographic societies, the question was raised as to the best transparencies for enlarging from. Some advocated one process, and some another. Some of the best commercial enlargements, by the negative process, are from carbon transparencies, but in reality those by any other process, if equally as good, so far as vigour and gradation are concerned, will answer quite as well, and, under some circumstances, better. By reason of the varying thickness of the film itself in a carbon transparency, a species of halation is often seen, in the enlargement, where a deep shadow appears in juxtaposition with a high light. This, however, is not a very serious matter when the enlargement is made by diffused light. But when artificial light with a condenser is employed, the result is never so good as might be obtained from a transparency of corresponding quality, in which the image is of equal thickness throughout—say from a gelatino-chloride or a collodio-bromide plate.

IN England the carbon tissue supplied, specially for the production of transparencies, is made with a black pigment, but some supplied from the Continent is made with a reddish-brown one. Which yields the best results? The image of a carbon picture, whether on glass or paper, is built up of varying thicknesses of the pigmented gelatine, therefore it follows that the more actinic and transparent the colouring matter is, or the more it is attenuated, the greater thickness there will be in the opaque parts. Consequently, there may be a wider range of gradations secured than when the pigment is of an opaque character, and in a more concentrated form. Such transparencies however, although they might be better under some conditions, would not, by reason of the high relief existing, be so good for enlarging from by artificial light as those with a more level surface, like that obtained with an opaque pigment, or, better still, from a perfectly homogeneous film, like that of a dry plate.

ONCE more, this time on the authority of the London correspondent of a provincial paper, a photographer has been surprised when taking duplicate negatives of a young lady—who had just “died under peculiar and distressing circumstances”—to find that the subject had moved between the two exposures. Of course the doctor and nurse were

summoned, &c. We wonder how often this old and stale *canard* will be resuscitated, and from what source it will next make its appearance? This but a few months since we had it dished up in a very similar fashion.

THE *Illustrated Boston* has been prepared for interchanging with other organizations. It consists of a lecture, type-written, accompanied by sixty-six views for stereopticon entertainments; the text is also illustrated by contact prints from the negatives. Early in March a complete set will be shipped to Liverpool, and given to the Amateur Society of that city, in trust, for loaning to any amateur society of Great Britain that desires to examine or use it in giving an entertainment to its friends. This is, or will be, done, trusting that some of the Societies of the mother country will send to the United States similar illustrated descriptions of our localities.

ON applying to Mr. Steward—who is an agent for the Brin's Oxygen Company—for information as to the precautions taken by them to prevent accidents with steel cylinders, we are informed that the cylinders are made of soft steel, and of such a thickness in proportion to their diameter as to have a very large margin of safety when tested so as not to approach the elastic limit of the metal. Cylinders in which oxygen is compressed to 1800 pounds per square inch are all tested to 3000 pounds, both with air and water. Every cylinder brought into the works is tested, whether supplied by the Company or not, strange cylinders being frequently tested to destruction, and in no single case has any accident ever occurred, either at the testing or when the cylinders have been in circulation, from over-compression. Considerable precautions are taken to prevent the admixture of hydrogen with oxygen—all the hydrogen cylinders being painted red, and the oxygen painted black. Every cylinder brought into the works, whether it is a hydrogen or oxygen cylinder has the valve opened, so that the contents are liberated. Only the most experienced men are employed at the compressors, and separate pumps are kept for oxygen and for hydrogen.

FOURTEEN months only have elapsed since we gave an account of Suter's latest optical production in the form of a portrait aplanat, working with an aperture of $f=5.5$. We then stated, on the authority of Mr. Gutz, that M. Suter was indebted in no small degree for the large aperture he obtained to employing some of the recently introduced glass of Professor Abbe. Following still in the same lines, a still further improvement in this series, *D rapid aplanat*, has been made. Without in any way diminishing the angular aperture, and by a still further modification in the glass selected, the covering power, i.e., the ability to project a larger picture on a flatter field, has been considerably extended. Concerning that particular quality in the glass by which this has been effected, we do not stay to inquire, but it has also enabled the optician to extend the area of the dimensions; for whereas formerly the diameter of the glasses was confined to two inches, more or less, he has now introduced one of three inches, besides others more limited, all possessing similar characteristics as regards aperture and extension of field. We welcome the introduction or modification of any lens which will conduce to facilities in producing high-class work.

ECHOES.

I WAS much amused a few weeks ago at Mr. W. Brooks's indignation at having a formula for collodio-bromide emulsion fathered upon him by Mr. F. C. Beach, or Mr. Dunsterville, or some one; but I think he would have had still more right to complain of its “ragged” character if it had been stated in similar terms to two others which figure in a later portion of Mr. Beach's lengthy article. A fortnight ago I find a formula given on the authority of Mr. L. C. Landy, but due to Mr. H. S. Newton, and which was at one time considered of such value as to be kept secret. The peculiarity of this formula, to my mind at least, is that eighteen grains of silver nitrate are dissolved in ten drops of water and five drops of nitric acid. Twelve grains of cadmium bromide are separately dissolved in half an ounce of alcohol, and the two solutions mixed, after which the pyroxylene

and ether are added to complete the mixture. A second formula is mixed in the same manner, or at least it is directed that that order be observed. I need scarcely make any comment on the character of the emulsion likely to be produced in such a manner, considering that the silver haloids are directed to be formed in the entire absence of any colloid substance to promote fineness of division and ensure suspension and emulsification of the particles. But I do think that when a formidable paper is compiled from a variety of sources and read before an important society by one of its leading officers, it would be as well to devote just sufficient care to its details to ensure that any one ignorant entirely of the processes described may have some slight chance of success in attempting to follow the instructions given.

The old readers of the "British" of ten or more years ago will have little to learn from the republished formulae, and are not likely to be misled by any errors in the directions given; but the case is altogether different with the newer class of amateurs, who know collodio-bromide emulsion only by repute or in its prepared and complete form. To such the details of manufacture are quite unknown, and, being wishful of practising the process, a formula of such importance will recommend itself, and the instructions given by such an authority as Mr. Beach will be followed to the letter, but in this case, I am sorry to say, to the disgust of the experimenter and the discredit of collodion emulsion. The mistake is the less excusable because it is repeated in no ambiguous terms: "Add the silver solution and shake well, then add one ounce of ether," until which latter addition there is no collodion, and can be no emulsion.

I will merely add that if Mr. Beach's mode of working were possible, the compounding of a washed collodion emulsion, or of an emulsion of any sort, would be robbed of all its difficulties and troubles, for all that would be necessary would be to precipitate the bromide of silver rapidly, wash it, and then incorporate with the gelatine or collodion. But though "precipitation" processes have been devised, they have never come into general use.

I find another, at first sight, curious emulsion process in the list of published specifications of patents. The claim is for "a method for producing photographic emulsions not requiring a base or support," &c., and consists in the formation of a gelatine emulsion in the ordinary manner, but containing a larger proportion of gelatine than usual, and adding to it a certain proportion of potassium bichromate or other similar salt of chromium. This is spread upon glass or other smooth surface, properly levelled, and allowed to set, after which it is treated with sulphurous acid, then thoroughly washed in water, again dried, and finally stripped from its support in the form of a sensitive film.

I say at first sight the process seems a curious one in many respects. In the first place, an emulsion film of sufficient thickness to be "self-supporting," or capable of use without extraneous support, and containing the sensitive silver salt throughout its whole thickness, might appear a somewhat expensive one, but it is possible that the proportions of gelatine and silver may be so adjusted that the correct gradations are obtained in the negative, together with the necessary strength of film, without any undue expenditure of silver.

The use of bichromate of potash in gelatine emulsion is of course not unknown, but I have never hitherto, so far as I recollect, heard of such a film being coated previous to the removal of the chromium salt. Whatever other result may accrue, I can scarcely imagine a film of very exalted sensitiveness coming from such a combination, unless, indeed, it be finally treated with ammonia after the removal of the bichromate, in which case I should anticipate injury to the gelatine itself.

But the most noteworthy point in connexion with the patent is the resemblance to Froedman's method of making an insoluble gelatine support, more popularly known as the "Vergara film," a similarity, however, with an important difference. In Froedman's process the dried film of bichromatised gelatine is exposed to light previous to treatment with sulphurous acid, by which process it is rendered perfectly insoluble, the action of the sulphurous acid being then simply to decolourise the resulting tissue.

Exposure to light—at least for a sufficient length of time to thoroughly harden the gelatine—is of course practically impossible with a film containing silver bromide which has afterwards to be

exposed in the camera, though the presence of bichromate would suffice to protect it from slight exposure, such as would result in surface fog. This, in fact, is the function the bichromate has hitherto been called upon to perform in gelatine emulsion; but though it has been tried, I do not think that the preparation of emulsion in daylight has succeeded practically. Failing exposure to light, we have to seek other means for rendering the film insoluble, and these, whether effective or not I cannot say, are provided by the subsequent treatment.

Here, in fact, the sulphurous acid performs a totally different duty from that placed upon it in Froedman's process. The discolouration caused by exposure to light in the one case does not occur in the other, and the soluble bichromate would wash out of the gelatine film without recourse to any stronger measures than pure water; but by treating the chromated film with sulphurous acid the chromium salt is reduced, the sulphurous acid is oxidised to sulphuric, and the bichromate of potash is converted into double sulphate of potash and chromium or chrome alum. In fact, this is only a convenient if apparently circuitous method of adding chrome alum to the emulsion; convenient because it enables a large proportion to be introduced into the set film without in the slightest degree interfering with the fluidity of the emulsion or necessitating any special care in its management.

After treatment with sulphurous acid, we therefore have a film of gelatine acted upon by a more or less powerful dose of chrome alum, the effect of which, even after its thorough removal by washing, is to render the film insoluble when dry, and consequently, as may seem, similar to the Froedman or Vergara film. Such, however, is not the case, as the two tissues are very notably different in character, as any carbon printer will be aware.

Gelatine that has been subjected to treatment with chrome alum becomes, as is well known, insoluble after drying, but does not lose its power of swelling, more or less, under the action of moisture. Gelatine submitted to treatment with potassium bichromate retains not only its power of swelling, but also its complete solubility, *unless* exposed to light after drying, in which case, if sufficiently exposed, it loses both completely, and becomes as hard and impervious to moisture as so much leather or horn. Here, then, lies the difference between the two films.

The Vergara is, I believe, fairly easy to manipulate, owing to the absence of any tendency to curl or cockle, and requires no support or assistance in handling during development; but I should say that the new film would behave in a very different manner, swelling and curling, and generally "contorting" itself in a most objectionable manner the instant the developer touched it. I may be wrong, but my experience with gelatine films in the past does not lead me to hope for much from the new "supportless" sensitive films—I speak here from a mechanical point of view; from the photographic point, perhaps, the outlook is a little more promising.

The accident to Mr. Bowley has caused a not unnatural flutter in the breasts of photographers who are users of compressed gas, which it is claimed removes nearly, if not all, the danger attending the use of the limelight, even in careless hands. Sad as the result has been, and bitter the lesson, it is at least some consolation to know that the accident, if so it can really be called, was the result, so far as present evidence would seem to show, of an almost culpable carelessness—not negligence, but wilful carelessness bred almost of contempt for the danger courted. That the fatality was so limited, as it proved, was perhaps the greatest "accident" of all, for it is terrible to think what might have happened at any period during the travels of the cylinder of mixed gases. Let us hope the lesson will be taken to heart. One point is disposed of, *viz.*, the belief or assertion that in bursting the iron bottles would "rip" rather than fly in fragments; the facts of the recent occurrence point quite in the contrary direction.

What very contradictory information "Aliquis" has obtained in reply to his query on the subject of Photographing in Norway! What he wanted to know specially was whether he could rely upon having plates sent after him (or before him) from place to place, without having the trouble of dragging them with him. The Rev. A. M. Macdonald, speaking from the practical experience of four seasons' actual work in Norway, gives an altogether satisfactory reply, while another correspondent regales him with a story, which he evidently considers

ben trovato si non e zero, and which is quite the reverse of Mr. Macdonald's experience. However, experience is experience, while a story, whether true or not, is misapplied if it is to mislead.

Mr. H. M. Smith wants to have a "dealers' section" at the Convention, but why confine the principle? It may not be possible yet, but I do not see any reason why there should not be not only a dealers' section, but a section for amateurs, for professionals, for art, for chemistry, manufacturers, &c. &c. On the principle of the British Association, with its various sections, I fancy more useful work would be got through in the limited time the Convention lasts, and the members of "all sections" could meet together at the excursions and *conversaciones*, as do the "Britishers."

JUNUS.

THE PROPERTIES OF DETECTIVE CAMERAS.

No. I.

"In the multitude of counsellors there is safety." This axiom, doubtless, was running in the head of Mr. H. T. Duffield, of New York, when he decided that in order to present an average summary of the qualities and properties required in a detective camera, he placed himself in communication with several users of that now popular instrument. The experiences having been gathered in, Mr. Duffield has presented them *in extenso* to the local Society, together with a brief summing up of their properties by himself. This we shall here present in a condensed manner.

In reply to the question:—

1. What sort of detective camera do you prefer?

In this Council it appears that the quarter-plate was the size preferred by the majority; 5 x 4 taking second rank.

2. Is it necessary that the camera be so constructed that observers' attention will not be called to it?

The majority answer "No;" but it should by preference be made unobtrusive; it is almost impossible to so construct it that people will not "catch on to it;" but that nothing, however, that tends to affect the simplicity of the mechanism of the camera should be sacrificed in making it inconspicuous. A number think the detective cameras of to-day sufficiently unobtrusive for all ordinary purposes, especially street work.

3. Which is the best way to hold the camera while making an exposure so that it will be steady?

The preponderance of opinions is in favour of it being under one of the arms, the right generally, pressed closely to the side, the hand of that arm keeping it steady, while the other hand operates the release of the shutter.

(a) "I rest my larger boxes on my left fore-arm, not touching the body; the right hand works a bulb, and does not touch the body."

(b) "I have a push button on the right hand side, upper corner front, of my camera; I take a firm hold with the left hand, palm on the bottom, and steady with the thumb on the side, and then with nearly the same position of the right hand on the right side of the camera, and thumb pressing on the push button, or handy to it. I take a firm hold with the right, and I never have a blurred negative. At one time I pressed it against my side and found at times blurred negatives."

(c) "Under the right arm, with the right hand reaching under the box and one or two fingers controlling exposure by pressing a button at will. If the camera be so held, any motion communicated to it by the body will be a slow one, and for ordinary exposure there will be no movement noticeable. I never had any case of shaking in the detective camera."

(d) "Under the arm, resting upon the hip. Hold your breath when pulling the trigger. Do not rest the camera upon the stomach, and bend over it as though you had an ache in that locality; it is not graceful, and always attracts attention."

4. Should not the camera have a springback?

For detective work, it is not necessary; for view work, quite essential, is the general opinion.

(a) "No; because this requires a small stop, and thus prevents instantaneous work."

(b) "Would prefer a rising front."

(c) "Decidedly yes; and I see no reason why manufacturers have overlooked this very important feature."

(d) "Yes; two of them."

(e) "Certainly, if architectural effects are to be reproduced; for landscapes, not necessary."

(f) "If it would work automatically."

(g) "It is best to keep the detective as simple as possible."

5. Do you think it necessary to have a finder? Should there not be two? Should there not be hoods over the finders?

Four consider it needless; seven, that it is an advantage to have a finder, but not absolutely necessary; twenty-eight, that it is indispensable; nine, that one is sufficient; twenty-nine, that two are desirable. Hoods are also considered desirable.

(a) "I have two finders on my camera; a camera without any would be of

no value to me; when you want to take a picture either way (vertical or horizontal) you must have a finder for each position to be sure of your field."

(b) "A finder is quite needless; if three round head screws be placed on the outside of the camera to indicate the angle of view included on the plate, this will answer all purposes."

(c) "A finder is very necessary; one is sufficient, as it can be viewed as easily from the side as above; a cover, hinged and standing upright, serves as a hood."

(d) "I think one finder is absolutely necessary, but do not see the advantage of two; but I do think it should have a hood, as at times I find it almost impossible to get along without one, and, in fact, have concluded to put one on my box on a hinge; for, outside of its usefulness, it is a means of hiding the purposes of the box, and makes it a little more mysterious, or rather less conspicuous, to the uninitiated. I make a hood with my hands to answer the purpose until I get the chance to make a good one on hinges."

(e) "I think two finders so essential that I shall have an extra one put in; the hood I do not feel so necessary, as I make a hood of my hand."

(f) "Have tried without and with finder, and emphatically pronounce in favour of finder; do not consider a hood necessary; good only to keep off dust."

(g) "Finders essential, and to embrace the same angle of view as the lens cuts on the plate; certainly two; hood to screen off the light an improvement."

(h) "Very important to have two finders; if well sunken in the box there is no need of hoods."

(i) "Only use one finder, as the other cannot be made exact; consider hoods necessary."

(j) "Two finders necessary, and also sights."

(k) "Not essential; the large finder or full plate on which to focus I consider a powerful aid to intelligent composition and the study of nature."

6. Should not the detective be made solely for detective work, and not also be arranged for view work?

Nine answer for detective work only, twenty-nine for both.

(a) "I believe that it should be arranged for detective work only."

(b) "If 'detective' be used, in the strict sense of the term, it should not be so arranged; otherwise, yes."

(c) "If only for detective work, many of its appliances may be abandoned; while if used for view work also, too many cannot be added."

(d) "For detective, not tripod use, but should have a time shutter."

(e) "For the average amateur both ways."

(f) "Immaterial, provided the arrangements for time pictures are not complicated."

(g) "There is no need of a tripod attachment to the camera; all that it is capable of doing can be accomplished holding it in the hands."

(h) "The vest camera and others of that class are the only true detective cameras; the province of the so-called detective I consider to be the production of satisfactory pictures of moving objects or random bits of interest to tourist or pleasure seeker, or notes for the artist, architect, or engineer, to be gathered right and left with minimum of effort."

(i) "If the camera is as large as 4 x 5, it adds to its value to have it arranged for view work; I have used mine with a tripod for time pictures, and have made my best work with that arrangement."

(j) "I should not have bought a detective unless it might be used for view work."

7. What should be the focal length of a lens to cover with full opening the plate used?

(a) "The lens should be of about six inches equivalent focus, and should cover the plate all over with a stop of f.11."

(b) "I prepare a size larger lens than the plate used for various reasons, both for covering power and focal length."

(c) "The lens should be one size larger than the plate, i.e., a 4 x 5 for a quarter plate, &c."

(d) "Focal length should equal or exceed the diagonal of plate, and aperture should be as large as possible, f.4, if it can be obtained with good covering power and definition."

(e) "Not larger than seven-inch focus for a 4 x 5 plate, that gives an angle of 39°; six-inch focus would be better, covering a view of 45°."

8. Do you prefer a rapid rectilinear or a wide-angle lens?

Thirty-five, rapid rectilinear; two, wide angle; one, both.

(a) "For confined situations, of course, the wide-angle is best; but, for general work, give me the rapid rectilinear."

(b) "The lens for detective work is yet to be made, of an angle of view between 30 and 40°."

(c) "The rapid rectilinear at f.8 is a necessity, but f.6 is better; and these apertures cannot be obtained in a wide-angle lens."

(d) "A medium wide-angle is best."

(e) "It should be a moderate angle, so as not to greatly distort the perspective."

9. Is it not an advantage to have both of these lenses, and should not all detectives be so constructed that the lens can be quickly changed?

Twenty, no; fifteen, yes.

(a) "I do not think it would be an advantage to change from a rectilinear to a wide-angle lens, unless the necessary change of focal length could be effected automatically at the same time; to change one and not the other in a hurry would cause disheartening failures."

(b) "This would involve too much complication, and would perplex the artist, and lead him into errors and regrets; too much choice is injurious."

(c) "I think it would be an advantage."

(d) "Do not see the necessity; would make construction of the camera

proper more complicated, unless lenses of the same approximate focus were used; all lenses for any kind of work should have bayonet joints and fit in the same flange, within limits of course."

(f) "(a) Yes; (b) It would be a convenient arrangement."

(g) "The use of two lenses in a detective camera is not advisable; it is sure to confuse the operator, particularly in focussing."

10. *How does the single lens do for this kind of work? Is it rapid enough?*

The majority answer that they have never tried the single lens for detective work, and therefore cannot express any opinion."

(a) "No, except some high grade lenses."

(b) "A good single lens works quicker and with deeper range of definition than a doublet of the same aperture."

(c) "Of two lenses of equal focal and openings—one single and one double combination—the single should be the quickest if made of the same glass."

(d) "Yes, with good light, but it is apt to distort somewhat."

(e) "It will do well where there is brilliant illumination; I have taken instantaneous pictures with it at the sea-shore."

(f) "Single lens will answer for some kinds of work in summer."

11. *Do you use a fixed or moveable focus?*

Ten, fixed; twenty-eight, moveable.

(a) "I use a fixed focus with all my cameras; the $4\frac{1}{2} \times 5\frac{1}{2}$ works sharp for 40 feet and beyond; the $3\frac{1}{2} \times 4\frac{1}{2}$ for 25 feet and beyond; the others still shorter range."

(b) "Fixed focus at 18 feet."

(c) "Both."

(d) "Focus for every view, estimating distances, 8, 10, 12, 15, 20, 30, 50 feet, and distance."

(e) "Moveable focus I think is indispensable."

(f) "Moveable, but seldom used except for very near work."

(g) "Moveable from 10 feet to universal focus about 100 feet."

(h) "A moveable focus with seven-inch lens on 4×5 ; but if I used a shorter focus lens I should use a fixed focus."

12. *What diaphragm do you chiefly use in summer and in winter, the summer season being from May to November, and the winter from November to May?*

General answer: In summer, $f-15$; in winter, $f-8$ to full opening.

(a) "Always $f-15$, only changing the speed of the shutter."

(b) "For street work the next stop to full opening, and for water the next smaller in summer; for street work full aperture, and for water the next stop in winter."

(c) "The largest, varying exposure by the speed of the shutter."

(d) " $f-11$ always."

(e) "Third, whenever I can."

(f) "Full opening."

(g) "About $f-8$."

(h) "Depends entirely on conditions; no one more than another."

(i) "Summer, medium or next largest; winter, the largest; I never use full opening."

13. *Which diaphragm is best to use when the object is in bright light and in shade?*

General answer: Bright light—summer, $f-16$ and $f-22$; in winter, $f-8$ and $f-11$. Shade—summer, $f-11$ and $f-16$; in winter, $f-8$ and $f-4$.

(a) "Of course the diaphragm varies very much with the conditions of light, but the object of both of these questions was to ascertain the stops generally used. For marine views, $f-22$."

(b) "I always use the largest diaphragm I can; don't think I ever estimated a plate very much."

(c) "I generally use the largest diaphragm that I consider will do the work."

(d) "At the sea shore, $f-22$; when snow is on the ground, $f-16$ and $f-22$."

(e) " $f-16$ in bright light, summer, otherwise $f-11$; I prefer to use as rapid a shutter as possible."

(f) "I vary my diaphragm very seldom."

14. *What is the principal fault of your shutter?*

Fourteen are satisfied with their shutters.

(a) "No definite means of regulating its speed."

(b) "No means of knowing its speed."

(c) "No means of adjusting speed."

(d) "Arranged simply for instantaneous exposure."

(e) "To control the speed more perfectly, or at least to know its speed."

(f) "That it gives uniform exposure of the whole field."

(g) "That the speed of exposure is not uniform, being more rapid at the beginning."

(h) "That you can never be sure of the speed twice running the same."

(i) "Cannot change the speed as quickly as I would like."

(j) "Not quick enough."

15. *What is the average speed of your shutter when making exposures?*

(a) "Winter and summer, 1-20th of a second."

(b) "Generally give it slowest speed, except for marines, ice, snow, &c."

(c) "From 1-10th to 1-100th of a second (!); in summer, 1-10th to 1-100th; in winter, 1-10th to 1-20th."

(d) "Summer, about 1-40th of a second; in winter, 1-20th."

(e) "As fast as it will go, say 1-10th of a second."

(f) "As fast as it will go."

(g) "Highest tension of speed."

(h) "Highest speed, 1-200th of a second; lowest, 1-80th."

(i) "Probably 1-20th of a second."

(j) "Prefer slow shutter."

(k) "Half speed generally."

(l) "About 1-50th of a second in summer; about 1-20th of a second in winter."

(m) "Except on the water, as slow as possible."

(n) "Summer, 1-50th to about 1-100th of a second; winter, as slow as it is possible to get; subject still and sharp."

(o) "Summer, 1-40th of a second; winter, 1-25th of a second."

The majority of the answers reply: "Don't know," and "Can't find out." The beautiful candour of this general reply, when there was such excellent opportunity to display scientific knowledge, shows that the character of the photographer is susceptible of the highest moral cultivation.

16. *Should there not be some means of indicating the speed of the shutter?*

Thirty answer, "By all means;" eight, "Not necessary."

(a) "No, as any one with experience can guess."

(b) "At least some means of getting the same speed as often as wanted."

(c) "Yes; that is the fault which most detective cameras have; mine has a lever which can be moved forward and back one inch, and I can accurately judge the speed of my shutter."

(d) "Yes, I could record mine by number only, which would be useless for comparison."

(e) "Do not think it necessary; your judgment and experience should tell you what speed to use, and it takes quite a long experience to do artistic shutter work."

(f) "Yes, if reliable; but I doubt if a trustworthy indicator would show the degrees of speed above 1-100th of a second."

(g) "Don't think it would be any great advantage; detective cameras are already too complicated."

(h) "Good photographs can be and are made without this means, but I think much better and more uniform results could be obtained with it."

(i) "Yes; though I always use my shutter at full speed, and depend on development to correct any error, except in case of shade, when I slow my shutter."

(j) "A spring that is in tension constantly becomes fatigued and fails to give the same speed as at first; this is especially true of phosphor bronze; exposure at various speeds of the shutter on falling bodies, and measuring and calculating, gives the most correct results of the time of exposure and a ready means of checking off results at any time; the speed of shutter and diaphragm of lens used depends on sensitiveness of plate employed, season, time of day, and rapidity of motion of subject, and must be modified accordingly."

(k) "Yes, there should; I consider it a much-needed improvement."

(l) "Not without one had some effective light gauge."

(m) "Desirable as a matter of curiosity."

In the foregoing answers, so skillfully extracted from so many users of "detectives" by the ingenious Mr. Duffield, attention has been confined to the mechanical side of the question. In our next we shall present in a similar "boiled down" manner the views of the councillors relative to the treatment of the plate after exposure.

EXPERIMENTS ON THE REPEATED USE OF THE DEVELOPER.

A SERIES of experiments, into which I was led by circumstances not directly connected with the subject, may prove suggestive to many of those who favour the practice of using the same developing solution—pyro, hydroquinone, or ferrous oxalate—for a number of successive plates. The feasibility of such a course has never been doubted, though in the case of pyro, for fairly obvious reasons, it has not come into use; but with ferrous oxalate, and more especially with hydroquinone, this power has been seriously put forward as an advantage in those forms of development.

That the active principle of the developing solution is not exhausted in a single operation scarcely requires argument, and so far as the mere act of development or the production of a visible image is concerned all developers are capable of repeated use, but for practical purposes the question, of course, is whether the results produced are satisfactory. For my own part, I have always held the negative opinion, chiefly on the ground of uniformity of action, for it must always be borne in mind that, however large a surplus of developing power is carried over to successive developments, there is also a constantly increasing restraining influence derived from the films already developed. Every plate developed introduces a certain quantity of bromine into the solution, and this added restrainer, coupled with the natural exhaustion of the developer from use, must seriously modify its character every time it is used, and though the trouble may be minimised by employing a considerable volume of solution—which of course destroys the economy of repeated use of the same solution—the want of uniformity is never wholly done away with.

The experiments to which I refer were made with collodion emul-

den films which are well known to be greatly more susceptible to the restraining influences of bromide than films of gelatine; but though the immediate results may be more marked, the principle remains the same, and similar effects, though probably in a diminished degree, are to be anticipated with gelatine plates.

I was led into these trials in the following manner:—Having a large number of lantern plates to develop, I thought, for economy's sake, to utilize the power of repeated development, so made up a quantity of solution from which to work. For the size of plate mentioned I employ two drachms of solution, using it from a small tipped measure, and in this instance I made up four ounces of solution, intending after each development to pour the used solution back into the stock bottle and mix with the bulk. The solution contained hydroquinone, one grain; sulphite of soda, four grains; one hundred-grain solution of carbonate of potash, thirty minims to each ounce.

The first plate came up satisfactorily, though very slowly, which I put down to the temperature, the weather being frosty and the thermometer out-of-doors standing some degrees below freezing. The second plate was slower, the third still slower, showing no trace of image in ten minutes after the first application of the developer, though the exposure had been practically the same throughout. By the addition of more alkali I managed to get the picture out, but the final result was far from satisfactory, owing to the quantity of potash solution used being more than the film would stand. A fourth plate, without the addition of more alkali, at the end of half an hour showed only the heavy shadows, but these very dense, with very little prospect of getting out the details.

I could scarcely conceive that the result arose from either low temperature or from the minute quantity of bromide introduced into the large bulk of solution by the act of development, but I resolved to try it either, and which, cause was to blame. One ounce of fresh solution of the same composition was made, and, selecting a rather thin collodion negative with perfectly clean shadows, a test exposure of twenty seconds was given at a distance of twelve inches from a No. 6 Iray's burner, and this was developed with my standard solution of three grains of pyro and one minim of strong ammonia to the ounce. In the result the exposure proved to have been too much; fifteen seconds, or perhaps less, would have done.

With the same negative an exposure of fifteen seconds was next given, and the hydroquinone developer applied; the picture came up slowly as before, about two minutes elapsing before any image appeared, and development was complete in a little under eight minutes, the result being perfectly satisfactory. The slowness in the appearance of the image could be accounted for by the low temperature and the use of sulphite with the hydroquinone. The used developer was returned to the stock bottle, and a second plate was exposed under precisely the same conditions. Upon developing this, the time required for the first appearance of an image was found to have increased to nearly five minutes, and after a continued application of the solution for a quarter of an hour, a picture was obtained of great vigour in the shadows, but scarcely showing sufficient detail in the lights. In fact, it was a result which, compared with the previous one, was undoubtedly to be described as under exposed. A third plate, exposed under similar conditions, was still slower in development, and exhibited stronger symptoms of under exposure.

In order to ascertain if the temperature was the element at work in producing this result, a supply of hot water being at hand, the developing solution was raised to what we are accustomed to consider the normal temperature, namely 60°, and another plate exposed under similar conditions to the previous ones. In this case the development proceeded more rapidly, the image appearing in about a minute, and for some time going on with the usual speed; but a point was reached at which it apparently came almost to a standstill, and the continuation of the action up to a quarter of an hour failed to produce the full amount of detail, though as regards vigour and "punch" the result was remarkable.

Several more exposures were made, the temperature being kept as nearly as possible at 60°, and the times were increased gradually up to thirty, and, finally, forty seconds, but each successive development became slower and more prolonged, and each succeeding image denser and more remarkable for the contrasts it presented. Even with forty seconds' exposure and an application of the developer for twenty minutes the high lights of the positive were wanting in detail, and the general character of the result was that of a hard under-exposed picture.

Departing now suddenly from the use of the "stock" developer I had been employing, I mixed up a fresh batch of the same strength, and at a temperature of 60°, as before. Another plate was exposed for thirty seconds, with the result that it was hopelessly over exposed, the image "rushing" out in about fifteen seconds, and veiling over

completely in a very short time. I then returned to the fifteen-second exposure, and employing a fresh quantity of previously unused developer got a perfectly exposed picture, the image commencing to appear in about twenty seconds, and proceeding regularly until the development was completed in a trifle over four minutes. The character of the image was in every way different from those that had gone before, being quite devoid of the hardness and "rawness" in the lights of which I have spoken, and exhibiting none of the extraordinary density produced by the previously used developer.

Going back again to the cold developer originally employed, temperature 34°, the only difference I could detect was in the time occupied in development, the character of the final image differing in no respect from that produced with the same exposure and the higher temperature solution. With thirty seconds' exposure the picture was as badly over exposed at the finish as when the warmer developer was employed, though the action proceeded very slowly, and for a time seemed likely to give a good result. But at a point where the last details were still incomplete the plate suddenly veiled, and lapsed into that appearance of heaviness and want of sparkle that so strongly marks an over-exposed transparency.

The result of these experiments is to my mind conclusively against the repeated use of the same developing solution. I admit that possibly—nay, probably—the effects would not be so pronounced in the case of gelatine plates, nor, perhaps, with either pyrogallol or ferrous oxalate, but I am convinced that in a small way of working, or for amateur purposes, the practice is not to be recommended. The economy is, after all, but a small one, while the counterbalancing element of uncertainty far more than annuls any benefit that might accrue from that source.

I do not for a moment condemn the employment of ferrous oxalate for successive developments of gelatino-bromide paper, where, especially in the case of large sizes, the economy is considerable. In the first place, the effect produced by the increment of restrainer is much less powerful than in the case of hydroquinone, the additional sparkle given is an advantage rather than otherwise, and the extra time occupied in development is not very material. But where ferrous oxalate is thus employed, I think it is of importance that a liberal quantity of the solution be used in order that the change in its character may be as slight and as gradual as possible.

W. B. BOLTON.

DANGER OF MIXED GASES.

"It is an open secret in Dublin that the victim lost his life through trying to succeed in mixing the gases in one cylinder under pressure in such proportions as to burn at the orifice instead of exploding, and, unfortunately, in the end, caused an explosion within the cylinder, blowing it to pieces. Even then he would have escaped with the loss of his left hand and one rib fractured, had not one small piece of the cylinder struck him just under the left ear, tearing the carotid artery and fracturing the base of the skull in its passage. It was a great pity, for a better fellow never breathed; he was everybody's friend."

These are the exact words of a correspondent on the spot to the writer.

The writer in his youth studied chemistry and the other natural sciences at University College School, and these being just to his own heart soon became the assistant demonstrator to the Professor who took these classes. One of the experiments was the burning of the mixed gases, hydrogen and oxygen, in the proportion to form water, from a bladder. The jet used was what was then known as a Hemmings's jet, which consisted of a tube of about nine inches in length and three quarters of an inch of internal diameter, tightly packed with very fine copper or brass wires, in the middle of which a pointed brass rod was forcibly driven, thus only leaving a series of infinitely small tubular interstices for the gases to pass; a stopcock at the end of a solid brass nipple, with a very fine drill hole—of course with a platinum tip—completed the jet.

The flame was almost invisible in daylight, of a pale blue colour, and barely a quarter of an inch long, but melted platinum wire instantly. With this jet, used repeatedly by the writer, no accident ever happened. After he left school he still continued his studies, and was fortunate enough to have a workshop of two floors, with windows the whole length, the upper of which he fitted up as a chemical laboratory and the lower one as a workshop, with lathe, &c. This was in 1862. Being fairly provided with pocket money for the purpose, one of the first things to undertake was to provide himself with a similar Hemmings's jet. Being of a mechanical turn of mind also he made the greater part of it himself, including the packing of the wires, and an indiarubber bag of about one and a half cubic

feet capacity. This apparatus was only used once, for the bag exploded under his arm, without, however, doing any more harm than breaking about a dozen panes of glass. He also was in the habit of trying the well-known experiment of filling a soda-water bottle with the mixed gases, and firing it, with, of course, a towel wrapped round it, but at last the bottle burst in his hand into a thousand fragments, without causing the slightest abrasion, and he then abandoned mixed gases for ever.

He therefore considers himself justified in forming the conviction that mixed gases cannot be burnt safely, no matter what precautions are taken, and that, therefore, the ethox burner is wickedly dangerous, and ought to be prohibited by law, as also the benzoline substitute.

Explosions with bags never happen from what is euphoniously but wrongly described as back pressure. What always happens, whether to amateur or professional, is that the bags are not distinctly marked "H" and "O." The hydrogen pure (or carburetted) always burns in greater proportion than the oxygen. There is, therefore, always an excess of oxygen left. The oxygen bag is filled up with hydrogen.

This is what happens with professionals. They always talk of the oxygen as *gas*. They are extra busy, and Bill, a novice to the trade, is taken on as help. "Here, Bill, fill this bag up with *gas*." Bill takes the bag to the gas main and fills it up; the operator starts the performance, and can't get a good light. Tableau!

In coal mines, too, the initial cause of explosions is an outburst of compressed carburetted hydrogen—frequently released by a low barometer—meeting with a light, but it is instantly passed on to part of the workings which, although then quite free from gas, by repeated explosions is now charged with the very fine particles of coal with which the air of the mine is always impregnated. GEORGE SMITH.

MAKING UP FORMULÆ.

There are many things in photography that are suffering from lack of uniformity. Lens flanges are never made with the same threads for the same size lenses of different makers. American, English, and other European dry plates are all made of sizes to suit the whims of some particular set of individuals without any regard to the tourist who has a camera made in one section of the globe and finds himself in need of plates in another. If the makers of other pieces of mechanism were as thoughtless about the wants of their customers as the makers of photographic cameras, lenses, and plates, the advances in modern engineering would never have been made. But we think that the greater part of this confusion in things photographic is principally due to the photographers themselves, both the professional and amateur. For what is more bewildering than the hosts of formulae one sees in the photographic journals of to-day, the utterly reckless manner of naming the chemicals for use in them, and the confusion one gets into in trying to make up solutions for developers, baths, &c.

One writer will tell you to use hydroquinone; another, hydrochinone; and a third, hydrokinone. With, perhaps, a limited knowledge of chemistry you go to the photographic merchant and ask for hydroquinone. A polite and well-meaning salesman hands you a bottle marked hydrochinone or hydrokinone, and assures you it is the material you mean. This is perfectly true; but you have your doubts about it, carry home your purchase, develop a plate with it, and—fail. Now the first thing you do is to blame the salesman, believing he has given you the wrong material, when the real trouble is with yourself, and the wretched doubt produced in your mind by that label which does not correspond to the name given in the formula you wish to use. As a matter of fact, hydroquinone is the English equivalent of the German words hydrochinone or hydrokinone. These latter should never be used in English, and the manufacturers should be more careful about the labels they put upon the bottles.

Again, the writer of a formula tells you to use sulphite of soda. You again proceed to buy the material for use, and the first question you are asked is: Crystals or granulated? Thinking you have not carefully read the formula you hesitate to make the purchase, and return home to find yourself still in doubt, because the author of the formula fails to tell you which he means. The fact of the matter is, that the granulated sulphite is very much stronger in true sulphite of soda than the crystals; and very often formulae are given in which, if you use the granulated salt, you would find it impossible to dissolve the quantities specified. As a matter of fact, the crystallised salt contains fifty per cent. of water, while the granulated salt contains none. The same argument is true of carbonate of soda. In this latter salt we have about sixty-three per cent. of water in the crystals, while the granulated variety contains about fourteen per cent.

In the case of potassium carbonate, we have no such difficulties as those mentioned above as occurring in the case of sodium sulphite and carbonate. The potassium carbonate usually occurs in commerce as a powder, free from water. Occasionally a crystalline variety is seen that contains about eleven per cent. of water; but this salt is not often found for sale.

The true and only way out of this confusion is to use the hydrometer for making up solutions for developers. This has already been adopted by some of our dry-plate makers in the printed formulæ given in their plate boxes. If you tell a man to take a given number of parts of a solution of a given degree of density on a Beaumé's hydrometer, he is much more likely to get it right than if you tell him to take so many ounces of a salt without specifying the condition of the salt.

Indeed, it has for a long time been a wonder to us that photographers will use a hydrometer to test their silver baths with, and entirely ignore its use in every other solution that they make up. Such an instrument should be their daily companion, and we are certain that it will cause less trouble and give more uniform working in the dark room than any other method that we know. For example, a saturated solution of carbonate of soda stands at 19° Beaumé, and contains about thirty-nine per cent. of the crystals. A saturated solution of hyposulphite of soda stands at 40° Beaumé, and contains about sixty-three per cent. of the crystals. These degrees of density on the Beaumé hydrometer are for the ordinary temperatures, 60° to 70° Fahr.

If the writers of formulae would only state how much of a solution of sodium carbonate or sulphite, of a given density, is to be used, the question of the use of the crystals or granulated salt would never come up, as the density of the solution depends upon that true salt present without regard to the amount of water it contains. Thus, to make a developer, it might be said:—

Take—	
Sodium carbonate 10° B.	1 part.
Sodium sulphite, 10° B.	1 "
Water	4 parts.
Pyrogallol	10 per cent.

By this method the developer could be made up by adding two solutions of definite strength together, and any given quantity of pyrogallol could be added according to the volume of the mixture made up. Furthermore, any desired dilution of the developer could be very accurately stated by mentioning the degree Beaumé which the weaker solution should mark. Saturated solutions of any of the ordinary salts are not to be recommended; but any weaker solution, provided its density is known, could readily be used, and is far more easily made.

We hope we have said enough to induce the writers of formulae to state in more definite terms just what they mean. And if we could all agree upon the use of the hydrometer, a much better understanding and far less trouble and failure with dry plates would be assured. We are compelled to believe that much of the trouble between the makers and users of dry plates would be overcome if solutions of definite strengths were recommended, and not a number of salts dissolved in one solution. If the salts are separated, the quantities of each could be much better regulated to suit different circumstances—changes of light, character of view, time of exposure, and many others. Under the present régime very little margin is given in most of the formulae, and in a great many all that can be done is to add more or less water.

Can we hope for more definite statements of formulae? With the increasing intelligence in the ranks of photographers we believe we can. —Anthony's Photographic Bulletin.

HYDROQUINONE.

[A Communication by Mr. T. Charters White, on Thursday, January 3. Sir George R. Prescott in the chair.]

THE wise man admonished his readers that "of making many books there is no end, and much study is a weariness to the flesh." Had he lived in these days, and devoted his attention to photography, I think he would have justly said that in the multiplication of developing formulae there is no end, and the study of their action is a weariness and a distraction to the mind of the immature amateur; for it is as if he would go from one end of this big city to the other, but instead of being taught to go by its main arteries, he were to be guided by every stray wayfarer he asked, and should be directed by them to take their favourite way, and to follow his path through devious by-roads, till he became lost in a labyrinthine maze, and ended in confusion. So every practitioner of what has, by reason of its dirty stains, been called the black art, has his pet formula, and because he can, by reason of its subtle combinations and its fractional measurements, produce a well-developed negative, he straightway, in the fulness of his heart, imparts it to another worker, who, not possessing his friend's acumen, becomes landed in a hopeless mess, tries his formula on somebody's new brand of plate, modifies the formula after some fashion of his own, and gets a worse result than ever. It has often seemed strange to me that, considering bromide of silver forms the principal element in the formation of a sensitive gelatine emulsion, something like a universal developer could not be devised; but till that event is consummated, I suppose the amateur must go on floundering amidst the waves of this ocean of formulae—that is, if he is not contented to produce a negative which will give a good print, and be simply the means to the end he has in view. My impression is that this much-to-be-desired developer is to be found in hydroquinone. Prior to the year 1880, hydroquinone was regarded more in the light of a chemical curiosity than of any practical utility, till Captain Abney, in that year, suggested its

use as a photographic developer, whilst its high price at that time precluded its employment to any great extent. While closely allied to its kindred pyrocatechin and resorcin, both of which substances have been recommended as developers by Dr. Eden, it yet differs slightly in its chemical formula, containing one atom less of oxygen than the other two. Hydroquinone, according to its historians, may be readily obtained by distilling one part of quinic acid, four parts of manganese dioxide, with one part of sulphuric acid, the latter being diluted with half its weight of water. A gentle heat being applied, dense white vapours pass over into the receiver and condense into shining spangles of quinone. By the subsequent employment of suitable hydrogenising agents, the quinone is converted into hydroquinone.

Although this is, roughly speaking, one method of its preparation, it is now largely obtained from a combination of aniline, sulphuric acid, and bichromate of potassium, by which its cost is lessened, and which an increased demand may still do much to lower, as in the analogous instance of pyrogallie acid. So much for a very brief sketch of as much of its chemistry and photographic birth as I have been enabled to gather from the photographic publications. We must now consider, as conclusively as the time allotted to this paper will permit, what is of more importance to us as practical workers than its chemical history, namely, the advantages to be derived from its use as a developing agent.

The photographic literature of its early days teems with complaints of its slowness as a developer, and hence its general use in this direction was attended by so much disappointment that its use was discouraged; but as its management became better known it has come to the front again, and will have a fair trial, as it undoubtedly possesses many advantages over other developers with their complicated and intricate formulæ.

These advantages we will now consider.

I do not pretend that my observations should be taken as based upon exhaustive or systematic experiments. I have neither the time nor the ability to devote to this research; but my experience of its advantages to the amateur are such as to lead me to recommend its more extended use, with the view of modifying it to suit various classes of work and adapting it for varying exposures, and if it can be made suitable for landscape work, and for instantaneous as well as time exposures, then we shall have a developer which will enable us to diminish our stock of bottles in the dark room to two—one for the mixed alkalis, the other for the hydroquinone. As the latter does not require any restrainer we do not need any bottle of bromide solution, and as it can be used for the development of the various makes of bromide papers no ferrous oxalate solutions are required; therefore, two more bottles are dispensed with. As with this developer any amount of density can be attained, we want no intensifying solutions, so here go two more bottles; but this diminution in the number of bottles does not by any means exhaust the list of its advantages, one of its most marked being the entire absence of fog, with the mixed alkali, unless in the presence of ammonia, when a veiling may take place depending in degree upon the quantity employed, producing in some instances almost the appearance of a colloidal-bromide emulsion. Its great advantage to me in photo-micrography is its capability of rendering fine detail without that blocking up which arises from lateral development by which delicate lines become almost closed up, and which I have frequently found from the use of pyro; it appears to my mind an excellent developer from this peculiarity for those who have the photographic copying of maps, plans, or line work of any kind. Of course this absence of blocking up may be more apparent than real from the absence of fog, which may make the fine detail appear clearer and sharper than does pyro, but it is a point which will be all the better if investigators will examine and verify. We may reckon amongst its advantages that of its cleanliness, as evinced in the freedom from stains on either negative, hands, or towels, although the latter become brown, but as they are saturated with alkali they are easily washed. Some objections have been raised on the score of its being rather more expensive than pyro, but I think these are unreasonable and untenable, as one bath of developer may be used for at least four negatives without losing its power to any great degree. One foreign worker with it was accustomed to make up a large vertical grooved bath of it, and leave all his negatives in till they were fully developed, but while I cannot recommend such haphazard work, it will serve to show its power and its economy as a developer against pyro. If that is not enough, the old mixed developer, instead of being thrown away, may be bottled off for future use, and after a fortnight it has been found retaining a considerable amount of energy.

One other advantage arising out of the use of hydroquinone is the ability to take a mixed developer in travelling abroad, to be enabled to test exposures, and without the mess and the staining of bedroom utensils arising from the use of iron or pyro.

And yet another advantage which may be considered in conjunction with the last, and that is the amount of light which may be employed in comparison with that to which we are restricted in the use of pyro. In one case a gentleman, whose name I now cannot remember, once developed a plate in the open room, merely adopting the precaution of standing with his back to the gas while using this developer. Now this ability to stand more light is an advantage to those whose eyes are likely to be strained and damaged by the semi-obscure light hitherto necessary with the usually recommended developer, and with this also no ammonia fumes are flying about to distress your ophthalmic as well as your olfactory organs.

The advantages in the printing of transparencies is well known to many in this club, and those members who have used hydroquinone for this purpose will support me in bringing evidence to its freedom from deposit as well as stain; we have none of the creamy deposit of oxalate of lime arising from the employment of ferrous oxalate nor the yellow stain from the use of pyro; the slide comes out of the developer perfectly clean glass, but, as the alkalis are rather difficult to remove, it is necessary that the transparencies should be passed through a bath of alum and citric acid before their final washing, as if this is omitted the plates bear a streaky appearance when dry. With regard to the exposures necessary with hydroquinone-developed plates, if I may judge from photo-micrographic work, it appears to me that we may give a very full exposure without any detriment to the quality of the negative. It has not been possible at this season of the year to try it on instantaneous work, but should it be tried later on I think the hydroquinone must be increased to a very full extent; a developer weak in hydroquinone is very slow, but by increasing its proportions it becomes as manageably rapid as pyro. We trust the next season will enable us to put this new agent on its trial, when I believe, unless I am too sanguine, that it will be weighed in the balance and not found wanting in the good characteristics I claim for it. If we should find it lacking in the good qualities we are so familiar with in pyro, I will fully retract, and throw up my brief.

The formula I have employed, and with whose results I am well satisfied, is that given in the direction for developing Thomas's lantern plates, but I find that it requires slightly strengthening with more hydroquinone to make it conveniently quick in its action when used upon ordinary negatives. Negatives developed with hydroquinone fix very quickly and thoroughly, as this developer has not the tanning action on the gelatine which pyrogallie acid has, consequently the film is more pervious. There is a very unusual precipitate formed in the fixing bath in the shape of a greenish-brown finely granular deposit, unlike anything seen with pyro, but of whose nature I am not chemist enough to tell you any particulars. I only call attention to it to warn those who may be led to fix albumenised prints in the same dish that as had this deposit in, to see that the dish is well cleaned with hydrochloric acid before it is used for fixing prints, as I recently had about a dozen prints hopelessly stained yellow from neglecting this cleanly precaution.

Hydroquinone may also be used for developing any of the bromide papers. I have lately been trying it on Morgan & Kidd's, and also on the Eastman paper with about equal results—that is, I found a very decided yellowing of the whites, which was most annoyingly prominent when the prints were dry. I have succeeded in doing away with that by immersing the print in the acetic acid bath recommended for clearing the Eastman paper after the iron developer, and it seems to remove it almost entirely.

The formula used is stated to be unusually and unnecessarily strong, but I have preferred taking it as I found it, instead of going out of my way to try and improve upon it. I have not the time for experimenting, or I dare say other and more favourable modifications might be arrived at. Hydroquinone is on its trial at the bar of the photographic world, and I close my pleadings in its behalf by asking you to believe that I am honest in all I claim for it.

(Discussion in our next.)

THE CONSTRUCTION OF PHOTOGRAPHIC LENSES.

This paper, which was read at the Society of Arts by Mr. Conrad Beck, appeared in our last and preceding issues. The discussion was as follows:—

The CHAIRMAN (Mr. J. Traill Taylor) said two years ago he addressed an audience in that room on the characteristics of the lenses then in existence, without any regard to theory. Mr. Beck had discoursed on the theory, so that in this case practice certainly went before theory. Mr. Beck said that a concentric lens had hitherto been an impossibility, as, if quite concentric, it would not have the required refraction. But some two or three years ago he examined one in which, so far as he could learn, the lenses were concentric. It was made of a glass of an exceedingly high index of refraction—some of the new Jena glass—and projected the oblique pencil practically perfectly on a flat plane. The aperture was somewhat small, however—about f.16. Some difficulty arose in obtaining the right kind of glass, but it was consoling to know that such a thing had been done. Mr. Beck had suggested a spherical lens as one which, if obtained, would give marginal definition on a curved plate; but many years ago Mr. Sutton made a lens composed of a shell of fairly dense flint glass, filled with water, and an ingenious diaphragm placed in it. It was a panoramic lens, embracing a wide angle. The plate was curved cylindrically, and the spherical aberration was very well corrected—sufficiently well, at any rate, to enable one to enlarge a picture taken with it two or three diameters.

Mr. T. H. DALLMEYER said he did not quite follow Mr. Beck in what he said about theoretical men. They were in many ways indebted to Sir George Airy's treatise on spherical aberration, and he afterwards annexed it up in a practical form for opticians who did not understand the subject. Only a day or two ago he was looking over a paper by the late Peter Barlow, who worked with Dollond, and he there said, in a particular instance in which he described a negative achromatic eyepiece, that although he gave the formula, opticians as

a rule had to sacrifice a very great deal of mathematical elegance to the utility of practical observation. When you had theoretically arrived at the main principles to work upon, a man used to observing the character given by the principles—in such as the image, and so on—would know in what direction to lean—so that he could gain anything through a calculation of the excentric pencil. The excuse made for the mathematical men not going into the subject was that it was too cumbersome; there was no prettiness in it. The results were laborious, and when obtained you gained very little information which you would not obtain better by a little practical effort after first arriving at the approximate result theoretically. With regard to Jena glass, he had one or two specimens which were very full of colour, and the surfaces were not to be relied upon, so that he had not done much with it. However, on high authority, such as Dr. Vogel, they were told that these lenses were very successful, and as he did not think English opticians ought to be behind, he was working on the same subject.

Mr. J. WARNERKE asked if it were possible to have lenses suitable for orthochromatic photography, viz., with a coloured part added, in order to avoid the use of screens, which generally very much affected the sharpness of the image.

The CHAIRMAN said he presumed the question would include colour, either in the glass itself or in the cementing balsam, to act the part of a screen in orthochromatic photography. Captain Abney had suggested the application of coloured collodion to one surface of the lens.

Mr. WARNERKE said he had come to the conclusion, from his own experiments, that the use of the screen, either in front, behind, or between the lenses, and no matter how carefully prepared, spoiled the image.

Mr. DALLMEYER said no doubt that would be the case. If you looked directly through the parallel surface of the glass there was no effect on the position of the image, but if you looked obliquely through a parallel ray it was certain to be displaced. Captain Abney's plan, therefore, would be preferable if the colouring matter were applied equally to the surface. It struck him the other day that perhaps the best possible form would be a coloured glass, if it could be obtained homogeneous, placed parallel to the surface of the outside lens, and then possibly the rays coming in any direction would not suffer—but he was only speaking off-hand.

The CHAIRMAN remarked that history repeated itself. This plan had been suggested before Mr. Dallmeyer was born, by Emil Busch, in a very old treatise on photography. But in this case, the blue glass shell was for the purpose of obtaining the actinic effect.

Mr. BECK thought it must be obvious to every one that if the glass of the lens itself were coloured there would be much more colour in the thicker part than in the thin. If you had a parallel plate of glass, the same lens would always have to be used with it, as it would alter the corrections.

Dr. LINDSEY JOHNSON asked for a definition of two words which one often met with, which he had seen used with quite different meanings. Dr. Monckhoven stated that an aplanatic lens was one which could be used with the full opening, and that an antiplanatic one had to be stopped down in order to get definition at the sides. On the other hand, Dr. Eder gave an absolutely different definition, saying that an aplanatic lens was one in which the two systems—the front combination and the back—were almost similar; whereas in an antiplanatic lens they were totally different, as in a portrait lens. The first definition seemed to him totally absurd, as you had only to cut down your lens sufficiently, as in one of Ross' portable asymmetrical ones, and you had at once an instrument which could be used with full opening; yet if it were not cut down to small circles, instead of what Dr. Monckhoven would call an aplanatic lens, it would be an antiplanatic. In no book could he find an authoritative definition of these terms.

Mr. LYONEL CLARK said he understood Mr. Beck to mean by astigmatism spherical aberration of the oblique pencil, and he should like to know what difference there was between that and coma. If it were the same, it would somewhat simplify a rather troublesome correction. He was much pleased with the attack on examination papers, and the absurd mathematical way in which the simplest problems were obscured. One reason, probably, was that examiners were nearly always chosen from those who wrote books, and, consequently, those who went up for examination had mainly to find out what marvellous terms his examiner had happened to use. With regard to coloured glasses, as Mr. Beck had pointed out, it was practically impossible, and certainly not desirable, to tint the glasses themselves, on account of the different thicknesses of the refractive surfaces; but in a discussion on the same point some time ago, it was mentioned that it would be quite practicable to use a method which had been employed by the Chairman for a different purpose—to take two ordinary glasses, a positive and a negative, exactly correcting each other, and cement them together with coloured balsam.

The CHAIRMAN said there was another objection to the Jena glass besides the colour, which had been already mentioned, and one which seemed fatal. That was the stability of the surface, after it was polished, to disintegrate or rust, as he might term it. A distinguished London astronomer had a prism from abroad, made of a very suitable kind of glass, but after a short time it was found that the surface got rusty. He then had it cleaned and polished, and encased within parallel plates of harder glass, and it then became utilisable. If a glass of this sort were employed, as Mr. Dallmeyer employed the flint glass in his treble single combination, some benefit might arise; but he thought the Jena glass would bear a good deal of improvement before it could be used

as ordinary glass. A method of applying colour in connexion with spectacle glasses was patented some years ago, consisting of putting a film of coloured balsam or varnish between two surfaces of glass ground to the proper curvature. He did not know that they were much used, but he remembered seeing a lot of them sold off by auction not very long ago.

Mr. J. R. GOTZ said as far as his information went, an aplanatic lens was one free from spherical aberration, which brought the rays to a focus on a plane. The question arose next, with what portion of the aperture did it do that. Photographers required a large aperture, and the answer would be that when a lens was satisfactorily aplanatic, it was so with a large aperture. Almost every lens could be so with a small aperture, but a well-corrected first-class lens should be aplanatic with a large aperture, and that was the direction in which Continental opticians had been working. The antiplanat was simply a description of the form of the lens. The firm which brought out the so-called antiplanat required to bring something new before the public, and, as far as he could understand, the term simply applied to the form in which it was ground. With regard to the Jena glass, he thought there was a good deal of piecemeal information about, which gave it a character which it only partially deserved. Some of it was exactly the same as glass produced before by eminent firms, and would show the sodium and other lines coincident with it to about the third or fourth decimal. Such glass, of course, might replace that which had been used hitherto perfectly well, as it could not be any more susceptible to atmospheric influence. There were other kinds, which were exceedingly white. For instance, there were some light flints which would almost replace the heavy flints, and with great advantage. The Jena people offered to make glass for opticians, giving any refractive index they required, or any required dispersion, and if they could do this, it was hardly right to complain of what they did. The establishment of the manufactory had been preceded by a good deal of research, which was supported by the Prussian Government, who found Messrs. Schott the necessary funds to make every possible experiment, and at last the experiments were completed, and the factory was established under the protection of the Prussian Government. He thought it was a great credit to them, and that when these glasses were better known their value would be more appreciated.

Mr. CHAPMAN JONES said he had seen several examples of the Jena glass, but only one was affected by the atmosphere to any appreciable extent, and they were all remarkably free from colour, much more so than most flint glasses. In a depth of four or five inches one might almost call it colourless. With regard to the use of coloured screens, he thought it possible, by putting the screens either in front or behind the lenses, to cure curvilinear dispersion in a single lens.

Mr. THOMAS S. TAYLOR, while thanking Mr. Beck for his interesting paper, thought there was one matter he had somewhat overlooked. He said that to cure astigmatism it was necessary to have lenses of deep curves, but he ventured to think that that was a misapprehension. What he meant by astigmatism in a lens was that the oblique pencils were practically what was known as the circle of least confusion. He should put the matter thus:—To obtain a flat field in a photographic lens, to make the rays at the edge of the plate to coincide in the same plane with those in the centre, deep curves were necessary. It was possible to obtain practically no astigmatism in a lens which gave a very concave field. If you got the centre in focus, with no astigmatism, and then pushed the glass a little further in and focussed the edge, you had very little astigmatism, if the lens had flat curves; but if it had deep curves, you had the maximum astigmatism. Therefore, he came to the conclusion that it was impossible to have a flat field together with freedom from astigmatism; the two were physically opposed, just as depth of focus and length of focus were. Mr. Beck had possibly overlooked one fact when he said that it might be possible with the Jena glass to make lenses perfectly concentric. If so, the convex surface of the lens would be flatter than the concave, and therefore it would minify, not refract, the concave surface being of shorter radius. This might be overcome, possibly, by a difference in density, but as the lens was designed the denser one must be the convex one, with the concave surface inwards. He concluded, therefore, that astigmatism and flatness of field were physically opposed to each other. He fully agreed that Mr. Beck had done good service to optics, and to science generally, by his none too strong remarks with reference to examinations, and the impractical and useless application of formulae in such examinations. With reference to the Jena glass, Mr. Gotz had referred to the possibility of any optician obtaining exactly what glass he required on giving the refractive index and the dispersion; but he (Mr. Taylor) thought that was the weak point in what the company proposed, because it seemed to him that so many different qualities would be produced, that it would be impossible to rely on getting two or more batches exactly the same. In England there were only a limited number of qualities obtainable, and therefore the quality was kept regular; and unless it were so, it would be necessary to recalculate the curves for every batch of glass.

Mr. BECK, in reply, said the Chairman had referred to a globe lens, which he thought was the same as he had mentioned as having been tried and discarded.

The CHAIRMAN said he referred not to the so-called globe lens, as formerly employed in America, but to the panoramic lens of Mr. Sutton, which was designed and manufactured in London; it had a perfectly spherical shell of glass, which was filled with water, and a diaphragm was fixed in it. The American globe lens (which he sketched on the board) was of an entirely different construction.

Mr. Beck said he had meant to refer to Sutton's lens. The other was not really concentric, because it was made of ordinary glass. There was immense room for the mathematics in connexion with optics to be written better. No one who had read such books as Parkinson's, and the ordinary mathematical books on optics, could help seeing that they were atrociously bad. Even Heath's book, which came out about a year and a half ago, although it was a magnificent work in many ways, had this defect, that he defied any one on reading it the first time to say how he reckoned his signs. With reference to the words *splanatic* and *antiplanatic*, he only considered them names for a particular form of lens, more of a commercial character than anything else. He took *splanatic* to mean freedom from spherical aberration, which did not mean giving a flat field necessarily. A great deal had been said about the Jena glasses, and some one had mentioned forty-five different kinds. He had particulars of over ninety kinds, and had samples of, perhaps, forty, and some of it was equal in every respect to what they were in the habit of using, and, in fact, it was just the same; but some would not stand exposure to the air, and the great difficulty was that just those kinds which they wanted to use were those which would not stand exposure. Those which had the extraordinary qualities which would make it possible to do what Mr. Thomas Taylor seemed to think impossible, were those which would not stand exposure properly. Mr. Taylor doubted the possibility of making concentric lenses which should be refractive and not give a minus effect, but he had thirty or forty lenses at his factory, which he should be glad to show him. He thought he was under some misapprehension about astigmatism. It meant the aberration of rays in passing obliquely through a lens, so that they did not come to the same point. When you had got the rays to meet, then came the question of flatness of field. If you corrected astigmatism you had a curved field. To perfectly correct flatness of field was largely a question of stopping down; but there seemed to him no impossibility in perfectly getting over the difficulty. It was said that it had been done in Germany, but whether that was so or not time would show.

The CHAIRMAN then proposed a vote of thanks to Mr. Beck, which was carried unanimously.

FIFTY YEARS' PHOTOGRAPHY.

[A Communication to the Glasgow Photographic Association.]

By general consent it is agreed that the science, whose aims and purposes we, as an Association, seek to further and advance, has at last reached its period of jubilee. At this stage in the history of photography it may not be without interest to take a retrospective look, and see from what comparatively small beginnings the science and art of photography has arisen. Many of the earlier facts and triumphs have been lost sight of in the perfected processes of our own time, and are indeed unknown to the ordinary worker of the present day. In the paper which it is my privilege to bring before you this evening, it would be perfectly impossible, having regard for the time at my disposal, to lay before you the complete record of what has been done during the fifty years' existence of photography; I can only refer to the more important points, and it will be my endeavour to do so in a way that may not be deemed wearisome by those who may be present this evening.

We have it on the authority of the poet Laureate that—

"Science moves but slowly, slowly creeping on from point to point,"

and perhaps a good confirmation of this may be found in the fact that the camera obscura existed for nearly three hundred years before a method was found whereby the pictures obtained in the darkened chamber could be rendered permanent. The name that has been associated with the camera is, as most of you are aware, that of John Baptista Porta, a neapolitan philosopher, who flourished in the sixteenth century. Eder, in his *Handbook of Photography*, is inclined to attribute the discovery of the camera to a Benedictine monk, one Panthus, but be this as it may, certain it is that Porta in his *Magia Naturalis*—*Natural Magic*—describes the method of obtaining images in a darkened chamber. In the first edition of this work reference is made only to a simple aperture, while in the later editions the use of lenses to improve the appearance of the image is recommended. A word or two regarding Porta may not be out of place. First of all we will throw upon the screen his portrait, taken from the frontispiece of one of his works, *De Humana Physiognomonica*, published at Sorrento in 1586. I was fortunate enough to secure a copy of this very rare first edition at the sale of Lord Crawford's library.

Porta seems to have been born at Naples about the year 1550. At a very early age he appears to have shown great delight in studying the works of the old philosophers, and it is recorded that when he was ten or eleven years of age he was able to compose in Latin. Brought up under the care of an uncle who fostered the natural tendencies of young Porta, we find that he travelled through France, Italy, and Spain, his principal object being to consult the various libraries scattered throughout these countries, and make himself acquainted with the contents of the old manuscripts collected together in the different storehouses of learning. Porta, on account of a Society which he founded and named *De Secreti*, found himself in discord with the Pope of that day, Paul III., and he had to betake himself to Rome in order to justify the action, and this presumably he would have no difficulty in doing, as the Society was only intended as a means for encouraging the natural sciences, the members for which were only eligible who had done something in the way of discovery, either in the

art of medicine or in natural philosophy. Porta, along with his brother Vincent, established a museum of natural curiosities, which was visited from time to time by the men of science from other countries. Porta never married. He died at Naples in the year 1615. His writings were varied. We have already referred to his *Natural Magic*, it was originally published in four books, but subsequent editions contain twenty books. Several of these contain as frontispiece a portrait of Porta standing in front of a concave mirror, with a sword in his hand performing the experiment known as the mysterious dagger. We will throw on the screen the picture in question, which is taken from a copy of *Magia Naturalis*, published in Amsterdam in the year 1664. The original work I have brought with me and can be seen by the members at the conclusion of the paper. I have also a copy of an early edition published by Plantin, of Antwerp, in the year 1585, which contains only the four books. I may mention an English translation has been published bearing date 1669. I regret that so far I have not been able to procure a copy of this translation. I may, however, give a few quotations from the seventeenth book of this translation, which bears more especially on Porta's experiments with his darkened chamber, and the employment of a lens. After describing the way "to see all things in the dark that are outwardly done in the sun with the colours of them," he adds: "Now will I declare what I ever concealed until now, and thought to conceal continually. If you put a small lenticular crystal glass to the hole you shall presently see all things clearer, the countenances of men walking, the colours, garments, and all things as if you stood by: you shall see them with so much pleasure that those that see it can never enough admire it." He further recommends, "But if you will see all things greater and clearer, over against it set the glass, not that which dissipates by dispersing, but that which congregates by uniting both by coming to it and going from it, till you know the true quantity of the image by a due appropriation of the centre, and so shall the beholder see more fitly birds flying, the cloudy skies or clear and blew mountains that are afar off, and in a small circle of paper (that is, put over the hole) you shall see, as it were, an epitome of the whole world, and you will much rejoice to see it." The quaint descriptions of a concave and a convex lens are well worth noting, that which dissipates by dispersing and that which congregates by uniting. Porta further suggests the use of the darkened chamber as an aid to drawing. He says:—

"If you cannot draw a picture of a man or anything else, draw it by this means, if you can but only make the colours. This is an art worth learning. Let the sun beat upon the window and then about the hole; let there be pictures of men that it may light upon them but not upon the hole. Put a white paper against the hole, and you shall so long pit the men by the light, bringing them near, or setting them further, until the sun cast a perfect representation upon the table against it; one that is skilled in painting must lay on colours where they are on the table, and in the superficies it will be seen as an image in a glass."

The camera obscura was at one time a much more popular affair than it is now. It formed often one of the features of country residences. The diagram thrown on the screen will give a good idea of the form in which the camera obscura was erected.

Before we pass on, however, I may refer to the general writings of Porta, and the titles of his various works; these are:—A treatise on cipher writing, entitled *De Furtivis Literarum Notis*; one on plants, *Phytognomonica*; another on the relations supposed to exist between men and animals, *De Humana Physiognomonica*; it might be interesting to show the mode in which this work has been illustrated. A transparency from one of the cuts will therefore now be shown. It represents the head of Socrates alongside a stag's head, the point of similitude as in the flat noses. Porta has a work bearing on agriculture, cultivation of trees, &c., and its title is *Vallia*; another relating to optics, *De Refractione Opticæ parti libri III.* He wrote concerning hydraulic engines, *Pneumaticorum libri tres*; another work, *De Cælesti Physiognomonica*, treats of the heavenly bodies. *Ars Reminiscendi* is a compendium of all the methods made use of by the ancients to aid and strengthen the memory. A book regarding distillation, *De Distillatione*, which gives one a good idea of the state of chemistry, or rather alchemy, in the sixteenth century. A treatise on fortifications, *De Munitione*; and the last of his scientific works, *De Aeris Transmutationibus*, which may be reckoned the first work bearing on meteorology. Porta towards the end of his life took to writing plays, and four comedies and two tragedies emanated from his pen. Enough has been said regarding our philosopher to show how varied must have been his talents, and although much that is inaccurate and even childish is to be found in his writings, we have yet to remember that he lived in an age of superstition, when alchemy and astrology were regarded as sciences. The only other two works which I possess of Porta's are two editions of his cypher-writing, the first edition published at Naples, 1563, and a later one published at Montbelliard, a town in France, in 1593. These, with those previously mentioned, can be seen by any interested at the conclusion of my paper. In anatomy Porta's name still lives, for anatomists still speak of the Vena Porta.

It is difficult to say to whom we should attribute the camera obscura in its portable form. Robert Hooke, a famous English mathematician describes such an apparatus in 1679, and Mario Antonio Cellio, in 1687, recommends this form of the camera for assisting artists. In the transparency now shown you have a reproduction of the illustration which is found in Hooke's *Philosophical Experiments*, where this device of his is

described. This work was published in 1726, and the original copy I have with me.

Photography may be said to be the offspring of the two sciences—optics and chemistry. We have just been considering the parentage on the optical side, and perhaps on the chemical we might have to go still further back in the annals of history were it desirable to be minute; but one thing is certain, that at all events in Porta's time the darkening of silver chloride by the action of light had been observed by the alchemists. The name by which this substance was then known was that of horn-silver—*luna cornea*; and the alchemist, Fabricius, in his work, *De Rebus Metallicis*, printed in 1564, gives a lengthened account of its various properties. It was reserved, however, to the famous Swedish chemist, Scheele, to give, in 1777, a philosophical explanation of this darkening action of light, and he showed that the action took place more rapidly in the violet-coloured rays than in any other. Coming now to the beginning of the present century we find that Ritter established the fact that the rays beyond the visible spectrum had even a greater action than the visible. The names associated with investigations of a similar nature at this period may be just simply given, Sennebie, Seebeck, Dr. Woolaston, Sir Wm. Herschel, and many others.

In France, a Professor Charles was in the habit of showing to his class about this time a mode by which portraits of a kind could be obtained by the darkening action referred to. The picture now shown will indicate his manner of proceeding. Strong sunlight was allowed to penetrate through a considerable aperture in a darkened chamber, and where the light fell the sitter was so placed that the profile of his head cast a shadow on the paper behind him; a sort of silhouette was thus obtained, but as no mode of rendering it permanent was forthcoming it was valueless.

Thomas Wedgwood, fourth son of the Wedgwood of porcelain fame, as also Sir Humphrey Davy, occupied themselves with the attempt to secure light-drawn pictures. Beyond establishing the fact that the chloride was more susceptible than the nitrate of silver, and that white leather as a basis for the image gave better results than white paper, the problem of fixing remained still unsolved. These two investigators did not attempt camera pictures, they contented themselves with what we would now call printing by contact. This was in 1802. We come now to the year 1814, and the man who was destined to secure the first permanent picture appears on the scene—Joseph Nicéphore Niepce. He, too, seems to have started in the first instance experimenting with the salts of silver. Discarding these, he studied the action of light on resinous and bituminous bodies. He devised a process, to which he gave the name of heliography, which was based on the fact that a substance known as bitumen of Judea after exposure to light was no longer soluble in the menstrua which originally dissolved it. Application of the process now known as the bitumen process remains to the present day, being made use of in certain photo-engraving processes. Niepce employed pewter plates covered with the sensitive bitumen. Comparatively sensitive in the case of contact printing, the material was by no means sensitive enough for camera work, hours being required to effect the necessary change in the camera. Pictures are, however, extant secured by this means, and some little time ago I had the honour of bringing one before our Association. A few facts connected with Niepce's career may not be without interest. He was born at Chalons-sur-Saône, March 7, 1765. Educated for the Church, he, however, ultimately became a soldier, and saw actual service. Retiring from the army on the score of ill-health, he settled down at Chalons. His leisure time would seem to have been devoted entirely to experimenting, and we may take it that it was about the year 1813 he commenced those experiments which ultimately ended in his heliographic method. A good deal is learned regarding Niepce's work from a French book, *La Vérité sur l'Invention de la Photographie*, a biographical notice by Victor Fouqué, published in the year 1867. The book in question is rarely to be met with now, but I have a copy, which can be seen further on. Nicéphore Niepce had a brother, Claude, and the book is largely made up of the correspondence which took place between the two brothers. Claude seems to have had also an inventive turn of mind, and he came over to England regarding a machine of his, the "pyrelophore"—a method of propelling vessels by means of hot air. This was about the year 1811. Nicéphore visited his brother at Kew in 1827, and he then wished to bring his process before the Royal Society. On account of his not divulging the method his memoir was not received by the Society. At the opening meeting of last session we had that identical memoir before our Society, as also a reproduction of an engraving and the camera picture already referred to. Niepce would seem to have worked hard all his life at the attempt to secure light-drawn pictures, but success did not crown his efforts. He died at the age of sixty-eight, his death occurring on July 5, 1833.

Four years previously Niepce had entered into partnership with Daguerre, and we will throw upon the screen a portion of the facsimile of the now world-famous copartnership, that portion containing the signatures of the respective contributors. Fouqué's work has the complete deed reproduced, but we have thought it sufficient for our purpose to show the particular portion referred to. Daguerre, although a Frenchman, may be said to have added a word to our English vocabulary. Although many may not exactly comprehend what a Daguerreotype really is, few there are who have not heard the term. A few details regarding Daguerre, and how he became associated with Niepce, may be here given. This photographic pioneer rejoiced in a perfect plethora of

names—Louis Jacques Mandé Daguerre. His portrait, taken from a Daguerreotype by Mayall, in 1846, is now presented to you. Daguerre was born at a village near Paris, named Cormeilles, on November 18, 1787. He seems to have been left at an early age to his own resources, but appears to have developed a considerable talent as a scene painter. He was employed as scenic artist at several of the theatres in Paris. Daguerre originated those scenic effects known as dioramas. A diagram illustrative of Daguerre's pictures and his mode of showing them is here reproduced. The pictures were painted on both sides of the canvas, and shown first by reflected and afterwards by transmitted light. A description of the mode of producing such pictures is to be found in a translation of Daguerre's treatise on Daguerreotype published in London in 1839.

I have with me this evening the translation referred to. Daguerre's Diorama was one of the sights of Paris. It was opened in the year 1822, and continued till the year 1839, when it was destroyed by fire; this occurred on the 3rd of March in the year specified. The subjects he had in this manner portrayed on canvas were many and varied—*Roslin Abbey in a Fog*, changing afterwards to a snowstorm; *The Deluge*; *A View of Paris from Montmartre*; *Napoleon's Tomb*, *St. Helena*; *Princes-street, Edinburgh*, and *A Fire*, &c. The Temple of Solomon was his last production.

In his sketches from nature Daguerre is said to have largely made use of the camera obscura; and to fix the ephemeral images of the instrument seems to have been the one idea of the illustrious Frenchman. So engrossed with what he deemed possible did Daguerre become, that the story is told of his wife consulting some of the scientific men of the day regarding the sanity of her husband, and receiving the reply that the thing Daguerre sought after was not by any means impossible. We rather think that Madame Daguerre would not derive much comfort from an answer such as this. It may be here mentioned that Isidore Niepce, the son of Nicéphore, took his father's place in the Niepce-Daguerre copartnership, which was to last for ten years, starting from 1829.

W. LANE, JUN.

(To be continued.)

THE USE OF COMPRESSED GASES.

THE publication of the complete evidence in the case of the lamentable Dublin explosion has undoubtedly given a thrill of relief to many whose confidence in the security of the useful gas cylinders had been somewhat rudely shaken by the first accounts. True workers of experience waited before forming any opinions, knowing, or rather feeling sure, that when the truth was known some circumstances would be found which would explain the occurrence, without detracting from the security generally felt when proper care and experience are brought to bear. But old hands were puzzled. Even such an operator as Mr. Chadwick cannot help showing it. It seemed impossible to suppose that a man, apparently conversant with the matter, should expose himself to the danger of experimenting with a cylinder of "mixed" gas. But the apparent impossibility has proved to be the truth, and, what most would have anticipated, turned out to be the actual result. Given a cylinder of mixed gases in a room with some one who avowedly went in to "experiment" with it—"experimenting" necessarily meaning trying how it would burn—and it needs no special evidence to account for the explosion and the fire; indeed, had no explosion taken place, all settled ideas as to explosive gas would have been upset.

But one or two points arise on which questions may be asked. The deceased gentleman is reported not to have considered the mixture dangerous, because the quantity of hydrogen was small as compared with the oxygen. Let all experimenters be warned that no quantity of hydrogen is too small to become explosive in the presence of oxygen. On the other hand, the quantity of hydrogen may be too large to be dangerous, seriously that is; but such a mixture as existed in the Dublin case could only be, as it proved, most violent in its combustion and results.

Another question is, Why did it not explode at first when tried by the customer, and afterwards on its return to the works? This is easily explained. When the cylinder was fully charged, the valve would be opened to such an infinitesimal extent, that flame, though "snapping" in the pipes, could not pass back into the cylinder; later on, as the pressure decreased, and the valve would be opened more, a "flame-way" would be created, and the explosion would result.

It will be seen, therefore, that no discredit is cast by this case on the use of compressed gases, and that the cylinder was not in any way at fault. Various suggestions have been made as to the desirability of a government test for such cylinders, and as to making the commercial mixing of such gases penal, and it may be well in a few words to examine such suggestions.

First, the desirability of a government test. No such test would have prevented the explosion under consideration, and there is no case on

record of a cylinder failing through weakness. It is well known that Brin's Oxygen Company will not charge strange cylinders without previous testing, for which they charge, I believe, one shilling, and it is within the power of all who use their own cylinders to have a guarantee of test by the makers. My own cylinders, and I would never use bags, or make my own oxygen again, are guaranteed by the makers as tested to two tons to the square inch, and as the full charging pressure is one hundred and twenty atmospheres, or considerably less than one ton, the margin of safety is ample. Further, if a cylinder has properly stood the test of charging and transmission, it is not likely to burst in use when the pressure is all the while diminishing. This element of danger may safely, therefore, be left for makers and compressors to deal with, without any need for government interference.

On the question of special legislation for "mixed" gases, there appears little need for any amendment of the existing law, as the dealer who sent out mixed gas for oxygen or hydrogen would certainly find himself on trial for manslaughter if death were caused thereby, and liable for damages if the only consequence were destruction of property—a liability quite as strong in prevention of carelessness as any direct legal penalty.

The lesson of the explosion seems to be that no more danger need be looked for in the use of gas in a compressed form than in the bags, at least not as arising from the cylinders or the compression, while in the opinion of many the advantages are all on the side of the portable form; while another lesson is that neither gun-cotton, dynamite, chlorate of potash compounds, nor the limelight, are things to be handled without due and proper care, and a reasonable knowledge of their nature and peculiarities. All these things are safe in careful hands, all these things, and many others, are dangerous in careless hands; and there are few operations which prove the truth of the proverb, "Whatever is worth doing, is worth doing well," more completely than those connected with oxyhydrogen lighting.

Some of the suggestions in Mr. Chadwick's article in last week's JOURNAL are most valuable, and although to some extent already anticipated in current practice should be insisted on with persistent iteration until the practice becomes universal. I allude to the proposal that in all cases a distinctive colour should be adopted for gas cylinders, say black and white, or better, black and red, for oxygen and hydrogen respectively, and that in all cases the contents should be distinctly and unmistakably marked on the outside. The idea of altering the fittings so that it should practically be impossible to fill incorrectly is good, but would, I fear, cause too much disturbance to existing conditions of trade, as all the present stock of cylinders would have to be taken over by oxygen, and new cylinders, and all connected with their filling, made for hydrogen, which hardly seems practicable. Distinctive colours and plain marking ought to be quite sufficient for ordinary care, which is all that should require to be legislated for. B.

LETTER FROM GERMANY.

A Quick Printing Process—Results with the New Optical Glass from Jena—Concentrated Hydroquinone Developer—Influence of the Developer on the Colour of Prints—Caustic Potash in the Developer.

Many times (writes Dr. Vogel in *Anthony's Bulletin*) I have heard professional photographers ask the question: "What can I do to furnish in two days 1000 prints from one negative?" If I reply, Take bromide of silver paper—the answer will certainly be: "That gives black pictures, but I want them brown like regular photographs." Well, this could be very easily accomplished with the aid of Lichtdruck (cottonotype). But good cottonotypes are not to be had everywhere. We have now a process admitting very well the solution of the problem, and which can be executed by every skilful photographer. It is nothing more or less but the use of chloride of silver gelatine paper. This paper has been known for years, but has met with less favour than it deserves. By way of a test I gave director Helf, in Jüdenburg, an order to develop 1000 copies upon chloride of silver gelatine paper.

Mr. Helf writes:—"The copies you sent me were printed in the hand copying apparatus (Patent Schlotterhaus) on roll paper, in diffused daylight, seven seconds. Total time, two and a half hours."

The rolls were cut in strips of four pictures each; duration, two hours; they were then developed with oxalate of potassium, 3; sulphate of iron, 1 (saturated solutions); diluted with some quantity of water, and with moderate addition of bromide of potassium.

The developer keeps from fourteen days to one month. Four strips of four pictures each were worked at one time. Time, three minutes; therefore total duration of development for one hundred pictures about four hours. After this they were well washed and fixed two minutes in lots of forty; therefore altogether one hour. After this they were washed for two hours in repeated changes of water.

The toning was done with twenty copies at a time in the sulphocyanide

gold bath. It was finished in about four hours. After this the pictures were washed for one minute and put into the alum bath together about one hour. This was followed finally by washing, squeezeing upon glass with a rubber roller, and drying by artificial heat (two hours). During the summer season this is done best in the open air in sunshine.

The squeezeing requires about four hours for 1000 copies. This time is calculated for one person, with extra help the time can be reduced to one half.

The tone is according to one's pleasure, but it is difficult to obtain perfect equality in large quantities, because the intensity of daylight changes during printing. This is no hindrance for practical purposes.

The pictures are trimmed with the glass pattern. The mounting requires practice and care. Glue is spread in the middle of the cardboard (very little, to prevent it from running out on the sides), and the picture is placed on a large glass plate and glued on the edges; but great care has to be taken that the glue does not touch the picture side. In mounting, the glued parts of picture and cardboard will meet.

Each picture is laid upon a fresh part of the glass plate, and when this is full another one is taken; the first one used can be cleaned and dried in the meantime. With a little practice and working in concert, one hundred and fifty pictures can be mounted in an hour by two persons without injuring the glass in the least. The material used for pasting has to be a pretty thin glue. The pressing on to the cardboard has to be done with a rubber roller. After drying, the picture is burnished (cold). Retouching is done from colour with gum arabic.

Since the establishment of the new factory of optical glass of Schott & Co., in Jena, a change is coming in practical optics, therefore also in the production of photographic objectives. Until now all opticians of the world were obliged to procure their glass from Paris and Manchester. Unfortunately, these were not always uniform, and the lens calculations made for one lot would not always agree with those for the next shipment. This has ceased now. The glass factory in Jena is under a scientific management, and one fusion is exactly like the other. The opticians do not require any more to remodel their polishing trays, for each new shipment and the glass furnished is of such uniform proportions not thought of as attainable in former times.

Our first-class opticians, Voigtlander in Bromswig, and Steinheil in Munich, are occupied with testing the new glass, assisted by two scientists of the Imperial Physical Institute, Dr. Lummer and Dr. Kaempfer. The first result of their activity I obtained recently from Voigtlander, in the shape of two eyescopes of exactly the same focal distance. The difference was surprising. With full opening the one will cover a visual field of fifteen cm., completely sharp, whereas the other will cover only eleven cm. This is of great importance for portraits and instantaneous views. The luminous circle of the new objectives was also about four cm. larger than that of the old ones. This is of great significance for the production of wide-angle lenses.

The results obtained characterise sufficiently the progress which has been made with the new glass of Jena.

The movement in favour of the hydroquinone developer proceeds quietly. My son made the observation recently, how, with different mixtures of hydroquinone, with carbonate of potassium or sodium, the colour of the paper pictures (bromide of silver paper) made with the same can be considerably influenced. This colour depends upon the quantity and the kind of the salt added. If the developer is made according to the following formula:—

Sulphite of soda (crystals)	40 grams.
Hydroquinone	5 "
Carbonate soda (crystals)	50-150 "
Water	900 c.c.

Green pictures will always be obtained up to seventy-five grams carbonate of soda. At a larger soda proportion the tone will gradually improve to black or brownish black.

With seventy-five grams of carbonate of soda and correct exposures good results can be obtained, but not with over exposure.

Carbonate of potassium has the great advantage over soda, that the pictures will never have a green tone, and it is therefore decidedly to be preferred for the development of paper pictures.

My son composes the developer as follows:—

Sulphite of soda (crystals)	40 grams.
Hydroquinone	5 "
Water	150 c.c.

After everything has dissolved (if necessary, by putting the bottle in hot water), fifty to fifty-four grams of carbonate of potassium are added. A larger quantity of carbonate of potassium will easily cause strong formation of bubbles during development, particularly in hot weather. For use, five c.c. are diluted with water to thirty c.c.

This concentrated developer keeps a very long time (in diluted condition only two to three weeks) and can be recommended particularly for travelling. In the development of gelatine plates I obtained with the same also very good results; it might also be recommended for instantaneous views, producing a great many details and causing a very rapid development.

For the negative process I prefer in most cases the soda developer. On

account of its greater durability it can also be kept in the following concentrated form:—

Sulphite of soda (crystals)	40 grams.
Hydroquinone	5 "
Carbonate soda (crystals)	75 "
Water	200 c.c.

For use, dilute ten c.c. with water to thirty-five c.c.

Both developers can be graded according to the character of the plates to be developed or the desired result; for too hard working plates less water is used for the developer, and more water for soft working plates.

The price of the hydroquinone developer might prove to be considerably cheaper in the form mentioned (even if used for one development only) than that of the pyrogallol developer.

Several authors recommend an addition of caustic potassium or caustic soda. I do not feel much inspired about it. True enough, it accelerates development, but it causes slippery hands and easily gives cause to frilling, particularly in the summer. I remark, besides, that the development with carbonate of potassium and correctly exposed plates has a duration of only two or three minutes.

NOTES ON THE EXPLOSION OF A GAS CYLINDER.

On January 28 a lamentable and fatal accident happened to Mr. Thomas Arthur Bewley by the explosion of a cylinder of compressed gas at the shipbuilding yard of Messrs. Bewley & Webb, East Wall, Dublin. The deceased gentleman established machinery for the compression of gases, and supplied the trade with compressed coal gas and oxygen in wrought-iron cylinders. Owing to the uncertainty of the exact cause of the explosion a good deal of anxiety has been excited amongst the public.

The combustible gas, whether hydrogen or coal gas, was stored in cylinders painted red, and the oxygen in cylinders painted black. This rule was intended to be invariable. On December 27, Mr. Chancellor, of Sackville-street, sent an urgent request for a bottle of oxygen, but there being none of the black cylinders available, owing to the excess of business at Christmas-time, Mr. Chancellor was informed that he could be accommodated with oxygen in a red cylinder. The cylinder was returned on January 15. Afterwards an application was made for a bottle of hydrogen and one of oxygen. It had been forgotten by the deceased that this bottle was charged with oxygen, and, being red, it was simply filled up and sent out as hydrogen.

It was attached to a limelight apparatus, when the discovery was made that it contained mixed gases, for the indiarubber connecting tube was blown off as soon as the gas was ignited at the burner. It was placed on one side and labelled "mixed gases." Two days afterwards the bottle was sent back to Mr. Bewley and was placed on the table in the drawing office, where it remained until the fatal occurrence.

Instead of allowing the gas to blow off he tested a small quantity of the gas in a tube in the presence of one of his foremen, who described the "spurt" with which it went off when a lighted match was applied to the mouth of the tube. The flame seen was a small blue one. He stated to the foreman that as the amount of inflammable gas was so small he intended to use the cylinder himself as an oxygen cylinder. As the pressure was higher than he required, a portion of the gas was allowed to pass into another black cylinder, which reduced its tension from 800 to 400 lbs. (the breaking strain of the bottle is well over 2000 or 2500 lbs.). It must be remarked that the connecting tube did not fit satisfactorily, and that at the time (two o'clock) a small gas jet was burning in the room. At 4.25 the explosion occurred, but as no one had been in the drawing office but Mr. Bewley himself the conditions under which the explosion took place are not precisely known. The evidence, however, is fairly conclusive.

In the first place, it must be stated that the metal of the cylinder was perfectly sound, and in the interior there was no appearance either of oil or of rust. While the upper part of the cylinder was blown to pieces, the body of it struck the arch over a window and caused the wall to bulge; it then ricocheted apparently against the wall, and passed through a window opposite to where it had first struck. The upper end of the cylinder was found at a much greater distance from the building.

One witness, who saw a gauge on the bottle marking 800 lbs., believed that the cylinder had been overcharged, and that disruption occurred simply by the elastic force of the gas. Having examined the premises, I was in a position to state at the inquest that the nature of the explosion was most certainly that of a detonation. The table and drawers were splintered into matchwood, and the glass from the window, as it lay on the ground, presented the peculiarities of fracture which are characteristic of such an explosion.

The examination of the top of the cylinder just below the shoulder showed that the fractured metal at this part had a different appearance from the other fractured surfaces. Instead of being bright it was burnt all the way round, that is to say, covered with magnetic oxide. Moreover, the medical evidence showed that death was caused by shock, and the force of the explosion threw the body out of the room. While the left hand was severed from the arm at four inches above the wrist, the right was charred, and singeing was noticed on the right leg, and the hair was crisp from the same cause.

Without doubt the explosion occurred from the detonation of mixed gases within the cylinder.

The valves of both cylinders, which had been connected by a tube previously, were found wide open. The ignition of the gases was most probably caused, not by any chemical action spontaneously taking place within the cylinder, but either by a leakage, which was tested by applying a match, or, the leakage being serious, the gases were fired by a lighted gas jet. It must be remembered that what was believed to be the same gas had previously exploded in the limelight apparatus, merely blowing off the indiarubber tube, but, the valve being but slightly open, the explosion was not communicated to the interior of the cylinder because the pressure was higher and the issuing gas was travelling at too great a speed for the temperature of ignition to be maintained in the stream issuing from the small orifice in so large a mass of metal.

For the better understanding of this explanation I will refer to a very simple experiment. Carbon monoxide stored in a gas holder under a pressure of six inches of water cannot be burnt from an ordinary gas jet, but if the size of the orifice be enlarged to $\frac{1}{16}$ or $\frac{1}{8}$ of an inch it can be made to burn when the pressure is somewhat reduced. There is no material alteration in the conditions of the experiment if the gas be mixed with air or oxygen. In fact, the temperature of ignition cannot be maintained in contact with the cooling mass which surrounds a small orifice, or with the gas under a very rapid rate of flow.

We cannot precisely ascertain the temperature of ignition or the rapidity of explosion of the mixture of gases contained in the cylinder, but it certainly contained a large excess of oxygen, and the conditions under which it was first found to be dangerous were different and less favourable to explosion than after the pressure was reduced.

The verdict of accidental death was coupled with a recommendation that the public should be protected from similar accidents by a Government stamp being fixed to all cylinders used for such purposes. But greater safety would be secured by making the fittings for hydrogen and oxygen cylinders so entirely different that it would be practically impossible to charge a cylinder with wrong gas.

—Chemical News.

W. N. HARTLEY, F.R.S.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2584.—"A New or Improved Stereoscopic Apparatus." J. A. DE BRAAM.—*Dated February 13, 1889.*

No. 2588.—"Improvements in connexion with Photographs." G. I. SPALDING.—*Dated February 14, 1889.*

No. 2623.—"A New or Improved Flash Lamp for the Rapid Combustion of Magnesium Powder to be used for Photographic or other Purposes." J. LEISK.—*Dated February 14, 1889.*

No. 2678.—"Improvements in Apparatus for Lighting Photographic Dark Rooms." F. W. BRANSON.—*Dated February 15, 1889.*

No. 2723.—"Apparatus for Controlling the Exposure of Photographically Sensitive Plates when using Flash Lamps." F. W. HART.—*Dated February 16, 1889.*

No. 2727.—"Improvements in and in connexion with Magnesium Lamps." R. J. H. RASTRICK.—*Dated February 16, 1889.*

PATENT COMPLETED.

AN "INSTANTANEOUS" PHOTOGRAPHIC SHUTTER.

No. 16,224. JAMES LYON, Engineering Department, Cambridge University.—*November 9, 1888.*

A PHOTOGRAPHIC shutter for photographing rapidly moving objects.

This shutter opens the lens gradually, it then leaves the lens fully open for a much longer time than was occupied in opening it, and it finally closes the lens gradually in a time nearly the same as that taken to open it.

However short the whole time the lens is wholly or partially uncovered the ratio of the time that the lens is fully open to the time taken in opening and shutting the lens is large.

The object of the shutter is to give the largest possible amount of light to the sensitive plate during any given time of exposure of the plate to light entering the camera through the lens.

The movements of the two leaves which form the covering to the lens are effected by a disc having in it two pins each of which operates a leaf. The pins work in two slots, cut in two sheets of metal called sliders, the slots being so shaped that when the disc revolves the sliders move through a certain distance; the pins then arrive at a portion of the slots which are concentric with the centre of rotation of the disc, and, therefore, the pins move through portions of their paths without moving the sliders; the pins then arrive at portions of the slots which are so shaped that the sliders are moved in the contrary directions.

The movements of the sliders are multiplied in the leaves by means of levers or otherwise. The disc is made to rotate by means of a snitable spring, and the exposure is effected by releasing the disc by means of a catch operated by a pneumatic cylinder or otherwise. The momenta of the working parts are so adjusted as not to shake the camera.

UNDER the title of *The True Position of Patentees*, Mr. H. Moy Thomas has published, through Messrs. Simpkin, Marshall, & Co., a little book in which the patent laws and regulations at home, abroad, and in our Colonies and dependencies are explained for the information of English inventors.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 25.	North Middlesex Club	The Iron Room, Strood Green.
" 26.	Great Britain (Technical)	54, Pall Mall East.
" 26.	Bolton Club	The Studio, Chancery-lane, Bolton.
" 27.	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 28.	Burton-on-Trent	The Institute, Union-street.
" 28.	Halifax Photographic Club	Mechanics' Hall.
" 28.	Liverpool Amateur	Royal Institution, Colquitt-street.
" 28.	Oldham	The Lyceum, Union-st., Oldham.
" 28.	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.
On Thursday night, last week, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. C. H. Cooke presided.

Mr. F. W. HART exhibited a view of Weston's Electric Light Factory, taken at half past ten p.m., by the magnesium flash light. He also exhibited a group taken by the flash light at the Freemasons' Tavern by the Stereoscopic Company and himself; he employed fifteen magnesium lamps, which were fired simultaneously; the size of the negative was 12 x 10 and the weight of magnesium burnt sixty or seventy grains.

The CHAIRMAN remarked that the photograph was a very good one, but the magnesium light had acted upon the eyes of some of the sitters.

Mr. A. HADDON said that one "Free Lance" had been criticising him in a photographic journal by separating a portion of his remarks from the context; such action was unjust to public speakers, and people who committed such actions did more harm than good to the photographic community. After stating that "Free Lance's" version was inaccurate, Mr. Haddon continued that that writer had said that an angular ring on the back lens did no harm, but he (Mr. Haddon) asserted that it did do harm, and cut off some rays which would otherwise reach the plate. He was prepared to prove his point or to admit he was wrong if "Free Lance" would on any Saturday come down to Greenwich to experimentally test the matter, but only on condition that the result should be published as widely as the original charge against him. At a previous meeting Mr. Kerr had said that he had ascertained that a quarter of the lens must be uncovered before the whole of the plate is covered by the image, and this went towards supporting his (Mr. Haddon's) assertions. If "Free Lance" accepted the challenge he (Mr. Haddon) would promise not to reveal his identity.

Mr. Hart exhibited some good photographs of interiors taken by the flash light.

Mr. J. B. R. WELLINGTON exhibited his new detective camera, the chief novelty in which is, he said, that it opens from the bottom, the halves of which bottom slide into the ends of the camera when the latter is opened. The camera has a roller blind shutter working close to the front of the plate; he had found it to answer very well. The camera carries six double slides ingeniously packed inside with the maximum economy of space and remain inside while the camera is in use. The whole weighs six and a half pounds without plates.

Mr. J. G. R. WOLLASTON asked if Mr. Hart would give a demonstration with his simultaneously flashing lamps before the Association.

Mr. HART replied that for the present he was short of lamps.

An exhibition of lantern slides then took place. Some pictures by Mr. Wollaston from negatives taken on Eastman's stripping films were projected on the screen. Then followed views by Messrs. Cooke, H. M. Hastings, and J. Joel.

Mr. HASTINGS said that some of his negatives for the slides had been efficiently intensified by means of Mr. Wellington's sulphocyanide developer.

Mr. H. S. STARNES exhibited some lantern views from Kodak camera negatives; also some views of ordinary size on plates containing white silver. He said that he had created one hundred and twenty plates at a cost of five pence halfpenny.

Slides by Mr. Wellington followed, then came those which had been publicly announced for exhibition that evening, namely, some views of Holland, taken by Mr. P. Fincham, and brought by Mr. T. E. Freshwater; also some views of scenes in the same country taken by Mr. F. A. Hartman, who gave an explanatory description.

All these were viewed with much interest, and Mr. FRESHWATER said that Mr. Fincham's negatives were four inches square; the slides were wet collodion transparencies taken from the said negatives.

Mr. FRESHWATER then exhibited some views of the Jubilee procession taken by himself, and stated that at the next lantern meeting he would bring a series of slides illustrating manners and customs in India.

CAMERA CLUB.

On Thursday evening, February 14, lantern slides were shown at the Camera Club, a large and varied collection having been brought together. The subjects exhibited were as follows:—Tintern Abbey series and microscopic slides, Mr. F. Evans; hand camera work, Mr. Beck and Mr. Shipton; landscape, Mr. B. G. Wilkinson, jun.; scenery at home and in Canada, Lieutenant Gladstone; views around Richmond, Mr. J. H. Williams; slides on ferrotype and on gelatine-albumen plates, Mr. H. M. Elder; also work by Messrs. Ferrero, Laurie, Barclay, Mackell, Major Scott, and the Hon. A. W. Erskine.

Some transparencies from negatives by Mr. Gambier Bolton were lent by Messrs. Fry & Co., and, at the request of members present, the American slides received in the 1884-5 exchange were again shown.

During the evening Mr. ROBERTS drew attention to the new form of Beard & Oskey's regulator, which was in use at the lantern, and Mr. Ferrero exhibited a new dark-room lamp introduced by Messrs. Marion & Co.

The subject on Thursday, February 23, will be *Notes on Photographic Lenses*, when a paper will be read by Rev. T. Perkins, M.A.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

A MEETING of the above Society was held at the West Norwood Club on Tuesday evening, February 12. The chair was occupied by Mr. W. H. Walker. Messrs. W. Rice and H. S. Bellsmith were elected members of the Society, and Mr. W. Gale was elected an honorary member.

A demonstration of the working of the Eastman Company's new stripping films, their transferotype and bromide papers, was given by Mr. Bellsmith.

Mr. BELLSMITH announced that in their new film the Company had entirely overcome the earlier difficulties which had been encountered by those gentlemen who had adopted their use—viz., damp spots and difficulty in stripping.

The next meeting of the Society will be on February 26, when Mr. Wolf will occupy the chair.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE monthly meeting of the Society was held on Tuesday, February 5.—Mr. H. J. Taylor occupied the chair.

Three new members were elected.

The annual lantern slide competition for the best series of six slides made from negatives taken during the previous year was held. Five competitors entered. The slides were exhibited. The first award fell to Mr. Furniss, and Mr. E. Beck took the second.

A discussion regarding the merits and demerits of the slides took place, and it was considered that the best slide was one in the set shown by Mr. Hunt.

A *Concours* was held by the above Society, on the 12th instant, and was well attended.

A large number of photographs, the work of the members, and including the various prize and competition pictures of the past season, were exhibited on the walls of the Hall.

A loan collection of photographs included examples by Messrs. H. P. Robinson, J. Gale, Bedford, Lemere & Co., F. M. Sutcliffe, Morgan & Kidd.

Photographic appliances were exhibited by Messrs. Culley & Preston, including a portable developing tent, shutters, and cameras. Messrs. Hibbert Brothers also showed cameras, stands, &c., including one of Messrs. W. Watson & Sons' new patent cameras.

Mr. Bromley had some fine stereoscopic transparencies and prints, also a microscope showing micro-photographs.

During the evening a large number of views, taken by the members, of places of interest in Sheffield and neighbourhood, were shown by Mr. W. D. Forsdike's lantern.

BRIGHTON PHOTOGRAPHIC SOCIETY.

A MEETING of this newly-formed Society was held at 35, Vernon-terrace, on Thursday, the 14th instant. Mr. D. E. Caust was voted to the chair.

The minutes of the last meeting having been confirmed, the officers for the year were elected, viz.:—*President*: Dr. W. H. Rean.—*Vice-President*: Mr. W. Jago, F.R.S.—*Committee*: Messrs. Foxall, Court, Harncastle, Burt, Sharp, G. Perren, Wall, R. Wicks, E. J. Bedford, and Devereux.—*Treasurer*: Mr. J. P. Silsbury Roberts.—*Secretary*: Mr. A. H. C. Corler.

A discussion then ensued as to the room to be used by the Society, and eventually the matter was referred to the Committee to report on at the next meeting.

The meetings of the Society will be held, during the winter months, on the second and fourth Tuesdays in each month, at a quarter past eight p.m. The Society is open to photographers, amateur and professional, either ladies or gentlemen. All applications for membership, &c., to be sent to the Hon. Secretary, Mr. A. H. C. Corler, 42, Montpelier-road, Brighton.

DERBY PHOTOGRAPHIC SOCIETY.

THE members of this Society held their usual monthly meeting in their new rooms, Derwent-buildings, 3, Derwent-street, on Tuesday, February 12.—Mr. R. Keene presiding.

Mr. T. A. SCOTTON read a paper and gave a demonstration on *Lantern Slide Making*. He also gave a demonstration on making transferotypes on opal.

The lantern demonstration was supplemented by an exhibition of lantern slides by Mr. E. J. Lovejoy (Hon. Secretary).

The members of this Society have now taken rooms of their own, and intend, as soon as possible, to fit up a dark room. They have a fairly good library.

MANCHESTER PHOTOGRAPHIC SOCIETY.

A MEETING was held on February 14.—Mr. John Schofield, Vice-President, in the chair.

Messrs. James Whittaker and W. Schofield were elected members.

The evening was open for short communications.

Mr. C. F. BURNAN had been trying hydroquinone for stereoscopic transparencies. He was rather in favour of it for some classes of work, but thought it was apt to produce shadows too clear, and high lights too dense, for negatives; in fact, with his present experience, he would be rather afraid to develop a negative on which he set much store. Other opinions were given in favour of hydroquinone and against it.

Mr. G. H. JOYNSON had been working the wet collodion process for microscopic work, and failed to produce the fine image he desired with iron developers, even when it contained gelatine or albumen, as had been advocated by Mr. J. Pollitt.

Mr. ABEL HEYWOOD, jun., said Dancer, of Manchester, used to produce some of the finest work of that class, and Miss Dancer was at present engaged in this branch of photography. He advised Mr. Johnson to call and see the lady named.

Mr. ATHERTON thought a slow and very much restrained developer would be the best.

Mr. F. EDWARDS said Messrs. Mawson & Swan gave special instructions and sold special collodion for this class of work. He believed they advised a weak developer.

Mr. JOHN S. POLLITT considered the great secret in obtaining a fine deposit was in slow development, accompanied by the addition of gelatine and iron; but pyrogallol acid he believed to be the best of all. The latter was slower to the extent of about fifty per cent. than iron. Long exposures and slow development produced fine grain, and vice versa. He called attention to the sixth edition of Harwich's *Photographic Chemistry*, pp. 36 to 43, and also to the ninth edition, pp. 124 to 132, wherein were stated some curious experiments made by the late J. W. Young, a highly respected member of this Society, viz., that it was possible to fix a collodio-albumen plate and afterwards to develop it. He (Mr. Pollitt) had tried several times to repeat this experiment, but had failed.

Mr. AHERTON remembered the circumstances very well, and he had often done it. The image was, however, weaker than if developed first and then fixed.

The Hon. SECRETARY (Mr. W. I. Chadwick) said the result of Mr. Young's success might, no doubt, be from the fact that the collodio-albumen plates were finally dipped in gallic acid before drying, which was to a certain extent a developing agent.

Mr. JOHN SCHOFIELD called attention to a difficulty he had experienced in toning ordinary silver prints which had been washed in hard water. The same paper when washed in soft water toned quite readily.

The Hon. SECRETARY said he should have expected the conditions to be reversed. Ready sensitised paper was generally very acid, and when this is so the prints should be washed in two changes of water, and then the third water should be made alkaline with carbonate of soda, after which there was very little trouble in toning.

Mr. BRENNAN referred to the Dublin explosion. He thought the matter was too serious to pass by in this Society unobserved. He was telling his little boy about the explosion, and the boy asked why the cylinder then in his room did not "go off." "Really," said Mr. Brennan, "I could not tell him why it did not."

Mr. HEYWOOD, jun., said the matter was so serious he would never have a cylinder about his home again.

Mr. W. J. CUNLIFFE and others were of the opinion that unless some assurance were given to the public, it should not be sold to inexperienced persons.

The Hon. SECRETARY had seen the report of the inquiry into the cause of the explosion, and expressed his views for precautions in future (as published in the last issue of *The British Journal of Photography*), the idea of having different sized screw ends to the oxygen and hydrogen cylinders being highly approved of by all, and the only satisfactory way in which public confidence could be restored.

Mr. J. T. LEES said the purity of the gases could be easily tested by filling a soda-water bottle with water, then holding it neck downwards in a bucket of water, and allowing the gas from one cylinder to bubble in or fill the glass bottle, then applying a lighted taper. If pure hydrogen were present, the gas would burn at the neck of the bottle; if oxygen, the taper would burn brighter. If mixed gases, they would explode, and the explosion would be a small affair and do no damage.

Mr. H. WHITEFIELD thought the test might be a very good one, but what was a lanternist to do when he found he had got either two cylinders of oxygen or two of hydrogen, or a mixed cylinder? What we required was some plan by which the gases could not get mixed, and the suggestion of Mr. Chadwick was the only one that met the case.

Mr. HEYWOOD, jun., thought the suggestion of Mr. Lees a very good one, and worthy of everybody's consideration.

But again the members were almost unanimous in requesting some better system than at present exists, and ultimately it was resolved that a committee, consisting of Messrs. Abel Heywood, jun., C. F. Brennan, John Schofield, and the Hon. Secretary, write to the President (Sir Henry Roscoe, M.P.) on the subject, and report at the next meeting.

Mr. H. SMITH exhibited a very nice print by Willis's cold-bath platinotype process. After many trials with various other papers he considered this the best; it was much quicker than silver printing.

Mr. J. WITHAM gave his experiences with Pizzighelli platinotype paper. He considered it very reliable, but, in reply to a question from the Hon. Secretary, said his experience was based upon only one sheet.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

The ordinary meeting of the above was held in the Society's Rooms, Grand Hotel, Colmore-row, on Thursday, the 14th instant.—Mr. W. J. Harrison, F.G.S., in the chair.

Messrs. W. F. May, T. H. Kendrick, and G. E. Wilson, were elected members.

Mr. W. THOMAS HORTON then delivered his paper on *Daguerreotype*, giving full particulars of this now extinct practice of photography, and exhibited the apparatus used in the process, with a number of *Daguerreotypes*.

In the discussion which followed, in answer to the question, "What kind of lens was used in *Daguerreotype*?" Mr. J. EDMONDS said an ordinary single lens was used, but allowance had to be made for focussing. Early lenses were limited in variety, but good views were taken about that time on calotype paper with a non-achromatic meniscus lens. He remembered excellent portrait lenses by Voigtlander in which the chemical and actinic foci did not coincide, and which required the dark slide and the focussing screen of the camera to be set at a different distance from the lens, in order that the plate might be in the true chemical focus. Mr. Edmonds referred to his recollections of photography when Mr. Whitlock practised *Daguerreotype* under "Beard's patent," and exhibited photographs of Birmingham celebrities at his shop in that part of New-street which is now Stephenson-place, also of Mr. James Johnstone, a skilful photographer, who practised *Daguerreotype* at that early date.

Mr. J. COTTEWILL: Members had spoken as though the difference between the chemical and visual foci was a novelty nowadays, but at the present time he found it still prevalent in many cases in modern lenses. Out of six portrait and landscape lenses in his possession only one is perfectly coincident in chemical and visual focus.

Mr. G. M. LIFF had some time ago an old camera with single lens of early make, which, after focussing on the glass, required the back to be moved to obtain the correct focussing for the plate.

Mr. W. J. HARRISON: The lenses used by Daguerre and others in the early days of photography were uncorrected in this respect, that the chemical and visual foci were not coincident. This was pointed out by Towson, of Liverpool, about 1840, and was remedied by the genius of the Viennese professor Petzval. The speaker exhibited a large picture of Daguerre (a fine print by Nair, of Paris, on Eastman paper), being a copy of a *Daguerreotype* taken about 1840.

Mr. E. C. MIDDLETON had seen old cameras with one opening for focussing screen and another for dark slide.

Mr. WALTER GRIFFITHS then read the following paperette on *His Experience with "Kristaline" as applied to Photography*—

I expect all of you have heard of kristaline, but, perhaps, few of you have tried it. It is an American production, as the spelling of it with a "K" would reveal. It is, I believe, manufactured as a lacquer for brass and other goods, but it also has some properties as a photographic varnish that are useful and, therefore, interesting to us. Of its composition I am quite ignorant; perhaps some of the members can enlighten me; but it differs greatly from the negative varnishes that we are accustomed to, or lacquers either. It smells strongly of "pear drops," and, oddly enough, inhaling the vapour induces coughing; at least, it does to me. Unlike varnish, it is very thick, and runs almost like treacle, which at first gives the impression it is too thick and wasteful; however, a large part of it drains off again, and the remaining film is found to be about right in thickness. A plate coated with it takes half an hour to dry cold, and it never seems to be tacky like ordinary varnish. It does not mess your fingers. With heat it dries in a minute or so, but not so quickly as ordinary varnish. It will not mix with water, but on bringing it in contact with it it does not form a white cloud or precipitate that some varnishes do, particularly common ones. It will not mix with alcohol properly, but will mix with ether, with which it may be thinned, but on coating a plate the ether soon evaporates and leaves the kristaline as slow drying as ever. As regards the nature of the film, I find it not so impervious to water or moisture as I had understood. A gelatine film will soon swell under it; however, for all that, it compares favourably with ordinary varnish for all practical printing purposes, and, in fact, has some advantages. I have not had any silver stains upon it from albumen paper printing, but am not prepared to say it is proof against that. I think one of its most valuable features is that a film of it assimilates itself closely to the character of the surface upon which it is spread; that is to say, a dead or matt surface remains almost as dead or matt underneath it, which cannot be said of ordinary varnish. It is, therefore, peculiarly suited for such things as opal pictures, either bromide or carbon. A film upon plain glass dries so much like the glass itself that it is difficult to distinguish which side it is upon, the more so because it is perfectly free from waves and all surface markings whatever; in this respect it has the advantage over most varnishes. It is quite possible that a coat of it on the back of a silver print would materially lengthen its life; and, by the way, it is useful to paint your bottle labels with, keeps them clean and fast to the bottles for a long time, and can be applied with a brush. As regards what usage it will stand, dusting has no effect upon it, but I should be afraid to indulge in washing it. Sponging it with water soon abrades the surface, and if continued the entire film crumbles off. I am speaking now of it on a gelatine negative. Sulphuric acid does not really remove it, but rather seems to combine with it (which may throw a little side light upon its composition); but it rapidly penetrates it and eats away the bromide image underneath. Neither nitric nor hydrochloric acids have any apparent effect upon it. And now as to its defects. Beyond some trivial inconveniences I confess I do not know of any that are not possessed by other varnishes, but as a retoucher I should expect it to be equal in that respect, as it retains the dull surface of the gelatine. I consider all our varnishes are defective in one particular quality, and that is they are not absorbed by the gelatine film. Kristaline is no exception to the rule. A collodion picture has the advantage of its gelatine rival in this respect, for the varnish and the collodion film having similar solvents, they partially combine, the latter becoming permeated with the varnish, and so able to withstand as much as the varnish will. If you were to employ a varnish with pure solvents it would actually dissolve the collodion picture, or, rather, the collodion in which the picture is imbedded; now, gelatine is not so protected; silver stains can get through even varnish to the gelatine, and if they do, "woe betide" the negative, for it is more difficult to get them out again than if it had not been varnished at all. A varnish, to be perfect, should be absorbed by the gelatine film. I am at present only acquainted with one receipt—"White lac dissolved in boiling water, with the aid of borax," and applied to the plate while the latter is wet.

A short discussion followed.

The CHAIRMAN announced that at the next meeting, on the 24th instant, Mr. J. F. Hall Edwards will read a paper on *Photo-micrography*.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

At the meeting of this Society, on February 12, Mr. S. S. Partridge, Vice-President, in the absence of the President, occupied the chair.

The members proceeded with the competition for lantern slides arranged for this evening, forty-eight slides being projected on the screen. The whole of the slides were of exceptional merit, leaving little to be desired, and presenting some difficulty in awarding the prizes. The slides for competition were sent in by Messrs. W. T. Tucker, S. S. Partridge, Squire Wilson, W. Taylor, Perritt, Weatherhead, and J. T. Cook. In the final voting Mr. W. T. Tucker was awarded the silver medal of the Society for six slides, which did him ample justice; and the bronze medal was awarded to Mr. W. Taylor for six slides.

It was announced that Mr. J. T. Cook, a member of the Society, had consented to deliver a lecture in connexion with the Society on Thursday, March 28, in the Lecture Room, Temperance Hall, entitled *Through Australia and New Zealand*, illustrated with lantern slides.

The meeting was then adjourned until March 13, on which date the print competition for the Society's silver and bronze medals will take place.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of the above was held in the Hamilton Rooms, Price-street, on Thursday evening, February 14, 1889.—The President (Mr. Paul Lange) in the chair.

Messrs. E. Twigg, G. M. Noakes, William Tomkinson, William Faltin, Francis Faltin, W. A. Brown, Walter Geikie, and John Wynne, were elected as members.

The PRESIDENT, after welcoming the members to the new rooms, said that he had a very painful duty to perform by drawing the attention of the members to the sudden death of Mr. W. F. Riley, a member of the Council, an ardent worker in photography, and an ever-willing helper to beginners; he also stated that the Secretary had forwarded a letter of condolence to the widow, Mrs. Riley.

The medals which had been awarded in the competitions for 1888 were then distributed to the winners—Messrs. Lange, Mackrell, Evans, Cornish, and Wilkinson.

The PRESIDENT read a letter from Mr. H. N. Atkins, in which he stated that, owing to leaving the city he was obliged to tender his resignation; it was, therefore, unanimously resolved by the members that Mr. Atkins be elected an honorary member of the Association.

The competition, "Bromide paper *versus* Platinotype," by Messrs. H. Wilkinson and Paul Lange, was then voted on by the members, the majority being in favour of the platinum print. Both competitors used the same negative.

Mr. W. B. Beaton exhibited a very ingenious detective camera, which found great favour amongst the members.

The remainder of the evening having been set apart for a lantern exhibition of slides, some two hundred slides by members were shown on the screen, the average quality of which was very excellent, giving much pleasure to the members and friends present.

IPSWICH PHOTOGRAPHIC SOCIETY.

THE monthly meeting of the above Society was held on Tuesday evening, the 12th instant.—Mr. J. Dixon Piper in the chair.

The main business of the evening was a demonstration of enlarging, given by Mr. A. C. Churchman. By means of one of Lancaster's enlarging lanterns Mr. Churchman exposed and then developed several enlargements from quarter-plate negatives on to 10 x 8 bromide paper, and turned out good pictures.

Two new members (Messrs. Fiske and H. P. Evans) were elected.

Mr. J. C. Wiggin exhibited Ashford's patent tripod and several wax paper negatives taken by his late father.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

AT the fortnightly meeting on the 18th instant, Mr. Henry Hlanly, L.D.S. Edin., President, occupied the chair.

The following gentlemen were elected members:—The Rev. A. C. Beckton, Messrs. P. Peach, and J. G. Westby.

The PRESIDENT then called on Mr. T. W. Cave, M.R.C.V.S., F.R.M.S., and Mr. W. H. Pratt, F.R.M.S., for their lecture on *Photo-micrography*.

Mr. CAVE said: Before introducing the subject of photo-micrography it is my wish to point out that the paper is the joint work of Mr. Pratt and myself. The paper is merely a description of our apparatus and the way in which we are accustomed to work. The apparatus has been designed by ourselves, and is the outcome of practical experience during three or four years' work in this subject. As to the method in which we work, there are probably other methods much superior to ours, but in our paper this evening we have endeavoured to give you the results of our own experiences, pointing out the difficulties and failures, and exhibiting on the screen a few lantern slides which we believe to be fairly good examples of successful photo-micrography. The lecturer then gave a full description of the apparatus used, pointing out and explaining the working of the different parts. Concerning the light, they themselves use a Welshbach incandescent burner. The arrangement of the object and the exposure of the plate were explained. Slides were then thrown upon the screen, including prolocata of blowfly, fore-leg of water beetle, gizzard of cricket, &c. In conclusion, he hoped that they had succeeded in interesting them in a branch of the great art of photography which is valuable to the cause of science and valuable as a most fascinating study, which can be carried on when other branches of the art must be laid aside owing to the want of sufficient light.

SOUTHPORT PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held in the Young Men's Christian Association Rooms on Monday evening, February 11.—Mr. R. Wyles (the President) in the chair.

Mr. P. GRAHAM, of Derby, gave a demonstration entitled *The Relation between Exposure and Development*.

The experiments were directed chiefly to showing the immense latitude in the exposure possible with development suited to the occasion. Mr. Graham having made a special study of this point, the plates employed were the new series issued by the Ilford Company, in which a special modification with a view to this latitude is embodied. The plates were not brought by the operator for the purpose, but taken from the stock of Mr. Wyles. After ascertaining the normal exposures required by a quick plate of the first reputation, and that being found ten seconds, exposures were given of one-third, one-half, and up to six times the normal ten seconds, the whole being made to yield good results, with little trace of either under or over timing. Another experiment was a test for balance. A sitter was seated in a strong blaze of light, clad in white on the lighted side and dark velvet on the shadow side, and exposures given of three and sixty seconds. The negatives were equally good, and both perfectly free of any balance. Further experiments with landscape exposures were shown, confirming the fact of the extraordinary latitude claimed.

The PRESIDENT, summing up the results shown, thought that Mr. Graham had made good his claim to the possibility of getting good results with widely diverging exposures, and had shown the members the necessity for studying conditions; and that in their own hands, by modifying development to suit exposure, much more could be done than was generally supposed possible.

Mr. BOOTHROYD and Mr. MARSDEN (the Hon. Secretary) followed, enforcing the same principle, and moving the thanks of the Society for his interesting demonstrations.

The chief principles advocated were understood to be as follows:—The use of an invariable quantity of alkali, quantity being adjusted to the constitution of the plate used and adhered to constantly. Dry pyro in preference to any solutions, quantity varied to suit the density required. In studio work, concentrated lighting requires less pyro, and lighting approaching a flat or all-round character, more pyro. Sulphite usable with the fixed alkalies, not with ammonia, to produce the colour preferred. Enough may be used to render the steam clearing solution unnecessary. Bromide used at the start when over timing is suspected, afterwards as may be indicated.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

THIS Association held a lantern evening on Friday, the 1st instant,—Dr. Anderson in the chair.

About one hundred friends were present, and upwards of two hundred slides belonging to various members were passed through the lantern.

Mr. A. R. McLEAN MURRAY, on behalf of the strangers, tendered thanks to the Association for the pleasant evening they had spent.

THE ordinary monthly meeting was held on Wednesday evening, the 13th instant.—Mr. R. A. Scott, M.A., Chairman.

Mr. Duncan, Edzell, and Mr. Davidson, Montrose, were elected members; and thereafter Mr. J. D. Ross read a paper on *Lantern Slide Making*. He strongly recommended hydroquinone as the developer for transparencies, and, after seeing samples of slides made with different developers, most of the members agreed with him. Two slides were developed successfully.

A lively discussion followed.

AMATEUR PHOTOGRAPHIC SOCIETY OF MADRAS.

THE first annual meeting of the above Society was held on January 15, Mr. F. B. Hanna, M.A., President, in the chair, H. E. Lord Connemara being present with Viscount Marsham, A.D.C.

The members present unanimously elected His Excellency a member of the Society, and Lord Connemara consented to allow his name to be placed on the list as one of the patrons of the Society, H. E. Sir Charles Arbuthnot, K.C.B., R.A., the Commander-in-Chief of the Madras Army, already occupying that position from the commencement.

The report of the Committee was read, showing that the Society was in a very flourishing condition.

The next business was the election of the Committee for the coming year. Mr. F. B. Hanna was elected President, being proposed by Lord Connemara and seconded by Mr. Sundaram Sastri. Messrs. J. C. Hannington, C.S., and C. Mitchie Smith were re-elected Vice-Presidents, the proposition being made by His Excellency and seconded by Mr. T. M. Horsfall. Lord Connemara then proposed that the following gentlemen be elected on the Committee, and this being seconded by the Zemindar of Challypally, was carried:—Colonel A. Curtois, Mr. T. M. Horsfall, Dr. G. Oppert, Mr. W. G. Pavey, Mr. C. Sundaram Sastri, and Captain R. H. C. Tufnell. Mr. Hanna proposed, and Mr. Horsfall seconded, that Mr. Dunsterville be re-elected Secretary and Treasurer, which was carried.

The PRESIDENT then spoke as follows:—It is always a pleasure to a Chairman at an annual meeting to be able to say that the year, the proceedings of which he was about to review, had been a successful one. He thought there could be no doubt that this had been the case with their Society. Their members were recruited from a limited portion of the community, yet, in the first year of the Society, fifty-one members had joined, one of these had died, and one resigned, so that at the end of the year the number of members was forty-nine. Meetings had been regularly held on the last Tuesday in each month, and at these meetings a number of pictures, the subject of which was in each case fixed at the previous meeting, had been exhibited. This method insured new pictures and was specially intended to encourage the less experienced members of the Society, who would, he hoped, avail themselves fully of the opportunity thus afforded of showing their work and of hearing the opinions expressed by more experienced photographers. Mention has been made in the report of the exhibitions of lantern slides that had been given at his house; as this had been so much appreciated, he hoped to have the pleasure of giving similar exhibitions during the current year. The pictures sent in for the recent competition were very good, but he regretted there were so few competitors; he hoped, however, that on the next occasion more members would send in pictures. He trusted that the members of the Society were fully satisfied with the work of the Committee during the past year—by far the greatest part of the credit was due to Mr. Dunsterville, their Hon. Secretary, on whom devolved all the hard work; but Mr. Dunsterville was one of those happily constituted men who were never so happy as when they are working hard; this, combined with a great love of order and regularity, enabled him to get through a wonderful amount of work, and accounted for the flourishing condition financially, and otherwise, of the Societies in which he took a special interest.

H. E. Lord CONNEMARA then congratulated the Society on having had such a successful beginning, and expressed a hope that the coming year would show even better results. He further said that he would like to see a photographic exhibition held in Madras, and trusted the Committee would see their way to carry out the idea.

Correspondence.

Correspondents should never write on both sides of the paper.

STRIPPING FILMS.

To the Editor.

SIR,—While paying due credit to Vergara and to Fry for their attempts to produce satisfactory films, it must be admitted that there appears, to outsiders at least, a regrettable want of enterprise in following the American lead in the direction of stripping films and roller spools. Why should this be? and why should our British emulsion makers, who originally led the van, quietly allow themselves to be hopelessly distanced by Eastman or by Carbutt?

There is no doubt that "films" are the ideal of the future, both for the studio and for the field. Rent, storage room, and weight will be saved in the studio by using strippers instead of plates. Then, also, the greater facilities for reversing negatives and for retouching from both sides, are all in favour of the film. So, too, is the diminished risk of

halation from large surfaces of white dress or skin in portraiture. For landscape work, when either great distances or weight are in question, the film, or the paper-coated roller, present overwhelming advantages.

Clearly, then, "films" have all the future before them, and the total disappearance of glass as a support is a mere matter of time. I write to ask your support to urge emulsion makers to show some enterprise in banishing glass as a support for studio work, and in adopting roller spools for the field. Glass, we all know, is heavy, easily broken, and favours halation. Why should not all manufacturers adopt some other support for plate films (or cut films), such as vulcanite, ebonite, celluloid, or stiffened cardboard? Emulsion could then be coated on a soluble substratum of gelatine, all plates could be stripped, and the supports returned to the manufacturer and credited for. Halation, too, would be greatly diminished by a dark-coloured support, which would practically amount to a ready-made "backing." In rapidity, too, the emulsion would be slightly increased, as compared to glass (as seems the case with paper backing), owing to absence of refraction.

Demand would soon cause a great reduction in price of such supports as vulcanite or ebonite, whilst any temporary excess of cost would be compensated for by decrease of weight (bulk for bulk), diminished risk of breakage, and allowances for returns.

I trust soon to hear that the winter has been turned to good account by some of the large emulsion firms in the direction of coated bands of paper for roller slides. Capital is not wanting here just now, and it seems scarcely creditable to the profession that we should have to rely on foreign makers for roller spools.—I am, yours, &c.,
PATRIOT.

WEIGHTS AND MEASURES.

To the Editor.

SIR,—Owing to the great inconvenience of readily ascertaining the proportional quantities contained in the numerous formulæ with which photographers have to deal, the Photographic Club has taken the matter in hand, and formed a Committee to devise, if possible, some scheme of weights and measures that will commend itself to photographers generally and supersede the intricate jumble at present existing, and also take means to secure the adoption of such scheme when a definite course has been decided upon.—I am, yours, &c.,
E. DUNMORE, Hon. Secretary.

NORWAY.

To the Editor.

SIR,—Having spent two summers in Norway with a $7\frac{1}{2} \times 5$ and a 12×10 camera, using both plates and films, travelling by land and water, I should strongly advise all intending visitors not to lose sight of their *impedimenta*. The Norwegians are the pleasantest, jolliest, most honest folk under the sun, but they are born without any sense of time. Hurry is unknown, and the laggard is vastly preferred to the tourist who is ever hurrying forward. I know something of the stolidity of Brittany peasants and of the phlegm of Dutch Walloons, but I was hardly prepared for the slow-bloodedness of the Norwegians. Hurry is hateful to them, and to attempt to use the word *Strak* ("Be quick") is certain to change smiles into scowls, and a good reception into indifference or worse. The only way to ensure keeping time is to rise early, and an hour in advance at least, see that horses, guide, boat, or whatever conveyance is required is being prepared and is well in hand. If one waits till close on the stipulated hour, one will find nothing done and be calmly told—"Oh, there is plenty of time yet!" Such was my experience in South, Central, and Northern Norway (with the single exception of one place, where the guide had been in America and knew that time was money).

This characteristic makes it dangerous to send luggage ahead or leave it to follow after. Goodness alone knows when it may turn up. But this peculiarity has with its drawbacks also its advantages. Guides and cariole drivers develop quite a weakness for the ambling photographer. Not only do they enjoy immensely being placed as a figure in a landscape, but they also appropriate the opportunity of studying the whole operation of unpacking, mounting, focussing, and taking a "photo." They thoroughly enter into the enjoyment of an unconscious journey in a dark slide and plate box to England, and, doubtless, vividly picture to themselves British curiosity as keenly exercised with their portraits, as ours is with their splendid scenery. But where their lack of speed comes in usefully to the photographer is, that no one—guides, drivers, boatmen, or even the steamboat folk—objects to—on the contrary, they positively favour—the delays incidental to photography. The guide is glad to get a 12×10 camera and slides off his back as often as you like, and when one goes a rough trip, such as most of those to the great waterfalls or glaciers are, his satisfaction is not to be wondered at. Never in my life have I strained and perspired as up and down Norwegian mountains, and over the rough rock and log-blocked tracks which do duty for paths off the main roads, which are few and far between. Cariole drivers, or the boys or pigs who sit behind them, are delighted that you should stop their spirited ponies with a "pr" or "purr" as often as you list, for each halt rests the hard-worked, willing brutes, who turn every second to good account by nibbling the grass and flowers,

My advice, however, to photographers who visit Norway is to keep to the steamers, and to drive as little as possible.—I am, yours, &c.,
February 16, 1889.
KENRIC B. MURRAY.

RE BRIGHTON PHOTOGRAPHIC SOCIETY.

To the Editor.

SIR,—As a professional member of the above Society I cannot let Mr. Henderson's letter of last week pass without a reply.

I have yet to learn that a few friends cannot come together and form a Society (of course proceeding at once to formulate code of rules, elect officers, &c., as their preliminary work) without laying themselves open to the charges of unfairness that have been made.

The history of this Society is as follows:—On January 22 a meeting was held, at which it was resolved to form a Society. It was formed that evening, about twenty joining. At this meeting a provisional committee was appointed to draft a code of rules, &c.; after this was done the meeting of January 22 was adjourned to February 7. Until we had proceeded thus far we did not even know that Mr. Henderson was in Brighton, much less that he was himself attempting to form a Society. On this coming to our knowledge we at once communicated with him, fully explaining all that had been done; he at once heartily joined with us.

If then Mr. Henderson went round to any friends of his and told them that the Society had *not* been formed, but that they could with himself help to form one, he can only blame himself, and *not* the Society, for any misunderstanding that may have arisen between himself and any of those gentlemen, for our position as a Society was most fully explained to him. This being so, it appears to me that he had no just ground for his action at our meeting of February 7, or for his letter of last Friday.

The whole of this most regrettable misunderstanding has arisen from Mr. Henderson not recognising the fact that the Society *had* been formed, and so could act in any way it thought expedient. We could hardly, because Mr. Henderson and some friends of his wished to join us, begin all our work over again. Are we to start the Society afresh for every batch of new members?—I am, yours, &c.,
GEORGE FOXALL.

To the Editor.

SIR,—Mr. Henderson's letter, re Brighton Photographic Society, contains certain inaccuracies which, with your permission, I should like to correct, as they are calculated to mislead your readers and thus create a prejudice against the Society.

Mr. Henderson states that he called upon me and "heard partly what had been done." This is incorrect. I entered into the matter fully, and told Mr. Henderson, among other things, that a Society had been formed called the Brighton Photographic Society, that the members had appointed a committee to draw up rules, &c., to be discussed and passed at a meeting to be held on February 7. I explained to him the work already done by that committee, and finally intimated that as Mr. Henderson was likely to be of use to the Society I felt sure the members would be glad to welcome him as an original member without election, and upon my own responsibility invited him to be present on the 7th.

This may have been partial information, but it appears to me to have been pretty full. I find it difficult to reconcile these facts with Mr. Henderson's statement, that "his idea was that no regular Society had existed previous to the meeting which took place on the 7th."

Again, I cannot see in any way how the Society is to be held responsible for Mr. Henderson's action in inviting gentlemen to be present at a meeting, when he himself confesses, to quote his own words, that Mr. Rean said "they were not elected," and I may be allowed to state that I subsequently wrote him to the same effect. If gentlemen should feel aggrieved that they did not receive a notice of the meeting on the 7th, surely they must blame Mr. Henderson for inviting them without authority to do so, and not the Society.

The form of "application for membership," which Mr. Henderson states he enclosed to you, in no way assists his case. The footnote, desiring that the form should be returned to me prior to February 7, was in accordance with the letter which I sent to the photographic journals, and which intimated that gentlemen forwarding their applications before that date would, upon election, be admitted without the payment of an entrance-fee.

With the latter portion of Mr. Henderson's letter I have nothing to do. Trusting that I am not taking up too much of your valuable space.—I am, yours, &c.,
W. H. REAN.

36, Vernon-terrace, Brighton, February 16, 1889.

GUTTENBERG'S LAMP.

To the Editor.

SIR,—Kindly allow me a little of your valuable space to reply to "Junius's" remarks regarding my lamp in last week's JOURNAL. "Junius" having chosen to air his views about an apparatus concerning which he had formed a wrong conception, now when in justice to myself I correct

his erroneous criticism, falls back upon a "woman's reason" for sticking to his opinion. Therefore I think there is little further need of refutation on my part; but I would like to add that the mere fact of his designating my lamp a "flash lamp," when the specifications particularly dwell upon its not being such, shows how little "Junius" understood that which he criticised.—I am, yours, &c.,
W. GUTTENBERG.

THE FATAL EXPLOSION OF A GAS CYLINDER AT DUBLIN.

To the Editor.

SIR,—The recommendation to make the couplings of different sizes would not prevent the man in charge of the compressing pumps from accidentally charging the oxygen compressor with coal gas, or *vice versa*, and then refilling a returned half-empty bottle with the wrong gas.

What the public require is perfect security, even if the gases have been accidentally supplied mixed.

Bearing in mind that the most energetic combustion is at once arrested by contact with a sufficient quantity of cold metal, I believe that an explosion would be rendered impossible by attaching a spiral worm of fine copper tubing to the lower portion of the valve, so as to project into the bottle, through which worm the gas would have to pass before reaching the jet. If one coil was found insufficient, two, or even three, coils could be used, one within the other, without materially reducing the capacity of even the smallest-sized bottle.

A Hemmings' safety jet permanently fixed behind the valve and in the bottle would, of course, have the same effect, but would, I think, reduce the pressure too considerably to admit of the use of a mixed gas jet.—I am, yours, &c.,
CLEMENT T. LEAPER.

Technical Schools, Kevin-street, Dublin.

COMPRESSED GAS IN CYLINDERS.

To the Editor.

SIR,—Following on the subject of the article by Mr. G. H. Baker, in your issue of February 13, with reference to the deplorable accident at Dublin, due to the explosion of a gas cylinder, I should like to crave leave to occupy a little of your valuable space with one or two remarks on the use and safety of compressed gas. First, let me say that it would be very much to be regretted if the public mind is permitted to be unduly alarmed, or the confidence of users of compressed gases to be shaken, by this or any other similar calamity.

What is required is not limitation of use, but proper precautions in use, and the diffusion of proper knowledge and the establishment of an efficient system of testing. Nothing more convenient or satisfactory in the way of artificial light for general optical purposes has yet been designed than the limelight as produced by compressed gases, used from separate steel cylinders with a good mixed jet, and the use of such pressure reducers as Beards' new small valve. I speak on this subject with the acquaintance derived from extensive experience in lecturing, and in the physical laboratory. The electric arc light, even where available, is difficult to manage, and incandescent lighting cannot yet, in general optical work, replace the limelight. Hence the steel cylinders are a great boon. Now the risks in their use are obviously,—

First, the metal cylinder may burst, even if filled simply with one gas. This is not a very likely thing to happen. If the cylinder stands the pressure in charging there is very little reason to apprehend that it will give way afterwards, although it might so happen if the gas cylinder were left charged in a place in which its temperature might rise very high. The remedy for this is a proper co-efficient of safety in the strength. The purchaser of a gas cylinder ought to be able to demand, and be supplied with, a certificate from some authoritative source, or reliable independent authority, showing that the cylinder has been tested, at least, to three times the maximum pressure it is ever likely to have to endure in use. A few shillings, as Mr. W. I. Chadwick observes, would cheerfully be paid for this.

The second, and by far most probable cause of accident, is the filling up of a partly emptied cylinder with the other gas. Some months ago, being myself nervous, as a user of steel gas cylinders, on this point, I called at the offices of Brin's Oxygen Company and stated my fears, and asked for information as to the precautions adopted to prevent it. I was politely informed that the Company's workmen were very careful and never made a mistake. I retired with fears unassuaged, but confident at least of this one thing, that if the Company's workmen were ordinary human beings the liability to error was bound to exist, assurances notwithstanding.

Now the public and users generally have this matter very much in their own hands. The practice of sending back cylinders with a little gas left in them, and of getting credit for two or three feet of residual gas, is a bad one. It ought to be a universal rule to send back the cylinders empty, and then even if filled up with the wrong gas there can be no mishap. It is a good deal better to sacrifice a few feet of oxygen or hydrogen by opening the stopcock wide before returning, than to run the risk of having delivered back to one a cylinder charged with mixed gases. By the use of a simple Y stopcock tube and a couple of bottles with

pressure reducing valves, it is always possible to use up to the last foot of gas, and change over from the empty to a full bottle, even during an exhibition.

In conclusion, I would say to every lanternist, photographer, or lecturer, that the remedy is with themselves. Instead of crying out for Government stamps on bottles, or penalties for mistakes, let every user adopt the following rules and adhere to them rigidly:—

1. Buy your gas bottles only of the best firms; use steel bottles, and do not consider cheapness as the chief recommendation in purchase. Go to a reputable firm and get them to find out for you if the bottle has been tested, if so, when and where.

2. Make it a rule to send back all your bottles empty, and with the stopcock open.

3. Paint your own distinctive mark on your bottles. Let the "H" bottle be painted red, with the word hydrogen on it in black; and the "O" bottle be black, with the word oxygen on it in white.

4. When you get back your full bottle test it yourself, or by a responsible assistant, in the manner described in Mr. Baker's letter of Feb. 15 (THE BRITISH JOURNAL OF PHOTOGRAPHY), and with these precautions invariably carried out, the risk of use of compressed gas will be reduced to a minimum, if not altogether annulled.—I am, yours, &c.,
J. A. FLEMING.

Professor of Electrical Engineering in University College, London.

To the Editor.

SIR,—I was very pleased to see the report of the inquest on the late Mr. Bewley in your issue of the 15th instant, as a careful reading of the facts contained therein should allay the apprehension caused by the explosion.

Personally, I have used the gases compressed in cylinders, for lantern work, upwards of three seasons, and have not during the whole of that time had the slightest mishap, though I cannot say the same respecting a period of about thirty years, during which I used the bags.

I remember seeing the compressed gases first used in Manchester, and also seeing the first exhibition (with the compressed gases) by our premier local lanternist, Mr. J. E. Jones, followed, shortly afterwards, by a technical lantern meeting of the Manchester Photographic Society, where the question of bottles *versus* bags was thoroughly gone into, the bottles coming out triumphant, though it required the continued successful manipulation of Mr. Jones to popularise the use of the compressed gases in our city. Another of our well-known lanternists, the indefatigable secretary of the above Society (Mr. Chadwick), has lately been converted from the "darkness" of bags to the "light" of compressed gases.

After a period so extremely marked by progress, it would be a great pity to get on a "down grade" movement, but if we find the required conditions of safety in the use of compressed gases, and insist on them, our words and deeds will be signalized by advancement!

What are the conditions of safety? I should say—(1) No admixture of the gases in the cylinder; (2) Cylinders, properly tested, to stand double the pressure used in them. The suggestion to make the screws of the cylinder necks different sizes, would certainly prevent carelessness in filling the bottles, but it would not prevent filling a cylinder containing hydrogen, with oxygen (or *vice versa*) intentionally, as making a union for attachment of another size screw is easily done. Therefore we have to trust the makers for correctly filling our cylinders. Our cylinders ought to be properly and correctly tested for pressure by an independent authority, and certified accordingly; and I trust that all possible influence will be brought to bear to have enforced testing and correct filling of the cylinders, and also a distinctive difference made between the oxygen and hydrogen cylinders, so that one may not be carelessly used for the other.—I am, yours, &c.,
J. A. FURNIVAL.

To the Editor.

SIR,—We observe in your issue of the 15th instant, Mr. W. I. Chadwick writes that while it is stated this Company supplies oxygen only in black cylinders, and hydrogen in red cylinders, "he has had a dozen black cylinders containing hydrogen for one red."

If Mr. Chadwick insinuates that these bottles came from us, we beg to give a most emphatic denial to the statement; we make it our invariable rule to compress hydrogen into red cylinders only. This branch of our business, viz., hydrogen compressing, was commenced only at the beginning of this winter.—I am, yours, &c.,
T. N. HESTER,

Secretary, Brin's Oxygen Company, Limited.
Connaught Mansions, Victoria-street, Westminster.

Mr. W. TYLER, Birmingham, sends us his *Practical Hints and Photographic Calendar for 1880*. It contains, *inter alia*, a complete illustrated list of Mr. Tyler's numerous little inventions.

A PRETTY little pocket synopsis of the meetings during the present year, and which forms at the same time a member's ticket, has been introduced by Mr. J. L. Mackrell, the Hon. Secretary of the Birkenhead Photographic Association.

Exchange Column.

*. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, a good cloth background, about nine feet by six feet, in exchange for uprights and stays of horizontal bar.—Address, W. NEWAT, Crellin-street, Barrow.

Mahogany-body lantern, four-inch condensers, four-wick lamp and limelight, two blow-through jets, ten-feet and five-feet screens, valve for compressed gas, union and key for bottle, in exchange for half-plate camera, three double backs, and rapid rectilinear lens.—Address, R. POLLARD, 101, Albion-street, Leeds.

A single stereoscopic camera, fitted with landscape lens, double dark slide, changing box to hold twelve plates, all in polished mahogany lock-and-key box, with tripod complete; will give in part exchange for a tricycle (Coventry Convertible Tandem, 1887, machine preferred).—Address, E. I. BARRS, High-street, Hailsham, Sussex.

Answers to Correspondents.

*. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPH REGISTERED:—

H. Grayson, Blackburn.—Design for advertisement with photograph on fancy mount.

R. BOOTHBRIDGE.—We are waiting for information.

W. J. ARCHER.—Received too late for insertion in this number.

VETRO.—Label the bottles and such a mistake will not again happen.

A. M. M.—We shall inquire into the subject and send you word privately.

W. M. PHILLIPS.—Try the first formula; the proportions are therein stated.

E. M. P.—We are at present unable to offer any suggestions respecting the lad. 1, 2, 3, 4.—Please send us your name and address, not necessarily for publication.

T. B.—A little glycerine added to the starch paste will prevent decomposition for several days.

NEW SUBSCRIBER.—Place a stop in front of the lens; you cannot use it otherwise for your purpose.

P.—Mr. E. Maybridge, of America, is at present in this country. He is to lecture at the Royal Institution and elsewhere.

WILLIAM KERR.—Immerse the print in a solution of oxalate of potash, acetic acid, and water; this will remove the yellow stain.

SIMPLICITY.—Your article cannot be printed unless as an advertisement. It is merely a means of trying to dispose of your invention.

SCRATCH.—The marks on the prints are caused by grit of some kind on the burnisher. Clean it thoroughly, lubricate a print, and try again.

S. (Lincoln).—You can, with an ordinary lead pencil, write a number on the gelatine film which will remain after the plate has been developed.

JAILER.—Nothing better than photographing the palm of the hand. Rub it smartly just before exposing, so as to render the lines clear and distinct.

T. T. L.—Your vignetting is too hard. Place your vignetter a little farther from the negative, and the results will be much softer. Report progress to us again.

PROVINCIAL.—Certainly; you ought to arrange for a visit to London during the Crystal Palace Exhibition. We can promise you a treat; at any rate, in so far as regards the newest of apparatus and mechanical appliances in general.

REV. B. P.—There are numerous freezing compounds, but that which will prove most useful to you on your arrival in the Bahamas is a simple solution of nitrate of ammonia in water, which may be used "over and over again." If you wish further details, write again.

LIGHT.—No. 2 possesses this advantage, that snow can more easily be cleaned off; but either will make a good studio. Put plain glass on the top and ground in the sides, especially if any buildings obstruct the light. Any colour of blind with fair opacity will answer.

W. G.—If the arborescent markings in the lens do not disappear under the influence of a rather vigorous warmth, then remove it from the cell, and, by adopting the means very often described both in these pages and in those of the ALMANAC, have the contact surfaces recemented.

SILK.—Immerse it in water, one ounce; gelatine, five grains; chloride of sodium, five grains. Hang it up to dry; then float for half a minute on a fifty-grain solution of nitrate of silver; dry, print, and fix as usual.

REX.—1. By substituting a larger condenser for the present one a larger picture can be shown. The size of slide capable of being projected depends entirely upon the size of the condenser.—2. We are unable to say unless we saw both lenses. You can make a trial without much trouble.

HYDRO.—1. Five inches.—2. Yes; but a little larger is preferable, to allow for marginal defects.—3. A little larger than the plate, so that no light from the lenses is obstructed.—4. Mount the lenses so that each one shall be opposite the centre of the plate when divided.—5. Stereoscopes can be had from a shilling upwards.

S. P. L.—The argentometer test for a solution of nitrate of silver may be relied upon when there is nothing else present than nitrate of silver; but it ceases to be reliable when the solution to be tested is an old printing or negative bath in which, owing to the very fact of age, there are bound to be many so-called impurities introduced as products of decomposition.

J. G. C.—For window transparencies a somewhat deeply-printed silver print will be found to answer quite as well as those that have been specially prepared on opal or glass at considerable expense. It may, in some instances, be desirable to render the paper translucent by varnishing or filling its pores with wax, but this depends upon circumstances, by which we mean the thinness of the paper and the luminousness of the subjects which are outside of the window.

W. D. inquires: "What is the best way of making a gold toning bath for wet plate lantern slides? Should the slide be placed in the fixing bath for the second time after toning? Any other toning bath more suitable I should be glad to be referred to should it have appeared in the JOURNAL during the last four or five years."—In reply: We do not advise the use of a gold toning bath for lantern slides, preferring platina instead, as, in our estimation, it gives a more pleasing tone. Place the contents of a fifteen-grain tube in fifteen ounces of water, then throw in a small bit of blue litmus paper, which will probably turn red immediately; add solution of bicarbonate of soda until blue colour is restored to the litmus; now add nitric acid drop by drop until the litmus becomes red. This constitutes a stock solution, a few drops of which added to water forms the toning bath.

MR. BYRNE, of Richmond, has had the honour of photographing Their Majesties the Queen and the Empress Frederick.

THE annual general meeting of the Photographers' Benevolent Association will be held on the 22nd instant (this evening) at 181 Aldersgate-street, E.C.

THE North London Photographic Society will hold an exhibition of the work of its members on March 5 at Myddelton Hall. During the evening a lantern entertainment will be given. Members are permitted to bring their friends.

PHOTOGRAPHIC CLUB.—The next meeting of this Club (February 27) will be the Annual Exhibition, and Mr. W. Cobb will read a paper on *Photography and Art*. Photographs for exhibition must be sent in any time not later than Wednesday afternoon, February 27.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Monthly technical meeting, Tuesday, February 26, at eight p.m., at 5A, Pall Mall East, when the negatives, developed by hydroquinone, shown by Mr. J. W. Swan, M.A., F.C.S., during the reading of his paper at the annual meeting, will be exhibited.

WALTHAMSTOW LITERARY INSTITUTE.—On Monday, the 18th instant, Mr. J. J. Brighshaw gave a lantern exhibition at the Walthamstow Literary Institute. The attendance was very large, many being unable to gain admittance. Numerous choice photographs were projected on the screen.

WEST LONDON PHOTOGRAPHIC SOCIETY.—Just when preparing for press we are in receipt of a letter from Mr. F. W. Hart, who says that the report of the meeting of the above Society which we published last week is misleading and damaging to him from undue suppression. This may be so; but the report in question was received from the Secretary, and inserted as received.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The following constitute the officers and Council of the Photographic Society, as elected at the annual meeting last week:—*President*: Mr. James Glaisher, F.R.S., F.R.A.S., &c.—*Vice-Presidents*: Captain W. de W. Abney, C.B., &c., Messrs. H. P. Robinson, J. Spiller, F.C.S., F.I.G., and H. Trueman Wood, M.A.—*Council*: Messrs. G. L. Addenbrooke, W. Bedford, V. Blanchard, Lionel Clark, F. Cobb, W. Cobb, A. A. Common, F.R.S., F.R.A.S., A. Cowan, T. R. Dallmeyer, Captain L. Darwin, T. Sebastian Davis, F.C.S., G. Davison, W. E. Debenham, W. England, J. Gale, Chapman Jones, F.C.S., Captain A. M. Mantell, J. Traill Taylor, Leon Warnerke, and S. G. B. Wollaston.—*Hon. Treasurer*: Mr. W. S. Bird.

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THE BRITISH JOURNAL OF PHOTOGRAPHY

No. 1504. VOL. XXXVI.—MARCH 1, 1889.

EXPLOSIVE SILVER AND IODINE COMPOUNDS.

THE precise connexion between the death of Mr. Bewley by the explosion of a gas bottle and the subject of chemical explosives is not clearly discernible at first sight, yet it is the case that, on the "that reminds me" principle, in more than one society or club at which the fatal accident has been spoken of the conversation has gradually become deflected into explosives in general.

It so happens that several photographic preparations—although quite innocuous in themselves—are yet separated from compounds of an exceedingly dangerous nature by only an extremely thin wall of demarcation, and upon some of these and their cognates we shall speak for a little.

A species of alarm has at various periods arisen in the minds of some who employ ammonio-nitrate of silver in photography, because of an imaginary close alliance between this compound and the deadly fulminating silver, which may render the conversion of the one into the other possible if not probable; and we know of some instances in which the photographer, seeing a dark-coloured incrustated powder surrounding the cork at its junction with the bottle containing the liquid, has been afraid to remove it for fear of the explosion that would inevitably occur had a fulminate been formed. But of this there is no danger, for something else than ammonia and nitrate of silver is required to form the fulminating compound. We say "fulminating compound" because there is another explosive other than the true fulminate of silver which is formed, concerning the comparative danger of which we are happily unable to speak from personal experience, although we know of lives having been lost by both.

An imperfect argentine fulminate, although one of a violently explosive character, is prepared by digesting recently precipitated oxide of silver in ammonia for twelve hours, then pouring off the liquid and cautiously drying the black powder in the air, having previously divided it into small portions. This is a most violent explosive, but not quite so much so as some crystals which are obtained from the ammoniacal liquid that was decanted. This liquid, after being gently heated, deposits, on cooling, small crystals which will scarcely bear touching, even whilst under the liquid. A modification of this consists in dissolving chloride of silver in ammonia, adding caustic potash in fragments, and when effervescence ceases decanting the fluid portion and washing and drying the powder. These were known as Berthollet's fulminating silver, although they are not now considered to be a true fulminate of silver, being simply oxide of silver and ammonia.

The true fulminate is formed by adding alcohol to a warm solution of acid nitrate of silver. We give a formula for its

preparation on the principle upon which sunken rocks are marked on the mariner's chart, viz., as something to be avoided when experimenting with chemicals in everyday use. Pour one ounce of alcohol over one hundred grains of powdered nitrate of silver and add an ounce of nitric acid. When the nitrate assumes a white, cloudy appearance, cold water is added to suspend the ebullition, and the powder is collected on a filter and divided into small portions. This is Brugnatelli's method; but those of Fownes and Liebig differ from it in no important respect. For example, the latter dissolves one part of metallic silver in ten parts of nitric acid, and then pours the solution into twenty-three parts of alcohol. This is heated to the boiling point, and is set aside to cool, when the fulminate is deposited in white, lustrous, acicular crystals, the weight of which, after being washed, equals that of the silver originally employed.

From the foregoing it will be seen how near to the wind photographers may sail without running foul of this most deadly compound, which only a few years ago was stated to be the most dangerous substance for which we are indebted to modern chemistry. It is certainly still the most dangerous of those cognate to photography, not excepting the iodide of nitrogen, a substance which at one time was recommended as giving a remarkable degree of sensitiveness when employed in photography. Indeed, in the earlier times, even the fulminates, not only of silver, but of the other metals, were suggested as being likely to possess marvellous sensitive-conferring properties. Friction or percussion are stated as means whereby the explosion of fulminating silver is effected, but such friction and percussion need be only very slight indeed—a touch of a feather and the fall of a drop of water upon the compound have been known to do the mischief.

We have alluded to iodide of nitrogen. We feel it to be a duty to refer to the fatal facility with which this substance can be formed. A few crystals of iodine placed in a capsule, with enough ammonia poured over it to effect its solution—and that is all. The compound arising from this simple mixture is the deadly ter-iodide of nitrogen. Such a mixture has been recommended, and is employed by many, for removing pyro stains from the fingers. When used aright, it is quite harmless, the condition of safety being found in there being an excess of the iodine. This solution was stated by the late Rev. J. B. Reade, F.R.S., at that time President of the Royal Microscopic Society, to form an agent in dissolving gold under circumstances valuable and interesting to microscopists. A drop is placed upon a microscopic slide, and a bit of gold leaf is laid thereon; this dissolves and forms beautiful tree and shrub-like growths of bright gold.

When photographers feel it incumbent on them to use iodide of nitrogen, they ought to take special care not to allow it to be placed aside where it will dry and crystallise, as in this form it cannot bear to be touched. Even the very act of throwing it away may lead to its exploding ere it is projected into the waste.

DOUBLE PRINTING-IN DEVELOPMENT PROCESSES.

COMBINATION printing on albumenised paper, when the work can be watched as it proceeds, is tolerably well known to most photographers; but in processes where the image is invisible until it is developed, it is manifest that the same plan cannot be followed, hence some method of securing accurate registration must be adopted. Many inquiries have, from time to time, been made with regard to the printing-in of clouds in platinotype and bromide paper pictures, and a similar query with reference to carbon was put at the last meeting of the West London Photographic Society. There are different ways by which the end may be attained, but, in the present article, we shall confine ourselves to one alone. It, with slight modifications, may be made available for many requirements where two or more negatives have to be combined; as, for example, in changing a background, introducing figures, or printing-in a sky.

The origin of the method to be described is due to M. Lambert, who was most skilful in combining portions of one picture with those of another in the carbon process. As the method is equally as applicable to platinum and to bromide paper as it is to carbon, we shall here describe it as we saw it worked by the inventor himself when he was here, and as we have since employed it ourselves. For our present purpose we will suppose that a large portrait negative has an objectionable background, which it is desirable to replace with a plain one, or a single figure out of a group is required.

In the first place we take a piece of thin, non-actinic paper, somewhat larger than the negative, and, holding it thereon, trace with a lead pencil the outline of the figure, and then lay it aside for the present. Next, the back of the negative is covered with thin, translucent paper, for example—*papier végétal* or *papier minéral*. The thin, paraffined paper sold by many fancy box makers answers quite well. The paper is placed, for a few minutes, between damp blotting paper to expand, and is then secured with gum to the edges of the negative. When dry it will be perfectly tight and even. Now the outline of the figure is carefully traced on the paper with a sharp-pointed pencil, only a faint line being made. For the printing, a frame with plate glass, not more than three-sixteenths of an inch in thickness, should be used, and it must be somewhat larger than the picture.

The negative is put into the frame and the sensitive paper placed upon it, and the frame closed. In placing the paper in the frame, care must be taken that one angle (it matters not which) is pressed evenly into one corner of the frame, and this should be marked with pencil on the paper, so as to avoid mistakes in its removal and replacement. Next, on the glass of the printing frame the figure must be painted round for about a quarter or half an inch—on the background portion—with oil colour, mixed with olive or other non-drying oil; Indian red is a good colour to use. In doing this, the pencil tracing on the back of the negative serves as a guide, and the paint should be kept just outside the line, and not be allowed to encroach on the figure. The yellow paper is now taken and roughly cut out for

about the quarter of an inch, first without and then within the pencil mark previously made. Thus we have two masks a quarter of an inch, or so, less than where the juncture in the picture is to be; the background one is now laid in position on the red paint, with a few pieces of glass or lead to retain it thus while exposing. This, of course, is to protect the sensitive paper outside the paint while the figure is printing. The frame is now exposed, but the printing must be conducted in diffused light, and the position of the frame should be changed from time to time.

When the exposure has been sufficient, the frame is taken into the dark room, the mask removed, and the paint cleaned off with a rag moistened with turpentine. Now, before anything is disturbed, the figure has to be painted round again, this time on the figure portion, just inside the guide line, keeping as much within it as in the previous painting it was without. This done, the frame is opened and the negative taken out. Of course, if the print were now developed it would show the figure on a white background, not, however, with an abrupt outline, but with a blurred, or rather a vignetted, one, arising from the diffusion of the light under the edge of the paint.

Supposing a plain background be desired, the sensitive paper is simply replaced in the frame, registration being secured by placing it in the same angle as before. The second rough mask is then adjusted, and the background printed-in also in diffused light, and with constant moving of the frame. It can, of course, be shaded, or otherwise, in the printing as desired. The object of the rough paper mask is simply to avoid having to apply the paint all over the portions requiring protection. By this method of masking, it will be seen that the two printings are vignetted into each other at the juncture, instead of being abrupt joins, so that a soft instead of a harsh result is obtained.

When the second printing has to be from another negative, a slightly different course is pursued. In the first instance, this negative is also covered with translucent paper; it is then placed on the first one, and adjusted to the position the two images are to occupy in the finished picture. The outline of the first, or principal negative, is then traced on the paper of the second one. Then, after the first printing has been completed, and the second mask prepared, the first negative is removed and the second one introduced, the tracing on its back serving as an accurate guide as to position.

In printing on bromide paper, artificial light, placed at some distance off, is best, and then the frame should be kept moving all the time by slowly turning it round.

WE are sorry to announce the death of an old-time photographer, Prof. P. H. Delamotte, of King's College. Many years ago (1856) Mr. Delamotte published a work on the *Oxymel Process in Photography*, which was characterised by its great practical value. In this process he was an acknowledged master; the work was illustrated by a charming picture obtained by the process in question. He was Professor of Fine Arts in King's College, and had taught art at South Kensington, some of the members of the Royal family being among his pupils. He died on the 24th ultimo, at Bromley, Kent, aged 68.

At the annual meeting of the Photographers' Benevolent Association an announcement was made that, owing to the feeble response to appeals made to the profession to establish an Orphanage Fund, it was found expedient to abandon that scheme. At the same meeting

one of the members, Mr. Hubert, advocated the employment of an Hon. Secretary in place of a paid one, but the majority of the members present, realising the nature of the arduous duties devolving upon this office, considered that the payment of the Secretary was imperatively called for, and ruled accordingly.

A SUBSTANCE which Nature terms one of the most remarkable liquids yet discovered, and which possesses properties that may render it serviceable in photographic processes, has recently been prepared by Drs. Curtius and Jay, of the University of Erlangen. Some two years ago the former investigator succeeded in isolating gaseous azidogen; but the free gas possesses such an affinity for water that its isolation in quantity seems impossible, water being of necessity a secondary product in all known reactions for producing this gas. But a pure hydrate of the substance—described as hydrazine hydrate—has been produced, and it is this liquid which possesses the remarkable properties alluded to. It is, of course, early to prognosticate as to the part it may play in the chemistry of the future; but the property we desire to draw attention to is its reducing power, which is evidently far beyond that of any of the substances at present utilised for photographic purposes—pyrogallol, hydroquinone, iron salts, &c. Hydrazine hydrate is probably the most powerful reducing agent known. The most easily reducible metals are precipitated by it from their solutions in the cold. Silver separates from strong solutions in fine compact crystalline masses, and from very dilute solutions in the form of perfect mirrors of great beauty. Neutral platinic chloride solutions are also similarly reduced, while acid solutions of iron, copper, and platinum are reduced from the ferric to the ferrous state, and so on. It remains to be seen if it can be utilised as a developer. In its concentrated form it acts on glass, cork, and caoutchouc, so that there are certainly practical difficulties in the way; whether they would be overcome by dilution we are not able to say.

For most photographic operations water of great purity is not at all actually essential, certain substances held in solution, such as carbonate of lime, being rather annoying than injurious in their effects; but there are other possible contaminations of a decidedly opposite character. Lead, for example, is one of these, and when a lead-contaminated water is used during intensification with mercury and sulphide of ammonium, the effects would be decidedly objectionable. We are led to these remarks upon reading that at one large town in this country, Bradford, water recently taken from the taps "is found by analysis, it is said, to contain from 40 to 150 grains of lead per gallon." A little sulphide of ammonium solution will rapidly indicate the presence of this impurity when a drop is added to the suspected water.

THE *Lancet* had an article lately upon the influence of the electric light upon the eyesight, founded upon the observations of Dr. Dubinski, of Kronstadt, who has for ten years had the opportunity of observing thirty cases of a peculiar ophthalmic affection occurring in young sailors, whose duties had obliged them to remain in the vicinity of electric lights. The symptoms of the disease are produced during sleep. The patient is awakened by profuse lachrymation associated with intense pain round the orbit of the eye; light has an intensely irritating effect. After a time, in from an hour and a half to three hours, the symptoms subside, and the patient is able to sleep again, to awake apparently none the worse, except for a feeling of fatigue about the eye. This is still a sufficiently distressing affection, and this account may act as a caution to all who use the electric light in photographic operations to shade their eyes from its glare as much as possible. Photography has enough of injurious accompaniments of its own without unnecessarily adding to them.

ACCORDING to the most recent experiments, however, one danger—that from the respiration of an undue proportion of carbonic acid gas, the products of combustion from gas or paraffin oil in close rooms—is not so much to be feared as once used to be thought. Following the original investigations of Dr. Richardson in this country, MM.

Brown-Léguard and d'Arsonval show that the danger arises not from this gas of itself, but from some other toxic agent accompanying it in the exhaled breath of human beings. In a large number of cases, these gentlemen found that the gas, when pure, could be inhaled in considerable quantities by human beings, dogs, rabbits, and other mammals. The authors themselves breathed for over two hours an atmosphere containing twenty per cent. of carbonic acid without any marked inconvenience.

THESE facts, nevertheless, do not contra-indicate the necessity for well-ventilated dark rooms, for there would still be the contamination by the exhaled breath of the occupants; and with gas burning in such a room, there would be the sulphur compounds also to deal with. The interest, therefore, is rather theoretical than practical; but it certainly is important to know that carbonic-acid gas alone is not a necessarily hurtful component of air when present in abnormal proportions.

AMERICAN MEN AND MATTERS.

A CAMERA Club has been organized at Rockland, Mass.

THE Case School Camera Club, of Cleveland, Ohio, has lately been organized, and has started under good auspices.

A CAMERA Club has been formed in the city of Rochester, N.Y. Both its President and Secretary are Englishmen recently well known in London and elsewhere, the former being Mr. G. H. Croughton, and the latter Mr. Peter Mawdsley.

THE Society of Amateur Photographers intends to make an exhibit at the Paris Exhibition to be held this year, and the members have engaged some one there to watch over their interests.

AN effort is being made to resuscitate the *Photographic Beacon*, a monthly journal lately published in Chicago, and conducted by Mr John Nicol, formerly of Edinburgh.

IN the *Photographic Times* of the 8th ultimo, Mr. H. P. Robinson offers strong protest against the alteration of the title of his picture, *Dawn and Sunset*, to *From Dawn to Sunset*, in which picture there is no pretence whatever to represent this implied gradation.

THE Annual Convention of the Photographic Association of America will this year take place in Boston, Mass., and will last from August 6 to 9 inclusively. Several gold, silver, and bronze medals are to be awarded for amateur work; one gold and one silver are to be set aside for foreign exhibits of portraiture. In addition, the Association are to award as a grand prize a bronze figure, value two hundred dollars, for three photographs illustrating Longfellow's poem, *Evangeline*, the size to be not less than thirteen inches, or larger than twenty-two inches.

THE following means have been suggested by Mr. Kraus, of Harrisburg, for reducing bromide prints that are too dark:—Make a saturated solution of chloride of lime and filter it. Dilute one part of this solution with four to eight parts of water, and immerse the print into it (the print being previously fixed and washed). This neither discolours the print nor the paper.

LONDON Societies, and indeed those throughout this country, have something to learn from New York, or its Society of Amateur Photographers. On the authority of the President we are enabled to state that "a ladies' night" has been arranged, on which occasion the various papers that are to be read will be by lady amateurs, as also will be the various exhibitions on that occasion, including prints, lantern slides, photographs of fancy work, &c.

THIS Society also gives smoking concerts. We should like to know whether ladies are admitted to these? Here smoking is a recognised

institution at every meeting of almost every Society, but we have no ladies' nights of the nature just spoken of in this country—more's the pity; but it is never too late to learn.

On the occasion of a flash-light group being made of the members of the Society just named—one which, we may remark, has turned out remarkably successful, judging from the specimen in our copy of the *Photographic Times*—the non-explosiveness of magnesium powder was proved to the audience by the powder having been vigorously pounded in a mortar, and its non-poisonous properties by forty grains having actually been eaten. But, *cui bono*, every one knows that magnesium is not explosive and non-poisonous; but supposing it had been poisonous, as are so many chemicals in daily use, this would not have effected its efficiency.

The veteran photographer, Mr. A. Bogardus, does not appear to entertain a very high estimate of the ability of portrait painters to pose sitters. He informs the *St. Louis Photographer* that they often bring their portrait painters along to do the posing—he was supposed to know the rules of drawing; but if they wished to see poor posing, the said painter was the man to do it. He says:—"I can name men in this city who can make better poses than all the old masters put together. Let them all stand in a row and work for hours, and I will bring a man that will in three minutes make a picture of a lady or child that shall show more grace, ease, and style than anything the gentlemen aforesaid ever conceived of. This is a pretty large assertion, but it can be demonstrated. There are pictures made every day, which for grace, ease, and beauty could not have been excelled in any age of the world."

ECHOES.

"In the multitude of counsellors there is safety" is a proverb that is generally found true, but in the case of the detective camera inquiry, reported last week, the seeker after information is pretty "safe" to get, hopelessly "fogged" by the glorious diversity of opinions offered. The enterprising Mr. Duffield is to be congratulated upon the energy and pluck displayed in carrying out his novel experiment, but I cannot think the result is worth the trouble.

To illustrate what I mean I should like to make one or two comments of my own on some of the replies, which are delightful in their variety or even direct contrariness; and the names of the different "authorities" not being given, each answer is of equal value with the rest. What, then, is to guide the searcher for help in judging between a direct "yes" or "no?"

Thus, the question is asked, "Should not the camera have a swing back?" and here the replies are charmingly graduated to meet all requirements—(a) "No;" (c) "Decidedly yes;" (d) with increasing emphasis, "Yes, two of them;" while (f) is either amusingly cautious or else is indulging in a little gentle sarcasm when he suggests, "If it would work automatically." Would that a good many photographic "properties" would work automatically!

Then, again, in reply to the query, "Do you think it necessary to have a finder?" One correspondent says, "A finder is quite needless;" the next, "A finder is very necessary." The next one again does "not see the advantage of two finders," and his immediate follower thinks "two finders so essential that I shall have an extra one put in," &c. So that any one who is about to fit himself up with a detective outfit may make up his own mind as to what he really wants, and then consult Mr. Duffield's authorities with perfect certainty that his decision will be found backed. Yes, in that sense there really is perfect safety in the multitude of counsellors.

I think it will strike many readers of the JOURNAL, especially old "lantern hands," that Mr. George Smith is somewhat unnecessarily dogmatic in some of his remarks on the subject of mixed gases. A harmless explosion resulting from the use of a home-made Hemmings's safety jet—never absolutely safe by the way—and the equally innocuous fracture of a soda-water bottle after firing many charges of gas in it, may be sufficient to warrant a nervous youth in "abandoning mixed gases for ever," but the two incidents are certainly not sufficient *per se* to condemn the use of such a mixture by more careful or less timid hands: nor do they entitle the operator to start up nearly forty years

later with a "bogy" consisting of a couple of unsuccessful schoolboy experiments dressed up for the occasion.

There is, I grant, little to recommend the employment of mixed gases at any time, or in the most careful hands, and it is not with the intention of arguing in favour of the practice that I allude to Mr. Smith's remarks, but merely to point out that the conviction he has formed "that mixed gases cannot be burned safely, no matter what precautions are taken," is decidedly a *non sequitur* in his case. The fact remains that mixed gases have over and over again been burnt "safely," if immunity from accident is taken as the measure of safety.

But his remarks on the subject of explosions from back pressure are still more extraordinary, diametrically opposed as they are to the belief and experience of every practical lanternist. "Explosions with bags," he says, "never happen from . . . back pressure." Then he goes on to explain what "always happens," namely, that the bags that explode are "always" filled with mixed gases, hence the trouble. Of course, if Mr. Smith is "always" behind the scenes sufficiently to so definitely locate the cause of all the gas explosions that occur, I can have little to say in contradiction, but I know the news will be a revelation to a good many operators who have made the mixed gases, back pressure, safety valves, and explosions generally, a careful study, instead of being scared by every foot of gas that explodes without hurting them. Here, again, it would have been safer to suggest a possible truism, rather than to dogmatise so severely. "Always" is a very definite term, and does not leave room even for the possible "exception" in the form of an accident that might prove Mr. Smith's "rule."

Whatever can be the matter with our good friends, the proprietors of *Anthony's Bulletin*? The "stock house" of that name I believe to be one of the, if not the, oldest in America, as well as one of the most enterprising and up to the times. Yet I find an article from their *Bulletin* opening with a statement that "lens flanges are never made with the same threads for the same size lenses of different makers." "Never" is just as strong a term as "always," and quite as objectionable in connexion with a statement that is not *known* to be absolutely correct. Have Messrs. Anthony, or their editors, never heard of the "standards" of the Photographic Society of Great Britain? and can they be unaware that many, or most, of the English opticians, as well as several Continental ones, have adopted those standards, both as applied to diaphragms and to flanges? If they are unaware of this, the information may be useful to them; if American opticians only are referred to as being behind the times, that should have been clearly stated in the article referred to, which says that a certain thing is *never* done, whereas in Europe, at least, it is done *daily*.

Then they go on to say that "American, English, and other European dry plates are all made to suit the whims of some particular set of individuals, without any regard to the tourist," &c., &c. Now, a more flagrant libel on English plate makers I cannot conceive. So far as I am aware, the only measurements in vogue are the English inches and the French centimetres, and plates of *any recognised size* by either measurement are made and stocked by most English makers and dealers. As regards "recognised" sizes, there are perhaps far too many English ones, but I have never heard of an American size that is purely American and *not* English, so that I am quite certain that American tourists have no ground for complaint in not being able to procure plates in England—or elsewhere, for that matter—to fit cameras built in the States.

The American has a way of *calling* his plate a different size to what we are accustomed to call it here: thus, 4×5, 5×8, 8×10 are his favourite sizes, and correspond with our 5×4, 8×5, and 10×8. A smart Yankee thought to take it out of an English salesman one day on this matter, but the "Britisher" was his match. Having ordered a dozen "four-by-five" plates, he was handed a packet conspicuously labelled 5×4; so, returning them to the shopman, he remarked, "I guess, young man, you've given me the wrong size—I want them four by five." "Quite right, sir," was the reply; "you will find, if you turn them round, they are four by five."

The gist of the article, however, is in the recommendation to adopt the practice of stating formulæ in quantities of a solution of such-and-such substance of a certain specific gravity, in order to avoid the difficulties arising from the existence of certain salts containing

different proportions of combined water. The practice is one largely adopted by chemists—i.e., by men who require the greatest accuracy, and who can attain it best by that means; but they are also, by training, competent to see that their specific gravities are correct.

But a more unpractical recommendation to the ordinary photographer it would be difficult to make. To him the operation of making a solution of any salt of a definite specific gravity, even if he possessed a hydrometer, would be perhaps greater than that involved in ascertaining whether his carbonate of soda contained ten or six equivalents of water, or none at all. The difficulty raised is, in fact—here, at least—chiefly an imaginary one. JUNITS.

AN ABSOLUTE STANDARD SENSITOMETER.

Some little time ago the writer determined to try and make an instrument which should test the sensitiveness of photographic films in such a way that it might be stated in terms of positive measure, and not, as heretofore, in reference to some arbitrary standard. "Ten times" and "twenty times" used as measures of sensitiveness may mean anything, they certainly mean nothing definite. "Rapid," "extra rapid," give some idea of the uses to which the plates may be put, but only vaguely, while the "rapid" of one maker probably differs widely from the plate of the same name by another maker. It seemed to the writer that photography had now attained a position when plate users might fairly say to plate makers, "Send me some plates of such-and-such a sensitiveness." Just as an engineer can say to a steel maker, "Send me some steel of such tensile strength;" or the electrician, "Send me some copper wire of such conductivity." It is true that there is a sensitometer in the market which is largely used, but it has an arbitrary scale, based on no natural scientific standard, and depends, so far as one instrument is comparable with another, upon the careful matching of a series of tests, which are liable to change, so that even if the same instrument is used, the readings of to-day are not strictly comparable with those of a month ago.

The writer experimented with various ways of forming time, and found it much difficultly and uncertainty in getting anything that could be reproduced with certainty time after time, that he came to the conclusion that another principle of testing must be adopted. On thinking the matter over, it appeared to him that instead of varying the intensity of the light acting upon various portions of the plate, the better way would be to let light of the same intensity act upon various portions of the plate for different lengths of time. The result, so far as the action of the light is concerned, will evidently be the same, while the latter plan has the advantage of being possible to be repeated with exactness in any place and at any time, and also of more correctly representing the circumstances under which the plates would be used.

The principle of the machine is very simple, is based upon scientific laws, and may be stated in such terms that a test made in England is strictly comparable with one made in America, and one made to-day with one made one hundred years hence.

Briefly, the plan is this:—A sensitive plate is placed at a fixed distance from a standard light, and small portions of the plate are exposed for gradually increasing periods of time to that standard light. Thus the times necessary to express the sensitive value of the plate are—(1). The light; (2). The distance between the plate and the light; and (3). The time that any portion of the plate was exposed to the light to produce when developed a visible image.

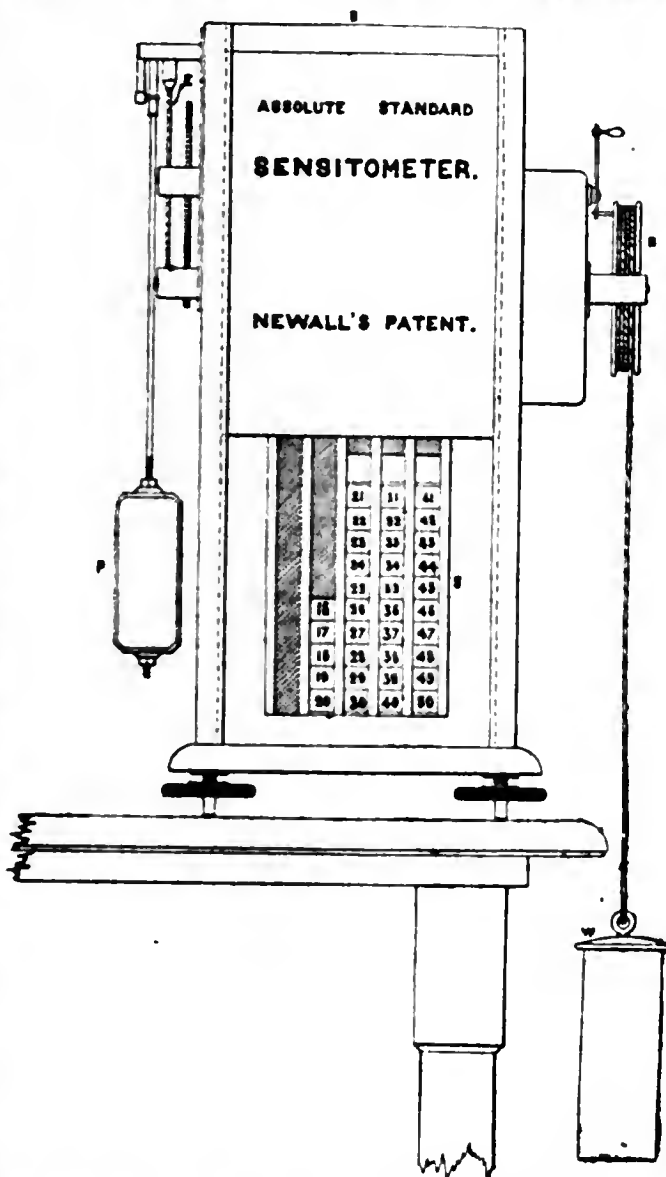
There is, of course, a somewhat uncertain point at either end of the operation, viz., the intensity of the standard light, and the energy of the developing solution. But these are incidental to any system of testing, and will probably be improved, if not made practically perfect, in the near future, while the testing itself is based on natural laws, and is correct beyond possibility of doubt. In the meantime it would be well if the Photographic Society would decide whether a standard candle or Harcourt's pentane standard should be used as the standard light, and what solution should be used as the standard developer.

The apparatus devised to carry out this system of testing is as follows (it is made to test quarter-plates, but can be made to take larger ones if wanted):—B is a kind of box containing the mechanism; S is a very thin glass plate in which are cut a series of figures from one to fifty. A series of shutters (one for each row of figures) works closely in front of the plate, and outside is one large shutter which closes up everything. P is a pendulum beating half seconds. D is a drum round which is wound a cord with a weight, W, at the end of it. This weight drives the mechanism. It is an escape-wheel controlled by the pendulum, having a pinion fixed to it, which gears into a wheel on the arbor of the drum D. Also on the arbor of D are five pinions, and on the backs of the five shutters are racks gearing with these last pinions. The pinions are so arranged that they come into action one after the other, each one starting when the one before it has lifted its shutter to the top. At each beat of the pendulum

one of the shutters is lifted so as to expose one of the figures, beginning with fifty and ending with one.

The outside shutter, which is not shown in the sketch, is held up by a catch, which is released half a second after the last figure on the plate has been exposed to the light.

The method of working is as follows:—The instrument is supposed to be placed on a table in a dark room, so that the weight can fall freely the length of the cord. The weight is wound up and all the shutters let down. The weight drum is locked by a catch till all is ready to begin the test. The plate to be tested is placed behind the figure plate and pressed up by the spring-back. The standard light is lit, and placed at



the determined distance. The outer shutter is raised till held by the catch. Finally, the trigger is pulled, when the five shutters will rise one after another, in steps half a second apart, until all the fifty figures on the plate have been exposed, and then the outer shutter falls and prevents further action on the plate, which is then taken out and developed. Suppose the lowest figure visible be twenty-five, its sensitiveness may be stated thus:—"The plate will give a developable image when exposed to a standard candle (or pentane light) at a distance of, say, ten feet for twenty-five half seconds."

It will be seen that the terms of this statement are such that they can be used and verified by any person, in any part of the world, without the instrument used having been previously compared. In other words, it is a natural and absolute standard.

The instrument may also be used for another purpose. If a batch of plates be carefully standardised then the instrument may be used to determine the chemical energy of various artificial lights, or of daylight on

different days, on different times on the same day, or of moonlight. In the case of daylight it would be necessary to diminish the full intensity by limiting the size of aperture through which light got access to the plate. But, again, all these values would be strictly comparable one with another in terms of time, distance, and size of aperture.

Many details of construction have necessarily been omitted in describing the instrument here, but if any reader wishes to know more about it, the writer will be pleased to answer any question that may be addressed to him.

J. W. NEWALL.

HYDROQUINONE AS A DEVELOPING AGENT.

[A Communication to the Photographic Society of Great Britain.]

I AM aware that hydroquinone is no longer an unfamiliar word in the ears of those who attend the meetings of the Photographic Society, and that many of the members have already experimented with this chemical; but I have a strong impression that its merits as a developing agent are not as widely or as clearly recognised as they deserve to be. I believe that these are both many and great, and, in fact, that of all developing agents hydroquinone is probably, on the whole, the best, and, therefore, I have ventured, on the invitation of your treasurer, to bring before you some evidences of its usefulness.

Hydroquinone is, as you know, a derivative of benzene. Its composition is $C_6H_4(OH)_2$; that is to say, it is a compound in which two of the hydrogen atoms of benzene are replaced by two hydroxyl radicals, and, as these hydroxyl groups occupy the first and fourth places in the theoretical benzene ring, the compound is called Para-di-hydroxy-benzene. Paradihydroxybenzene is a descriptive, but not an euphonious name, and hydroquinone is too long for the impatient photographer, who abbreviates hyposulphite to hypo and pyrogallol to pyro. However, the want of brevity in designating hydroquinone is perfectly met by its quite orthodox synonym, quinol—a word as easy to pronounce as pyro.

Hydroquinone, or quinol as I shall hereafter call it, crystallises in two forms, melts at 163° , distils without decomposition, and is soluble in water, alcohol, and ether.

But of quinol in its chemical aspect I am not going to say anything beyond this: that it is now procurable as a commercial article in a condition of sufficient purity and stability, and at a sufficiently moderate price to bring it into close competition in these respects with ferrous oxalate and pyrogallol.

When quinol is dissolved in water and exposed to the air it undergoes somewhat rapid decomposition by absorbing oxygen, and in consequence it loses power as a developer, more or less, according to the extent to which decomposition has gone, and it correspondingly changes colour, at first to a light and at last to a dark red brown. The change produced by contact with the air of an aqueous solution of quinol exactly corresponds to that which takes place in a solution of pyrogallol under similar conditions, except that, as Mr. Bolton has pointed out, the quinol solution keeps bright, even when the decomposition has advanced very far, while a pyrogallol solution turns muddy, as well as dark-coloured. But in a well-closed bottle, and especially if a small proportion of citric acid is combined with it, the solution keeps very well—as well or better than any other developing agent.

In discussing the merits of different kinds of developing solutions, it is necessary to bear in mind the properties that ought to be possessed by an ideal developer, but it is not possible to range those properties immovably in the order of their importance, because what is important in one class of photographic work is not important in a different class.

In nine cases out of ten, however, one of the most desirable properties in a developer is the property of *energy*, by which I mean the power to bring out the faintest impact of light, and give full effect to the sensitiveness of an extremely sensitive plate. If we rank one quality above another at all, I think we must put that in the highest place.

I do not forget that there are cases in which superior energy in the action of the developer is of no value. For example, in that class of negative employed in photo-mechanical work, where clear lines are to show crisply through an almost opaque field, there the property I mention is not a virtue but a vice. But that is an exceptional class of negative; and, looking not at the exceptions, but at the rule, there can be no question that the possession of superior power to develop weak impressions of light is, as a rule, more important than any other quality.

The sense in which I am using the word energy does not necessarily imply rapidity of action in the developer, although rapidity of action is generally an accompaniment, and a desirable accompaniment, of

energy of action. By energy, I mean the power, independently of time, to ultimately bring out to the utmost extent the faintest effect of light.

But there are certain properties that are *always* desirable in a developing agent. 1. It is always desirable that the developing agent should only act where the light has acted, and consequently not produce fog. 2. That in so acting, a certain degree of density, culminating in opacity, should be producible by it. 3. That it should be possible to modify its effect so as to compensate for errors of exposure, and obtain the degree of density required. 4. That it should be without detrimental action on the film in which the sensitive material is embedded. 5. That the colour of the image should not be photographically deceptive or bad. 6. That its action should, within reasonable limits, be rapid. 7. That it should be innocuous. 8. That it should be cleanly in manipulation. 9. That it should be stable. 10. That it should be cheap.

Besides these there are other properties which are *generally* advantageous. Rapidity of development is one of these, but there is another far more important than that, and it is the property of giving a gradation of density perfectly proportional to the degree of the light's action. That property is, of course, essential in almost every case except the one I have mentioned, in which only black and white are to be reproduced.

For the purpose of illustrating the capabilities of quinol as a developing agent, I have had made a series of negatives. These negatives bear on many of the points I have mentioned, and I feel sure will be found, by those who examine them, to be full of interest. I am sorry that it is so difficult to show negatives properly in a meeting like this, for the full measure of information can only be extracted from them after a somewhat long and minute examination, and comparison one with another and with the different conditions under which they have been produced all the while remembered. We must do the best we can under the circumstances, which will be to pass round those which are, so to speak, self-contained, and to leave the rest on the table to be examined, by those who care to examine them, after the meeting. I will do what I can to describe their characteristics, but a careful examination of the negatives themselves is the only way to fully appreciate the points sought to be brought out by them.

That you may have full confidence in the normal character of the results shown by these negatives, I may say that the experiments were carried out with the greatest possible care by Mr. John Green, the photographer attached to Mawson & Swan's plate works, one of the most painstaking and fastidious operators it has ever been my fortune to come into contact with.

I will, in the first place, pass round two negatives, Nos. 1 and 2, which illustrate the point that I have given the first place to, in the order of merit of the properties of developers, namely, energy.

The two plates are alike; they are Mawson's "Castle" plates, and they were exposed for the same time to the same object—in fact, they only differ in the mode of development.

No. 1 is developed with ammoniacal pyro of the most energetic composition compatible with a good quality of image.

No. 2 is developed with quinol solution compounded on the same principle; that is to say, with the object of getting the best possible quality of image, and containing in each ounce of distilled water—

Quinol	2 grains.
Caustic potash	4 "
Sulphite of soda	6 "
Citric acid and bromide of potassium (each) ..	$\frac{1}{4}$ grain.

If some of the qualities ordinarily required in portraits and landscapes, and, in fact, in all half-tone photographs, had been disregarded, it is quite probable that more detail still could have been brought out in the deeply shaded parts of the picture, but as it is, the pyro and the quinol are almost exactly on a par in the degree to which detail is developed in the least-lighted portions of the negatives. In other respects the quinol has the advantage. The colour of the image is better, and there is a character about it that forcibly reminds one of a good collodion negative. It is perfectly clear and clean in the non-lighted parts, and would, no doubt, yield a print in half the time required for the pyro negative.

I have here two small plates which were each exposed for the same time in the actinometer. One has been developed by a strong pyro developer—the "Castle" formula—and the other by quinol. In each case development has been pushed to the fogging point, and with the result that there is no difference in the extent to which the actinometer scale is developed. In both plates the fourth column of figures is complete, and there is the ghost of an image of two of the figures in the fifth column.

Mr. Green suggests, and his idea has been amply supported by

experiment, that the limit of developable actinic effect is, with a given plate, the fog limit, and that therefore it may be taken as a law that if different developers are used, each strong enough to produce fog, and if the action is continued to the fogging point, there will be no difference in the extent to which feeble light impressions are brought out. There may be difference in the staining effect of one developer as compared with another, and that may greatly mask the true photo-chemical effect; and, in fact, there is such a difference in the case of the two developers here compared. The pyro developer stains the film much more than the quinol developer, but so far as the true photo-chemical effect is concerned there is no difference. J. WILSON SWAN, M.A.

(To be continued.)

THE PROPERTIES OF DETECTIVE CAMERAS.

No. II.

CONTINUING our summary of last week of the properties of detective cameras. In reply to the question:—

17. Is it not desirable that the shutter should be so constructed that the foreground receives more exposure than the sky?

(a) "A diaphragm shutter working between the lenses is best; this will expose both alike."

(b) "It is desirable to give more exposure to the foreground than to the sky, but shutters so constructed necessarily work comparatively slow. I have had several, and the fastest was about one-fortieth of a second."

(c) "Do not think any such arrangement possible for very quick exposure."

(d) "Not necessarily; an instantaneous picture generally shows uniform lighting."

(e) "Do not think it cuts any figure in shutter work."

(f) "Yes; this an imperative need, and one which the dealers should respect."

(g) "No; the most satisfactory work will be obtained with a shutter that distributes the light evenly."

(h) "I think not for detective work."

(i) "Theoretically advisable, practically unnecessary."

(j) "Yes, if you use the camera only one way; if used reversed, one side receives more light than the other. A round opening is best all around, if you cannot shift the shutter."

(k) "It is an advantage in some subjects; with water in the foreground. Uneven exposure would give the reflection greater value than the sky."

(l) "I should hardly think so, as, for instance, in water and street views in summer the foreground requires in bright sunlight even less exposure than the sky."

18. On what part of the camera should the release of the shutter be?

Nineteen say on the side; nine on the bottom; two on the top.

(a) "On top or the right side. Mine is underneath, and is very unhandy on that account."

(b) "On the side, not on the top or bottom."

(c) "I like it best on the bottom, as it is less likely to be set off by accident."

(d) "Not on the camera at all; the chance of jarring in a moment of excitement is very great. It should work by the pressure of a bulb held in the hand which does not touch the camera."

(e) "I prefer right hand side, about two-thirds distance from the bottom, as this enables you to have use of the hand to steady and the thumb to make the release."

(f) "Is not this purely a matter of convenience?"

(g) "On the side, and to be worked by a movement backward, not sidewise."

(h) "I prefer it on the next side to the right of finder."

(i) "Underneath, so that the victim does not know when he is shot."

(j) "Depends on wish of operator."

19. Please give the formula of the developer you use.

Pyro and potash, or pyro; soda and potash seem to be the favourite developers.

(a) **No. 1.**
Sulphite of soda 1 ounce.
Water 5 ounces.

No. 2.
Carbonate of soda 1 ounce.
Water 8 ounces.

Normal developer: No. 1, 1½ ounces; No. 2, 1 ounce; pyro, dry, 4 grains.

(b) Equal parts of—
No. 1.
Hydroquinone or pyro 10 grains.
Water 1 ounce.

No. 2.
Carbonate of soda 40 grains.
Water 1 ounce.

And the ferrous-oxalate developer, i.e., one part of saturated solution of ferrous sulphate and three parts of potassic oxalate.

(c) Pyrogallie acid 6 grains.
Sulphite of soda 30 "
Carbonate of potash 13 "
Carbonate of soda 5 "
Bromide of ammonium ½ grain.
Citric acid 1 "
Water 1 ounce.

(d) **No. 1.**
Pyro 50 grammes.
Hydroxylamine chloride 6.5 "
Water 500 c.c.

No. 2.
Sulphite of soda (crystals) 100 grammes.
Carbonate of soda (crystals) 200 "
Water 500 c.c.

Normal developer. For use, take 1 drachm each of Nos. 1 and 2, and add 2 ounces of water.

(e) **No. 1.**
Pyrogallie acid 1 ounce.
Sulphite of soda 4 ounces.
Sulphuric acid 1 drachm.
Water, to make 16 ounces.

No. 2.
Carbonate of soda 2 ounces.
Carbonate of potash 2 "
Water, to make 16 "

(f) **Potash Solution.**
Carbonate potash (granular) 15 per cent.
Sulphite soda (crystals) 10 "
Distilled water 75 "

Commence with using one-half of the quantity of pyro solution used to begin development, and increase gradually to the full amount, 8 drachms in 4 ounces of water, if necessary to obtain the desired contrast.

(g) **Pyro Solution.**
Pyrogallie acid 5 per cent.
Sulphite soda (crystals) 20 "
Distilled water 75 "

For time exposures, use 2 drachms in 4 ounces of water, and increase to 8 drachms gradually if intensity of negative appears too weak.

For instantaneous and portrait work, commence with 1 drachm in 4 ounces of water until development starts, when increase gradually to the full amount — 8 drachms.

(h) **Hydroquinone Solution.**
Hydroquinone 2.25 per cent.
Sulphite soda (crystals) 10 "
Distilled water 87.75 "

Use 2 ounces with 2 ounces of water; add 3 to 6 drachms of potash solution. Development is slow at first, but once started the negative gains density rapidly. Continue development further than with pyro, as density is lost in the hypo. The mixed developer can be used repeatedly, and does not cloud nor stain.

(i) Sal soda 1 ounce.
Sulphite of soda 1 "
Water 15 ounces.

To 2 ounces of the above add 2 ounces of water and 6 grains of dry pyro.

(j) Granulated carbonate of soda 4 grains.
Pyro " sulphite of soda 8 "
Water 1-3 "
Water 1 ounce.

(k) **No. 1.**
Hydroquinone 48 grains.
Alcohol 1 ounce.

No. 2.
Sulphite of soda (crystals) 2 ounces.
Carbonate of potash, c.p. 3 "
Water 12 "

Normal developer No. 1, 1 drachm; No. 2, 2 drachms; water, 2 ounces. If not strong enough, the hydroquinone can be increased up to 2 drachms.

(l) **The Ladies' Developer.**
Hydroquinone 1 gramme.
Carbonate of soda 3 grammes.
Carbonate of potash 4 "
Sulphite of soda 7 "
Water 100 cc.

(m) Pyro and soda, or pyro and potash; either works well. The latter, however, needs a little care not to fog sometimes the high lights.

20. Please state your manner of using it (weak, normal, or strong) in summer and in winter.

The general custom is to begin weak, and as soon as details begin to appear, flow the plate with normal solution, and add, if necessary, either or both of the solutions as may be required.

(a) "The temperature of the solution is one of the most important factors. In summer it should be as cold as possible at starting, as it gets warm enough as the development continues. In winter it should be about 65°, and stay so. I generally begin with a well-diluted solution, and build up as required."

(b) "In summer, I generally succeed in bringing the picture out with a weak developer; in winter, normal, warmed."

(c) "Either method, with the formulae (b), will give good results. I prefer to start development with normal developer, and as soon as density is obtained get detail by treatment with dilute alkali. Potash or ammonia give equally good results."

21. Have you ever used in detective camera work ferrous oxalate, hydroquinone, or hydroxylamine developer? What has been your experience?

The majority answer they have not used either of these developers.

(a) "Have used all of them with perfectly satisfactory results."

(b) "I prefer ferrous oxalate for all work to anything else; have used many formulae, and always returned to my favourite contented with it."

- (c) "Yes! all kinds of experience."
 (d) "Ferrous oxalate gives me weak negatives; hydroquinone fogs."
 (e) "Unsuccessful with ferrous oxalate; successful with hydroquinone."
 (f) "I used ferrous oxalate in 1834 with good results, but it was too slow and was difficult to get detail out in the shadows. I have used hydroquinone to a limited extent, but have found it much slower than pyro."
 (g) "Never used ferrous oxalate after trying pyro and potash. I believe in using one developer—first, last, and always. Get a good one, and stick to it until you can get your negative every time, or most every time."

(To be continued.)

FIFTY YEARS' PHOTOGRAPHY.

In 1834 Daguerre attempted to float a company to work his process, for at this date he announced that he had at last overcome all difficulties. The public were incredulous, and so the company was never established. It was different with the scientists of that day. They foresaw the capabilities of the new-found art; and in Arago, the famous astronomer, Daguerre found a most excellent champion. It was in a large measure due to his personal efforts and his great eloquence that the French Government granted to Daguerre a life-pension of 6000 francs. Isidore Niepce received one of 4000. This was given on the understanding that the whole world was free to use the discovery about to be divulged by Daguerre. It is a fact worthy of being noted that Daguerre patented his invention in England. Was this in revenge for Waterloo?

It would take up too much time to go into details regarding the actual process; suffice it to say, that in the original method iodide of silver, produced by exposing a silvered plate to the fumes of iodine, was made use of, and development was by means of the fumes of mercury, while the unacted-on iodide was removed by a solution of common salt. Subsequently, by the use of bromine in conjunction with the iodine, a more sensitive surface was obtained, and the salt solution replaced by hyposulphite; further, the image was strengthened by a deposit of gold. This was due to Fizeau. From what has been said it will be seen that Daguerre's process, as at first brought forward, was not altogether a very perfect one.

Before we leave Daguerre we may briefly state that he retired from active life, or rather left Paris and settled down at Bry-sur-Marne, shortly after the pension had been awarded him. He married an English lady, Louisa Arrowsmith, but had no family. In the church at this place a canvas five yards square testifies to the handiwork of the dioramic painter. It is placed behind the high altar, and being lighted from above several optical effects are brought into play. The subject here depicted is the interior of a Gothic edifice. He still experimented, and, in 1844, he announced he would be able to take a horse at full gallop. He tried hard to fix the colours in pastel work, so as to do away with the protecting glass; but this problem remains practically unsolved to this day. In passing, I may mention there seems to be at the present moment an attempt to introduce pastel work by our local artists. This class of work has always been a favourite one with French artists. Perhaps some of our members may take the matter in hand, and bring renown to our Association, succeeding where the illustrious Daguerre failed. Daguerre died suddenly on July 10, 1851, in the prime of life. In the cemetery at Bry-sur-Marne a monument was erected over his remains by the *Société Libre des Beaux Arts* in the year 1852. In 1883, a succeeding generation has erected at Cormeilles-en-Parisis a statue commemorative of Daguerre and his work. It is erected on a small open place opposite the house where he was born, and consists of a pedestal some six or seven feet in height, surmounted by a bust in bronze, the work of the sculptor Capellari. On the pedestal are the dates 1789 (year of Daguerre's birth) and 1843 (year in which the statue was erected). The actual date on which the inauguration took place was Sunday, August 26. The portrait now on the screen is taken from a daguerreotype secured by Mayall in the year 1846.

Although when treating of Niepce we made no reference to the memorial which France, assisted in some measure by the whole photographic world, has erected at Chalon-sur-Saône, it was not from any overlook, but seeing this recognition by posterity of a great man did not take place till after homage had been done to Daguerre, we thought it better to refer to Niepce's memorial at this point. A good idea of the original statue will be had from the transparency now shown. The inauguration of this tribute took place on June 21, 1885, and was made the occasion of a considerable amount of ceremony. The artist, who was good enough to do the work gratuitously, was M. Guillaume. The statue, which is in bronze, was cast at the famous workshops of Barbadienne, of Paris. It seems to me that France is much more zealous of the honour of its great men than we are. Our countryman, Talbot, who did equally good work, and who was as early in the field with his discoveries as Daguerre, has, as yet, not had that recognition which ought to have been rendered him long ago. How comes it that no commemorative statue has been erected to the man who shares with the Frenchman, whose career we have just been considering, the honour of being the discoverer of photography?

* Continued from page 128.

Let us consider briefly Talbot's work, and I think we shall see how justly entitled he would be to the recognition I have spoken of.

Henry Fox Talbot was born in the first year of this century. In 1821 he graduated with honours at Cambridge. It was intended that he should have a political career, and for two years he had a seat in Parliament; but his instincts were scientific, not political. In 1834 he retired from public life and devoted himself to scientific research. He was a member of the Royal Society and contributed many important memoirs to that important body. The communication which interests us more especially was the one which was read on January 31, 1839, and which was entitled, *Some Account of Photogenic Drawing; or, the Process by which Natural Objects may be Made to Delineate Themselves without the Aid of the Artist's Pencil*. This was followed by another communication on the 21st of February, when the method of preparing the sensitive paper was given, for Talbot made use of a paper support, whereas Daguerre and Niepce had employed metal plates. The fixing of the picture Talbot effected by means of a solution of common salts, or solutions of bromides and iodides. In the introduction to his *Pencil of Nature* Talbot asserts that as far back as 1835 he had secured pictures of his residence, Lacock Abbey, in the camera. The manner in which he puts this fact is well worth quoting. He says, "This building was the first that was ever known to have drawn its own shadow."

We have had a lantern slide made from the actual picture of Lacock Abbey figuring in the *Pencil of Nature*, and we will now have it thrown on the screen. This picture is only one of a series I hope to bring before you at some future time, as I intend having transparencies made from all the photographs in the *Pencil of Nature*.

Talbot's process possessed one great advantage over that of Daguerre's. By his system he was enabled, having once got the original picture, to reproduce it over and over again. The first picture had the lights and shades reversed, and to this the now familiar name of negative was given, while to the copy, with the lights and shades as in nature, the term positive. These terms were introduced by Sir John Herschel. The process which now bears Talbot's name—Talbotype, and which was designated by himself Calotype—was first communicated to the Royal Society, June 10, 1841, and whereas in his photogenic drawing Talbot employed silver chloride in the presence of silver nitrate, he now had recourse to silver iodide. Briefly described, the preparation of the sensitive paper was as follows:—Writing paper was in the first instance brushed over with a solution of silver nitrate; when dry it was dipped into a solution of potassium iodide of a certain strength; after drying, to render it sensitive, a solution of what Talbot called gallo-nitrate of silver was brushed over it, this operation being done by candle-light. The paper could be used either in a moist or dried condition. After exposure in the camera, to render the latent image visible, the gallo-nitrate solution was again resorted to. This developer was made as follows:—One hundred grains of silver nitrate were dissolved in two ounces of water, and strong acetic acid to the extent of a sixth of the volume of solution was added. This was called A. A saturated solution of gallic acid in water formed solution B. A and B immediately before use were mixed in equal quantities, and this formed the gallo-nitrate developer. It is now pretty certain that the Rev. J. B. Reade had also adopted a similar mode of development, and in point of time was actually before Talbot, and on this point an attempt was made to render Talbot's patent for his process invalid. In a lawsuit it was decided that Talbot had the better claim, seeing the reverend gentleman had not published his method in a properly recognised manner.

A great advance in the proper fixing of the pictures was arrived at when hyposulphite of soda was employed instead of the bromides and iodides. Sir John Herschel had, as far back as 1819, shown that these silver compounds were soluble in a solution of the salt in question, but the fact, some way or other, was overlooked till Sir John called attention to it. In the year 1840 the hyposulphites had been known for some considerable period, Chausser, in 1799, being the first to prepare them. There are several reactions by which they may be obtained, but we refer only to one. The sodium salt may readily be obtained by passing sulphurous acid gas into a solution of sodium sulphide.

It would be beyond the limits of the present communication to individualise all the various modifications of calotype that were from time to time brought forward. In some cases the paper, to render it more translucent for printing purposes, was waxed before being sensitised instead of at the end of the operations, when the negative had actually been secured. Suffice it to say, that the paper process held its own till the year 1857, when the advent of collodion altered completely the character of photographic operations. There are other matters, however, to refer to before we can approach this era in the history of photography. To return to Talbot. In addition to the *Pencil of Nature*, he published another work, illustrated by silver prints—*Sun Pictures in Scotland*. This was in 1845, and one of the most interesting pictures in the collection is now shown by means of the lantern. It represents Walter Scott's monument in Princes-street, Edinburgh, as it appeared in October, 1844. It was then in course of erection, and the scaffolding surrounding it is well seen in the picture. All the views in the sun pictures would be particularly interesting to reproduce for showing in the lantern, and I hope to have this soon done. The work is lying on the table for the inspection of members. In addition to calotype, an engraving process was devised by Talbot, as also a very sensitive plate which was able to record the printed matter of a paper which had been fastened to a wheel and which was made to revolve

rapidly, the whole being illuminated for an instant by a discharge from a Leyden battery; this was in 1851. The details by which this result was obtained are published in the *Athenæum* of December 6, 1851. He devised also a method of calotype whereby positive pictures were obtained in the camera.

As already indicated, Fox Talbot did not confine himself altogether to photography; he was a mathematician of the first rank. He was one of the first who, in conjunction with Sir Henry Rawlinson, deciphered the cuneiform inscriptions brought from Nineveh. In 1834 and 1835, we find that he has papers, *Experiments on Light*, and *On the Nature of Light*, and, in 1872, we find that he has the following papers:—*Notes on some Anomalous Spectra*, *On the Early History of Spectrum Analysis*, and *On a New Mode of Observing Certain Spectra*. He seems to have been a busy man all through, and he died full of years and honours on September 17, 1877. Before proceeding further it should perhaps be mentioned that in 1852 he renounced his patent rights, and gave, with certain reservations, the right to work his process free to his countrymen.

We have already referred to Sir John Herschel's application of the now universal solvent of the unacted-on silver salts, viz., hyposulphite of soda, let us see what part he played in the drama of photographic discovery. The name of Herschel is so intimately connected with the science of astronomy, that the photographic work of the younger Herschel, as he has been called, is on this account not so fully realised as it deservedly should be. It is an ascertained fact, that as early as 1839 Herschel obtained a camera image of his famous telescope on paper prepared with carbonate of silver, and fixed with hyposulphite. He first suggested the use of glass plates in photography. He was the originator of the various iron processes. He experimented largely in the direction of colour photography, studying the action of the spectrum on all kinds of susceptible substances. The colouring matter of flowers was also dealt with by him in a similar manner. To detail all Herschel's discoveries would require a complete paper by itself. Many of the processes devised by this investigator have dropped out of sight, but his cyanotype, or blue process, remains to this day, and is largely made use of by engravers in copying plans. The platinotype process of Wills is, in reality, based on the fact first enunciated by Herschel, that light reduces ferric salts to the ferrous state. The salts of mercury were also pressed into the photographic service by this illustrious scientist. He it was who first showed the bleaching action of the bichloride of mercury on a silver print; this was in 1810. W. LAMB, JUN.

(To be concluded.)

LORD RAYLEIGH ON EXPERIMENTAL OPTICS.

No I.

Larry Saturday, in the course of a lecture upon *Experimental Optics*, delivered at the Royal Institution by Lord Rayleigh, F.R.S., the speaker said that Sir Isaac Newton, in his experiments upon the spectrum, chiefly used a round hole instead of a slit, and found that he could improve the spectrum by making the aforesaid aperture smaller; when the hole was too large, he found that the colours overlapped each other, but that as he diminished the orifice, the colours became purer and well separated. The lecturer illustrated this by passing white light through one glass trough containing an infusion of litmus which cut off the yellow rays, then through a trough containing solution of bichromate of potash, which cut off the blue and violet rays, so that pure red and green light could alone pass through the two solutions. A rotating diaphragm, as used in photographic lenses, was placed in the path of the rays; with large apertures the red and green images of the orifices were seen overlapping on the screen; he then rotated the diaphragm until with the smaller apertures the red and green rays were well separated. With the larger apertures, the colour of the space where the red and green rays overlapped was orange, proving that a visual orange can be made by mixing pure red and green lights.

Considering the great reputation of Sir Isaac Newton, Lord Rayleigh thought it to be strange that so few persons had studied the solitary book on *Optics* which had been written by that philosopher; it contained information on some points which in more modern times had been brought forward as novel. That Newton knew that a slit could be used in a spectroscopic as well as a hole, was proved by his statement that an "elongated parallelogram" would answer the same purpose; the lecturer supposed that the novelty of any more modern device did not consist in the substitution of the word "slit." An argument had been raised that if Newton had used the slit, he must have discovered Fraunhofer's lines, but in Newton's days there was great difficulty in getting good prisms, and there was at that time no reason why any one should suspect the existence of the lines; nevertheless, it was rather strange he did not discover them. At all events, it is certain that he used a slit. Wollaston was the first person who saw the lines; Fraunhofer, the optician, afterwards made an elaborate study of them, and they have ever since been known as "Fraunhofer's lines." The study of those lines has since become almost a special branch of science, so that it now requires the

labour of years for the student to become well acquainted with all that is known about them.

Herschel formed his spectrum very much in Newton's manner; after throwing it upon a screen he introduced into it a thermometer, and tested the heating power of the different rays; he found little warmth in the blue and green, more in the yellow and red, and more still in the dark region beyond the red. Dr. Thomas Young, in lecturing upon light before the Royal Institution, in 1807, characterised this discovery of Herschel's as one of the greatest which had been made since the days of Newton, and so, said Lord Rayleigh, it was. Subsequently more delicate instruments were used to measure the heat of the rays of the spectrum, and the first to use the thermo-electric pile for the purpose was Melloni. The lecturer here threw a spectrum upon the screen and moved a thermo pile in front of the screen; the terminals of the pile were connected by wires with a reflecting galvanometer, which threw a disc of light upon a white scale several feet long; as the pile was moved along the spectrum, the galvanometer needle indicator began to move as the yellow rays were approached, then proved more bent to exist in the red, and finally gave the greatest deflection in the invisible region beyond the red.

Herschel in his earlier papers inclined to the modern view, that there is very little difference between heat and light, but undoubtedly in his later paper he sums up against that view, and concludes that two agents are at work in the spectrum. He argued that if by any means it were possible to alter the proportion of the two effects two agents must be at work, and he found that by passing red rays through red glass very little difference was produced in the amount of light transmitted, but a great difference in the amount of heat, hence he came to the conclusion of the existence of two agents. His conclusions, however, were not accepted by his contemporaries; they were opposed by Young, who argued that the rays of the spectrum were but different degrees of the same scale, and that the apparent difference between radiant light and radiant heat is more in our sensations than in the things themselves. He argued that the longer waves might produce the sensation of heat, and the shorter waves of light darken emulsions of silver, and otherwise excite chemical action. The latter view is the one now generally accepted, except that it is now known that the rays which excite chemical action vary with the substances upon which those rays fall. Professor Langley, of America, has published that Draper, in comparatively recent times, first promulgated this view, but Lord Rayleigh said that it was a serious misrepresentation of the history of the subject. Long before Draper's utterance on the subject, the view that light and heat are at root much the same thing had been generally accepted in this country; he (the speaker) had been taught it before Draper wrote about it, and the view had been promulgated in earlier times by Dr. Balfour Stewart and others in this country. Here Lord Rayleigh projected a spectrum upon what he said was known to photographers as "bromide paper;" some pyro and ammonia developer was then painted over it by an assistant, and a vigorous image came out where the blue and violet rays fell. Herschel, he said, experimented with many substances, including bromide of silver, which he found could, by sufficient exposure, be impressed down into the red of the spectrum; these experiments were performed in 1840-50. It was once believed that steel could be magnetised by certain rays of the spectrum; he (the lecturer) thought this to be an error, demonstrable by proper performance of the experiments. Against Herschel's experiment on the differential action of red glass there is nothing but theory; if Herschel is right modern theories of light are wrong, or want revolutionary remodelling. He (Lord Rayleigh) believed that if Herschel's experiment were properly performed, and all conditions taken into account, Herschel would certainly be proved to be in error; it might be well if some of the persons, such as those who write text books, would settle this point by experiment, that the modern view may not rest upon accepted theories alone, but those theories are so strong and so well supported by proved facts, that he did not expect the substantiation of Herschel's view, the acceptance of which would shake the wave theory of light to its foundation. W. H. HARRISON.

PARIS EXHIBITION REGULATIONS FOR PHOTOGRAPHERS.

A copy of the full text of the rules relating to photographing in the coming Paris Exhibition has been sent to me. The rules are signed by M. G. Berger, Director-General of the Exhibition, and by the Commissioner-General, M. Lucien Pautreaux, Minister of Commerce and Industry. My translation of the said regulations runs as follows:—

ARTICLE FIRST.—The right to take photographic views in the Universal Exhibition of 1889 will not be made the object of any monopoly or exclusive privilege. All photographers permitted, on application, to take pictures within the Exhibition limits, and upon the days and hours fixed by the Administration, must be provided with an authorisation, signed by the Director-General of the "Exploitation." For that which concerns the Fine Arts group (classes one to five) the authorisations must be signed both by the Fine Arts Director, and by the Director-General of the Exploitation.

ARTICLE SECOND.—Photographers authorised, under Article I of the present regulation, will work at fixed times. For each of these admissions a payment of twenty francs (sixteen shillings), to go to the Administration, must be made for each apparatus employed. This payment must be made and receipted in the cashier's office at the Exhibition.

The admissions will have a duration of four hours; either from eight in the morning until midday, or from ten in the morning until two in the afternoon. All authorisations will be valid only for the days and hours indicated. The Director-General of the Exploitation will always have the power of renewing them, without additional payment, if they have not been used on the days and hours fixed.

ARTICLE THIRD.—Applications for authorisations addressed to the Director-General of the Exploitation must state:—1. The number of assistants the applicant intends to employ. 2. A statement of what apparatus he intends to use. 3. A formal declaration that the applicant takes the whole responsibility of any consequences his reproductions may entail. 4. An undertaking to conform to the police regulations and the rules of the interior.

ARTICLE FOURTH.—Season tickets at the price of 300 francs for each piece of apparatus employed, available during the whole term of the Exhibition, at the hours fixed by Article 2, will be issued to those photographers who apply for them.

ARTICLE FIFTH.—Assistant operators, like the operators themselves, must pay the same entrance fee as ordinary visitors, in addition to the sum paid for authority to photograph.

ARTICLE SIXTH.—Operators admitted to photograph must not, under any circumstances, introduce within the Exhibition fire, or explosive or inflammable substances. Their preparations must be made outside the limits of the Exhibition.

ARTICLE SEVENTH.—All reproduction of objects exposed, whatsoever be the nature of the said objects, is absolutely subject to permission being given by the exhibitors thereof or their authorised agents, countersigned by the Director-General of the Exploitation.

ARTICLE EIGHTH.—Photographers furnished with authorisations have the right to take general views of the palace, parks, and galleries, on condition that they send ten proofs of each view to the Administration.

The above is the last of the conditions laid down in the official regulations relating to photographing inside the Paris Exhibition.

W. H. HARRISON.

CAMERA CLUB CONFERENCE, 1889.

THE 1889 Conference will be held in the theatre of the Society of Arts (by kind permission of the Council) on Tuesday and Wednesday, March 26 and 27, under the Presidency of Captain W. de W. Ahney, C.B., R.E., F.R.S.

PROGRAMME.

Monday, March 25, at 8 p.m.—Smoking Concert at the Camera Club Rooms, 21, Bedford-street, W.C.

Tuesday, March 26.—Conference and Exhibition of Apparatus at the Society of Arts, 18, John-street, Adelphi, to be opened by the President at 2 p.m. Papers to be read from 2 p.m. to 5.30 p.m. in the theatre: Mr. Conrad Beck, *Depth of Focus*; Mr. J. Brett, A.R.A., *The Relation of Photography to the Pictorial Art*; Mr. P. H. Emerson, B.A., M.B., *Science and Art*; Mr. Lyonel Clark, *A Comparison of Developers*; Captain W. de W. Ahney, C.B., R.E., F.R.S., *The Law of Error and Photography*; Mr. T. H. Dallmeyer, *Shutters*; Mr. G. Lindsay Johnson, M.A., M.B., *A Shutter Speed Measurer*.

At 8 p.m.—Exhibition of Lantern Slides in the theatre. Slides from Paris, Vienna, American, and English Societies.

Wednesday, March 27, 10 a.m.—Apparatus on view at the Society of Arts, and Exhibition of Photographs by Members at the Club Rooms, 21, Bedford-street.

2 p.m.—Renewal of Conference in the theatre, Society of Arts. Papers to be read from 2 p.m. to 5.30 p.m.: Mr. C. H. Bothamley, *Chemical Changes from the Modern Point of View*; Mr. A. A. Common, F.R.S., *Irradiation in Astronomical Photography*; Mr. A. Dawson, *The Field of Photography*; Mr. W. T. Wilkinson, *Dry Plates for Photo-litho and for Collotype*; Mr. A. Pringle, *Photo-micrography*; Captain A. M. Mantell, R.E., *Photography applied to Military Purposes*.

7.30 p.m.—Annual Club Dinner for Members and friends at Holborn Restaurant.

All photographers are cordially invited to the Conference and Exhibitions. The meetings (except the smoking concert) will be open to ladies.

G. DAVISON, } Hon. Secs.
E. G. SPIERS, }

Camera Club, 21, Bedford-street, Covent-garden, London, W.C.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2547.—"Improvements in Instantaneous Shutters for Photographic Cameras." H. N. B. GOOD.—*Dated February 18, 1889.*

No. 3174.—"An Improved 'Magazine' Camera for Photographic Purposes." G. KNIGHT.—*Dated February 22, 1889.*

No. 3279.—"Improvements in Appliances for Producing Flashing or Continuous Lights (at pleasure) for Photographic, Scenic, Signal, and other Purposes." F. W. HART.—*Dated February 23, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN FRAMES OR STANDS FOR HOLDING PHOTOGRAPHIC AND OTHER PICTURES AND TABLETS.

No. 3115. JOEL CADDURY, Great Hampton-street, Birmingham, in the County of Warwick, and WILLIAM HENRY RICHARDS, Long-street, Sparkbrook, Birmingham.—*March 1, 1888.*

THIS invention relates to what are known as frameless photographic holders, consisting essentially of a back provided with certain fittings and spring and other clips which embrace and secure the glasses, with a photograph or other picture thereunder to the said back framing, which is made of wood, *papier maché*, or other solid substance.

This invention has for its object the securing of the said fittings, clips, and the like to the backs, as hereinafter described, by which improvements the method of attachment is greatly simplified and the appearance of the article greatly improved.

Hitherto, the spring and other attachments and fittings have been secure to the wood backs, commonly employed, by rivetings.

According to our invention, the said fittings are attached by ears or spike-like extensions made in one piece with the metal of the said fittings and passed through piercings in the said backs, and clenched or turned down upon the inner side.

In carrying out our invention we will describe it in connexion with fittings for photographic and other frames, as described in application for Letters Patent made by us on the 25th day of November, 1887, and numbered 16212.

To form the rest, which comes at the lower back part of the frame, we take a blank of sheet metal, making, as it were, a bar with ear-like extensions at its two opposite ends, which are turned inwardly at right angles to the other part.

The underside edge of the bar is provided at its two opposite ends with extensions, which are bent forward under the bottom edge of the frame like claw rests, upon which the lower edge of a photograph or other picture and the covering glass is supported.

The ears or spike-like extensions, bent from the extreme outer ends of the bar, are passed from back to front through longitudinal piercings made through the back, and with the extreme ends of the said ears bent flat to the plane of the front face of the said back.

The spring clip, which consists of two flat bars sliding one upon the other, with a spring interposed between a shoulder of one of them, and an abutment formed by the cutting away of the back part, wherein a portion of the said clip lies, is secured by the under-bar having ears or prong-like extensions at the upper and lower ends, which pass through like piercings made through the said wood—back part—and then clenched or turned down upon the front face.

The movable bar has a cross pusher bar at its lower end, and a hook-like claw at its upper end.

Thus the fittings are secured in their respective positions by ears or prong-like extensions which pass through piercings in the wood or other back and then clenched.

AN IMPROVED PHOTOGRAPHIC CAMERA AND CHANGING BOX COMBINED.

No. 4149. WILLIAM A. BRICE, Genova, Italy.—*March 17, 1888.*

MY invention consists in a photographic camera so constructed as to have two chambers, in one of which is stocked a pile of sensitive plates sufficient to fill it, the other being an exposing chamber. These are separated by two thin partitions, capable each of being moved upwards and downwards to a limited extent by means of small knobs or handles on the outside. By the action of these the upper plate of the pile can be transferred to the empty exposing chamber and dropped to its rear, where it is securely held conjointly by the pressure against one of the partitions aforementioned and that of a hinged flap, both being operated from the outside. This hinged flap serves the double purpose of conveying the sensitive plate or film gently from the upper opening through the empty space of the operating chamber by acting as an inclined plane whereby the plate, paper, card, or other sensitive film is ultimately conducted into accurate position at the point of focus, and also of acting as a movable abutment on one side against which the plate or other sensitive film is pressed by a spring stud underneath so as to ensure accurate register of focus. On releasing the plate from pressure after exposure, this plate, now impressed with a latent image, may be slid into and at the bottom of the stock chamber, the upper one of the series of plates being by like means slid over the top of the partition and made to take the place of the one removed at the focussing plane in the exposing chamber; and so on in rotation.

It is fitted with a finder, and the lens is covered by a shutter which may be operated either instantaneously or as slowly as may be desired. Suitable arrangements are provided for focussing.

After the chamber has been filled with sensitive plates, all the operations of transferring and exposing them are made without the camera being again opened. The final specification is illustrated.

LANTERN SLIDE COMPETITIONS.—Prizes in the competition instituted by S. Fry & Co., Limited, have been awarded as follows: 1st, E. Brightman, Bristol; 2nd, J. Mure, Paisley; 3rd, A. R. Dresser, Bexley Heath; 4th, W. Norgrove, Bristol; 5th, J. W. Shores, Bridlington Quay; 6th, W. H. Bailey, Cuckham. Nearly five hundred slides, from upwards of eighty competitors were sent for competition, and Mr. Hepworth (the Judge) expressed his admiration at the high order of excellence displayed, rendering the final selection a matter of extreme difficulty. Three out of the six successful competitors employed hydroquinone as a developer.

IN the slide competition of F. W. Vétel & Co. the following are the successful competitors:—1st prize of 3*l.*: Mr. G. I. T. Walford, 10 Soames-street, Denmark-park, London; 2nd prize of 1*l.* 10*s.*: W. F. Mackenzie, Lenzie; 3rd prize of 15*s.*: Mr. W. Marsden, 26 Sefton-street, Southport; 4th prize of one gross lantern plates: Mr. J. Huff, 10 Victoria-road, Penrith; 5th prize of half gross lantern plates: Mr. T. Harriman, Henley-on-Thames; 6th prize of half gross lantern plates: Dr. R. Atkins, Watford.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 4.	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 5.	North London	Myddelton Hall, Upper-st., Islington
" 5.	Holmfirth	
" 5.	Sutton	Society's Rooms, Sutton, Surrey.
" 5.	Sheffield	Masonic Hall.
" 5.	Paisley	Paisley Museum.
" 5.	Bolton Club	The Studio, Chancery-lane, Bolton.
" 5.	Coventry and Midland	The Dispensary, Coventry.
" 6.	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 6.	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 7.	Bolton Photographic Society	The Baths, Bridgman-street.
" 7.	Leeds	Philosophical Hall, Leeds.
" 7.	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 7.	Glasgow Photo. Association	Religious Institute, 177, Buchanan-st.
" 7.	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

LAST Tuesday night, at a meeting of the above Society, held at 5a, Pall Mall East, London, Mr. Thomas Bolas presided.

Mr. ARNOLD SPILLER said that five years ago he developed half a dozen negatives with quinol, and they were more stained than any he had developed in his life; perhaps the sample was bad.

Mr. A. COWAN thought that it had been proved that quinol would equal pyro as a developer; perhaps it gave less stain.

Mr. LOUIS MONTEFIORE believed that quinol gave good results with the more certainty; it always gave him fairly printable negatives, and he had not the same certainty with pyro; the former salt allowed greater latitude of exposure.

Mr. NEWLAN had used quinol for five years, and never had a bad negative with it.

Mr. CHAPMAN JONES had found some samples of commercial plates which would develop well with pyro, and not at all with quinol.

Mr. W. E. DEBENHAM, unlike some experimenters, had found that he could not use the quinol solution again and again, because it so lengthened development.

Mr. WINTER recapitulated some of Mr. Swan's results, and exhibited his experimental negatives.

Mr. COWAN thought that one of the pyro negatives before them, showing slight green fog, would print better than a quinol-developed negative before them, showing slight grey fog.

Mr. MONTEFIORE had found quinol to work well with meta-bisulphite of potash, but the developer required more alkali to neutralise the excess of sulphurous acid; caustic alkalies, instead of carbonates, reduced the time of development.

The CHAIRMAN remarked that Mr. Montefiore's negatives exhibited the slight veil often sought after.

Mr. MONTEFIORE preferred the slight veil.

Mr. WINTER said that Mr. Swan had found four grains of meta-bisulphite to one of quinol to stop development.

Mr. W. BEDFORD remarked that Mr. Swan had found sulphite of soda to be a strong restrainer, so perhaps it was hardly fair to compare quinol so used with pyro used without sulphite. He thought the opinion of the meeting should be taken on Mr. Swan's suggestion of using the shorter word "quinol" in place of "hydroquinone" in photographic circles.

The CHAIRMAN put this to the vote, and declared the majority to be in favour of "quinol."

Mr. W. B. HARRISON believed that Mr. Francis Cobb had first used the word "quinol" in photographic literature, in one of the almanacs a year or two ago.

Mr. GUTZ had found quinol and pyro to give the same results; quinol acted quickly towards the close of the development, and the plate had to be removed at just the right moment, or there would be too much density; he had had strong green fog with it.

The CHAIRMAN asked if lime in the water made any difference with quinol?

Mr. NEWLAN sometimes used well-water, rich in lime, and found that it made no difference. Quinol stained if plates were put in the hypo without washing, and when there was no sulphite in the developer.

Mr. BEDFORD had developed paper bromide prints with it, and put them direct in the hypo without getting stains, except with one sample of paper.

Mr. HERBERT FRY had found the slightest washing to answer, and no acid bath necessary.

Mr. J. J. BRIGGS had seen prints bearing out that statement.

The CHAIRMAN suggested that the kind of gelatine used might have an influence.

Mr. SPILLER said that that was Mr. W. K. Burton's opinion.

Mr. J. D. ENGLAND stated that the coarser the bromide in the gelatine, the greater was the liability to stain.

Dr. LINDSAY JOHNSON wished to know if quinol would work as well as pyro where there were violent contrasts, as in dark rock foregrounds with snow-clad mountains behind. He had been doing this class of work in Switzerland, and found that by taking Captain Abney's advice, and using very little pyro, much restraining bromide, and long development, he got on very well.

Mr. COWAN responded that some of the negatives on the table proved that quinol gave great latitude.

Mr. MONTEFIORE had found that under-exposed and over-exposed negatives could be developed well with quinol in the same solution.

Dr. JOHNSON had modified commercial rocking apparatus to keep a large dish rocking during long developments.

Mr. J. HERBERT asked if quinol would give as delicate half-tones as pyro?

Mr. WILLIAM ENGLAND exhibited two flash lamps he had made for a shilling each of tin and pieces of gas tubing; by branch tubes he could fire off the two

of them at once and release the shutter pneumatically. He then took two flash-light pictures of the meeting.

The CHAIRMAN announced that Dr. Lindsay Johnson would give ten guineas to the Society towards founding a museum if other members felt sufficient interest in the matter to subscribe a like amount. He (the Chairman) had no doubt that other members would subscribe more than ten guineas, and as the Society had no premises of its own, the objects collected might be temporarily deposited at South Kensington.

Mr. ARNOLD SPILLER thought it good to have a museum, but doubted if it would be well to join the South Kensington clique.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

ON Thursday, last week, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. H. M. Hastings presided.

Mr. F. W. Pask was elected a member of the Association.

Mr. A. HADDOX asked how an American firm registered the speed of films which they advertised as giving twenty-seven on the sensitometer. Warnerke's sensitometer only registered up to twenty-five, and without the firm stating what sensitometer was meant the information was useless to every one.

There was no reply.

Mr. J. B. B. WELLINGTON exhibited two prints made by General Dawson on Eastman's bromide paper, the one developed with ferrous oxalate and the other with quinol; the latter was the better of the two. This experience, he said, did not agree with that of Messrs. Morgan & Kidd, who had tried quinol for enlargements and found it to give defective results on the edges of the high lights.

The HON. SECRETARY announced that on that day fortnight, March 7, the lantern slides competitively printed by various members from negatives of intentionally varied quality would be exhibited and the decision of those present taken as to the best results.

Mr. A. HADDOX then gave an address and made some experiments relating to explosives. Some of the most explosive variety of gun-cotton he placed in alcohol and ether, and throughout the evening it would not dissolve; he then took it out and substituted some photographic pyroxyline, which dissolved immediately; the explosive sample was next dried and fired off to prove it to have been gun-cotton. He summarised the results of the researches of Hadow and others as to the nature of varieties of pyroxyline, and hammered upon an anvil a piece of paper which had been nitrated; it exploded only where the blow fell; the ignition did not spread outside. He said that Mr. Hubert's way of making a flashing magnesium light was highly dangerous, because any uninformed person using it might be tempted to reduce the size of the glass chamber to economise weight, and the extra confinement of the gun-cotton might lead to a violent explosion. In illustration of this, he placed a small tuft of gun-cotton in a glass flask, and, after placing both in a packing case and getting the Chairman to stand on the top of it to keep the case down, he fired the gun-cotton by means of a fine platinum wire ignited by electricity. There was a violent explosion inside the box. He then dusted some fulminate of mercury over a glass plate and fired the fulminate, which went off with a flash and left the plate silvered all over, so as to make a passably good mirror. He stated the conditions under which gun-cotton would and would not ignite, and explained how in warfare it is fired by means of detonating fuses.

The HON. SECRETARY remarked that those members of the Association who were not present that evening had missed a great treat.

Mr. HADDOX then exhibited an annulus of glass which he had cleanly cut from a glass tube by making a diamond cut upon the inside of the tube; had the cut been made outside, he said, no ring could have been cut out.

CAMERA CLUB.

ON Thursday, February 21, a discussion on *Films* was opened by the reading of communications upon various branches of the subject from Mr. H. H. O'Farrell (in India), Mr. H. Tolley, and Mr. George Mansfield. Sir George Prescott occupied the chair.

Mr. O'Farrell's paper referred to the Froedman films and to methods of keeping stripping films.

Mr. Tolley wrote concerning oiled paper negatives and strippers, and he sent some superb specimens of the negatives from which prints then upon the walls of the Club were taken.

Mr. Mansfield forwarded excellent work upon the new celluloid films of Messrs. Carbutt, and gave particulars of exposure and treatment.

The Hon. Secretary also showed negatives made on Allen & Rowell's ivory films (celluloid), and a long and interesting discussion was taken part in by Captain Barnes, Messrs. Davison, Walker, Bellsmith, Robinson, Lyonel Clark, Sage, Shipton, Paterson, S. Bourne, and Elder.

On Thursday, March 7, Mr. W. Adcock will read a paper entitled *Aims*.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE annual meeting of this Society was held at the Committee Rooms, 181, Aldergate-street, E.C., last Friday, the 22nd ultimo, there being a good attendance.

From the Secretary's report, which was read, it appears that the total disbursements for the year have been 74*l.* 14*s.* 6*d.*, against total receipts, 109*l.* 15*s.* 10*d.*, showing an increase of 35*l.* 1*s.* 4*d.* on the year's transactions. The fund has, therefore, been raised from 273*l.* 6*s.* 6*d.* to 308*l.* 7*s.* 10*d.*

The election of officers for the ensuing year then took place.—*President*: Mr. J. Traill Taylor.—*Trustees*: Captain Abney and Mr. W. S. Bird.—*Treasurer*: Mr. John Stuart.—*Secretary*: Mr. H. Harland.—*Auditors*: Mr. J. S. Rolph and A. Mackle.—*Committee*: Messrs. W. Bedford (Chairman), T. J. Collins (Deputy), H. D. Atkinson, W. F. Benham, F. H. Berry, T. Bolas, J. J. Briggs, H. E. Clifton, T. E. Freshwater, W. J. B. Humphreys, H. J. White, and J. Zaehnsdorf. (The Committee, in accordance with powers with which they are invested, afterwards added to their number Mr. F. W. Cox.)

NORTH LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting was held on February 19, at Myddelton Hall, Islington, — Mr. J. Traill Taylor, President, in the chair.

Mr. JAMES MARTIN presented to the Society a fine platinotype print of the President. He then called attention to the discolouration of the paper of a platinotype print which had been framed about two years—the part protected by the rabbit of the frame remaining unchanged.

The CHAIRMAN explained that the same effect was noticed some years back in carbon prints, which were thought to have faded; investigation, however, showed that the paper alone had become discoloured by exposure to light and atmosphere, but the print itself remained unchanged.

Mr. F. W. HART said that the discolouration of the paper was greatly influenced by the way in which it was framed. To properly protect a print, the glass should be pasted into the frame with pieces of card all round, the mounted print laid down, and the backboard fastened in and pasted round. He considered the discolouration to have been caused by fine dust and smoke getting in round the glass and settling in a fine film on the surface of the print.

Mr. E. CLIFTON said that paper made of wood pulp and bleached returns to its yellow colour when exposed to light; pure flax paper will not turn yellow when exposed to light. He had fastened a line negative on a clean board and exposed it to the light, the result was yellow lines on a white ground; he, however, considered the discolouration of the print in question to have been caused by smoke or dust settling on it.

Mr. CLIFTON had noticed a way of sealing up an engraving; the print was damped and the edges turned over and pasted on to the front surface of the glass; when dry the print was strained tightly over the glass, and the back-board pasted in.

Rev. E. Healy showed a shutter by Newman for moderately short or time exposures; it worked with an up-and-down motion.

Mr. HART exhibited an interesting 12 x 10 group taken by the London Stereoscopic Company on the occasion of the Jubilee dinner of the Union Bank of London, the Hart and Bishop lamp being the illuminant employed. Fifteen lamps, each burning five grains of magnesium, were used, and a fully exposed negative of a group of over seventy persons was obtained. Four such groups were taken, the whole time occupied in focussing, charging the lamps, &c., being only a few minutes. As a proof of the extraordinary power of the light, it was mentioned that an old Ross' doublet lens working at $f=24$ was used, the light being twenty-seven feet distant from the sitters.

Mr. HART then gave a demonstration connected with flames. He said:—

In the production of flame our starting-point shall be hydrogen. So far as we know it is a simple element; our accumulated experience, by which we test all theory, takes us no further at present. When I first began to study the nature and properties of flame, hydrogen was said to be a permanently elastic gas, our experience knew no more; since then it has been proved by experiment that hydrogen can be liquefied. See what a valuable thing experience is; it protects us in every direction, it enables us to devise new combinations for experiments, which are the buds of experience, likely to develop into a fresh limb of the tree of knowledge. The first experiment I show just comes within the range of the Victorian age. Here I have an ordinary Bunsen burner: turn off the air from entering below, and the luminous flame appears; I introduce a piece of tube, and you see that I draw off gas which is alight at the other end; this proves that that kind of flame at least contains gas ready to ignite so soon as it can find oxygen to combine with, and, inasmuch as magnesium also demands oxygen for its combustion, it is injudicious to allow the magnesium to be robbed of oxygen by discharging it into a gas already in the most favourable position to combine with oxygen. The gas is issuing at a very small pressure at the top of this tube, and when I turn on the air and convert the luminous into a non-luminous, or Bunsen flame, the pressure is still less at the end of the tube where the gas and air are burning as a mixture; it is still short of its full complement of oxygen, which has to be made up by the air outside to complete perfect combustion of the gas in this form of burner. When I reduce the quantity of gas to a portion so near its theoretical quantity entering the air holes, the flame at the top of the tube will be so exceedingly unstable that it becomes an explosive mixture issuing under slight pressure, and, consequently, will fire down, as you see; so to make it a practical Bunsen flame we must leave a little excess of gas in the mixture for the outside air or oxygen to combine with. I now introduce the tube about an inch above the orifice of the burner, and you see a portion of the mixture of gas and air is drawn off alight at the other end of this tube, and although this flame is permanent for many purposes of the chemist, it is easily put out, as you see, when I send a puff of air, such as used for ejecting magnesium powder, up through the tube. The small air tube would have to extend to above the mouth of the gas tube to be able to use it all. In all cases, whether of spirit or gas, luminous or non-luminous, I employ double flames to produce a homogeneous flame, through which to eject the magnesium. Here is another experiment to show that the large spirit flames employed for igniting the powder are flameless in the centre from absence of oxygen. Here is a tray packed with cotton waste saturated with spirit, in the centre I place a small metal tray containing a night light—there it is burning brightly; now, on igniting the spirit you see that it goes out from loss of oxygen, the interior of that flame is hydrocarbon vapour, most eager to combine with more oxygen than it already contains, so as to form carbolic acid with the carbon; so here we have two elements—hydrogen and carbon, both of which would rob the magnesium of oxygen under the circumstances, such as passing it through the flame.

A brief discussion took place upon this subject.

The next meeting will be on March 5, which will be the annual exhibition.

WEST LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on Friday, the 22nd inst., the President in the chair.

Mr. T. STAFFORD HAZEON read a paper on 'The Autotype Process,' with practical demonstrations. He prefaced the practical portion of his paper by giving a brief history of the process. He considered autotype had strong claims on the amateur for support on account of its simplicity, the range of colours obtainable, and, more important still, by reason of its absolute permanency. A vigorous negative gave the best results—those developed with hydro-

quinone were specially suitable. Ordinary negatives required treating by the double transfer process, therefore it was better to make a reversed negative; a simple mode of doing this in the case of landscapes and portraits was to expose the plate with the glass side next the lens—of course all patches of emulsion must be removed from the back of the plate. The focussing screen also would require readjustment. In autotype printing no image was visible before development, and in order to judge the proper amount of printing, an instrument called an actinometer had to be employed. The ready sensitised tissue as sold by the Autotype Company was about the rapidity of silver paper, but that sensitised by himself was much quicker. The operation of sensitising was very simple, and consisted in soaking the pigmented tissue in a bath consisting of one ounce of bichromate of potassium dissolved in twenty ounces of water. The tissue is allowed to soak for three minutes, taken out, squeezed, and put on a piece of blotting paper, and allowed to dry. The lecturer particularly recommended the process for the production of lantern slides; it produced a beautiful result, very free from grain. The print, after exposure, is developed by immersion in water at a temperature of about 110° Fahr. After development it is placed in an alum bath, and a final rinse in cold water completes the operation. Mr. Hazeon then gave a practical demonstration of the development of the exposed tissue by the single transfer process, the temporary support, pictures on opal and on glass, and concluded by remarking that expensive apparatus was by no means essential to work the process. Although he had a lot of paraphernalia with him, when at home he developed small prints in an ordinary basin and large ones in the sink of his dark room. All the necessary apparatus would be in every amateur's possession.

A large number of very fine prints in autotype, and also the dishes and apparatus necessary for the demonstration, were lent by the Autotype Company for the occasion.

Mr. DELVES BROUGHTON suggested that the over exposure might be due to the continuing action of light.

Mr. HAZEON had not noticed the effect referred to.

Mr. E. W. FOXLEE had had considerable experience in working the autotype process. Continuing action had been observed by early workers in the autotype process, including Mr. Swan, but eminent French authorities had denied that any such action occurred, and some years ago Captain Abney read a paper on the subject before the Photographic Society. At that time the nature of the action was found to be uncertain. Sometimes it would go on more rapidly in six hours than it would at other times in twenty-four. He (Mr. Foxlee) then took the matter up and made numerous experiments, and discovered that in damp and foggy weather the action was rapid, while in dry weather it was almost nil. He came to the conclusion that the phenomenon was due to the presence of moisture; if moisture were entirely absent from the tissue no action would go on. To prove this he made a number of exposures of equal duration from the same negative. Some of these he sealed up in an air-tight case. After a hundred days no further action was noticeable. Upon development the remaining prints were allowed to remain exposed to the atmosphere for varying periods of time, and showed signs of over exposure in proportion to the length of time they had been allowed to absorb moisture from the air. Those and other prints he had exhibited at the Inventions Exhibition and had received a medal for them. He did not agree that it was best to buy the tissue ready sensitised. The operation was an easy one, and if done at home the tissue could be prepared to suit the negatives. A thin negative required a tissue lightly sensitised, and a hard negative wanted a tissue very strongly sensitised to get the best result. He preferred to sensitise large sheets cut across the band. The dish should be the width of the paper, which should be rolled up, allowed to uncoil, and gradually drawn over the solution. A couple of glass rods placed across the dish facilitated the operation of draining the tissue and removed the surplus solution from both back and front.

Mr. HAZEON had found some colours to print more quickly than others.

Mr. FOXLEE: It depended upon the solubility of the pigment employed. Blue, for instance, was more soluble than red.

Mr. WHITING said the actinometer which had been exhibited, although simple, was not very perfect in its action. Light had a greater effect upon it than it had on a dense negative, and it required to be very carefully watched. He had brought with him an actinometer constructed of a series of thicknesses of coloured collodion. You put all your frames out together when No. 5 appeared on the paper, you turned down the frames which required that exposure, and so on with the remainder. There was then no trouble in changing and watching the tints.

Mr. WALTER COLLS had found the addition of a few drops of glycerine to the sensitising bath an improvement in hot weather. It prevented the tissue getting bad.

Mr. FOXLEE strongly deprecated the use of glycerine in such a climate as England. It would greatly promote the continuing action.

Mr. J. A. HODGES wished to draw attention to the fact that the working of the autotype process was attended with some risk. He thought beginners should be warned not to dabble too much in the sensitising solutions, in order to avoid the danger of contracting what was known as the "bichromate disease." He would ask Mr. Foxlee whether any effective precautions could be taken, and whether the malady affected all persons alike.

Mr. HAZEON said not one in a hundred was affected. If he were attacked he would discontinue working the process.

Mr. FOXLEE had suffered severely. His case had been exhibited before the medical society. However, he did not think the amateur need, with ordinary care, anticipate danger. He could bring out the disease in two hours. He attributed his own attack to gross carelessness. The disease attacked about half the employees at the Autotype Works. Buying the tissue sensitised did not obviate the danger which lay in the process of developing. If injury resulted from sensitising the tissue, it was owing to the bichromate getting into an abrasion of the skin, which produced a different effect to that known as the bichromate disease.

The PRESIDENT inquired whether the continuing action Mr. Foxlee had referred to had been utilised commercially.

Mr. FOXLEE replied that it had very extensively. It was used first by the

War Office authorities at Woolwich, and later at the Autotype Works, particularly during dull weather, when a large number of prints had to be got off. They were only half exposed, were then placed in a damp situation, and kept the necessary time before development.

The next meeting, on March 8, is a lantern night, when Mr. G. F. Blackmore will describe a new method of toning lantern slides. Visitors invited.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

At the usual fortnightly meeting, held in the Institute, Bexley, on Friday, the 22nd instant, Mr. Fringla presided.

Mr. DRESSER showed a number of bromide prints of local frost-and-snow scenes. Some time since, he (Mr. Dresser) advocated a novel competition; instead of giving medals for one or two prints, give each competitor twenty-four sheets of paper and award the prize to the competitor who had the best average; out of the twenty-four pieces he himself had obtained twenty-three perfect prints.

A negative of a snow scene was then handed round by the Secretary. It was marked all over by a sort of granular appearance; various causes were assigned for this, but the conclusion arrived at was that the markings would not interfere with the printing qualities of the plate.

Mr. PRINGLE called attention to a feature of this negative which was well known to old photographers but had not had the attention it deserved until Mr. Warnerke took it up; he referred to the relief of the image.

It was stated by one of the members that if a negative was dried with spirit and heated in the drying, this relief was very prominent.

A negative was shown by Mr. Edwards which had a broad band of discolouration at the bottom. In the discussion it was stated that either the hypo had not been properly washed out or that it was insufficiently fixed.

Mr. PRINGLE then exhibited the members' slides in the lantern. As each appeared upon the screen he pointed out the defects and good points in each, also giving hints for the remedy of the former. He advocated a warm colour for landscape slides, and showed the members some examples of colour and density for their guidance.

During the display a running fire of criticism and discussion was kept up by the various members. There was also an informal discussion after the exhibition.

The next meeting will be held in the Board Room, Bexley, Friday, March 8, upon which occasion an address upon *Lantern Slide Making* will be delivered by Mr. Charles Huxey.

CHILTENHAM PHOTOGRAPHIC SOCIETY.

On the 19th instant this Society had a lantern night at the Assembly Rooms as well as an exhibition of photographs taken by members. There was a large attendance. The pictures exhibited, chiefly landscapes and studies taken during the recent frost and snow, were mostly printed in platinum or on bromide paper, albumenized paper being evidently out of favour with the amateurs, especially for large work.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

THE members of this Society were favoured on Wednesday evening with an interesting lecture by Mr. JOHN STORRIE, the Curator of the Cardiff Museum, on his recent discoveries at Llantwit-Major of Roman remains. The lecture was profusely illustrated by limelight. A full account of researches in this district will shortly be placed before the public in pamphlet form, and may be photographically illustrated. It will prove a welcome addition to the antiquarian literature of Glamorganshire.

The next meeting of the Society will be on March 6, when Mr. W. Windsor will give a lecture on *The Lantern and How to Work It*.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third ordinary meeting was held in the Front Saloon, 29, George-street, on Wednesday evening, January 9, 1889. In the absence of the President, Mr. H. J. Blanc, F.S.A.Scot., Mr. W. T. Bashford, Vice-President, occupied the chair.

The CHAIRMAN intimated the receipt by the Secretary of a note from Mr. Hume, in which he regretted that he was unavoidably compelled to be absent from his post.

It was next explained that the Secretary, who had been requested by Mr. Bell-Smith to invite the Edinburgh Photographic Club and the Leith Amateur Photographic Association to a demonstration which Mr. Bell-Smith had volunteered for the ensuing meeting, was anxious to have the authority of the Society as a necessary preliminary to his taking any steps in the matter. The requisite consent was very freely given.

Introducing the notice of motion given by Mr. John M'Kean at the December meeting, the CHAIRMAN stated that, as the last issue of the laws was almost exhausted, the Council were desirous that, before requiring the assistance of the printer, these laws should be thoroughly overhauled, and, subject to the approval of the Society, be recast in a more consecutive form. Mr. M'Kean, relinquishing his own original motion, formally moved the adoption of the course proposed by the Council, whereupon it was agreed that the latter were at an early date to remodel the laws and submit a draft to a general meeting of the Society.

On the suggestion of Mr. HUME, who specially wished discussion to follow his own remarks, the next item of business was replaced by the exhibition by Mr. Fergus of Caldwell's instantaneous shutter, made by Mr. William Wray, optician, Highgate-hill, London. This shutter works with a rapidity from two seconds up to the one-fourth-hundredth part of a second, and it may be set to any intermediate time. It opens and shuts from the centre, is worked by a pneumatic attachment, and has this peculiarity, that although placed between the lenses it does not interfere in the least with the usual stops, or even with the iris diaphragm, should the lens possess one. The vibration which usually

accompanies such shutters appears in the Caldwell shutter to be entirely eliminated, and as it is placed between the stops and the cap combination of a rectilinear, it is in the very best position to obviate vibration. The shutter is beautifully made, and a fine specimen of Mr. Wray's work.

Following this, Mr. G. G. MITCHELL exhibited a new ferro-prussiate paper, demonstrated the simplicity of the process, and stated that the paper, the changes in whose colour were very subtle and difficult to distinguish, was issued in two qualities—one a strong form for white lines on a blue ground, the other for blue lines on white.

Dr. NICOT briefly summarised the chemical changes undergone by all forms of the cyanotype, and said:—The method of printing known as the "cyanotype," or more generally as the blue process, depends on the different reactions of ferrous and ferric salts with ferrocyanide and ferricyanide of potassium. These may be tabulated thus: A ferrous salt gives with ferrocyanide of potassium a white precipitate, becoming blue on exposure to air. With ferricyanide of potassium, a blue precipitate (Turnbull's blue). A ferric salt, on the other hand, with ferrocyanide of potassium gives a blue precipitate (Prussian blue). With ferricyanide of potassium, a brown colouration. Both ferric salts as a class, and ferricyanide of potassium, are sensitive to light, especially in the presence of organic matter, reduction taking place to ferrous salts and ferrocyanide of potassium respectively, which are able to give blues when treated with ferricyanide of potassium or a ferric salt, as the case may be. When the blue process is worked on what may be termed the development plan—that is, when the paper is coated with the ferric salt alone—and the ferrous salt produced by the action of light is converted into Turnbull's blue by immersion in a bath of ferricyanide of potassium, the latter salt is the developer, the former the sensitiser; but when the paper is coated with a mixture of ferric salt and ferricyanide, then both salts are sensitisers and both developers. For the action of light is to reduce in part both salts, and the reduced part of each reacts on the unaltered part of the other to form a mixture of Turnbull's and Prussian blue. And it may be noted, that while in the development method no amount of exposure will prevent the formation of Prussian blue, in the mixed solution method over exposure will tend to reduce the depth of colour, and if carried to excess prevent the formation of all colour. In working either method, it is necessary to use only freshly prepared solution of ferricyanide of potassium, made from clean crystals of the salt, for both the solid and solution are reduced by light alone. And if the organic salts of iron, such as oxalate, are used, the same precaution must be taken with the iron salt.

Mr. FORAN said he thought it would be well if the members would consult the original formulae for these processes, which were the invention of Sir John Herschel. Members would find them debated in Robert Hunt's *Photography*, where more than one process was given on the invention of Sir John. He had watched the process more than thirty years ago, and was then in the custom of sensitising the paper with one of the salts and developing with the other. It was also, he thought, an advantage to give the picture a wash over with a portion of the gold toning bath, which, he thought, very materially helped to give stronger results, and deepened the blue colour.

Mr. W. F. WALKER attributed the discovery of the sensitiveness of iron salts to light to the Swedish chemist Scheele, giving Captain Abney as his authority.

Messrs. WALKER, HASTFORD, and TURNBULL concurred in advocating a hard non-absorbent paper as the most suitable, in recommending the addition of an organic size, in advising the application of the sensitive solution to the surface only, and in washing the salt before dissolving it for use, to free it from acquired impurities.

Mr. TURNBULL further stated that, in cases of over exposure, reduction of density could be effected by treatment with an alkali.

Mr. WILLIAM HUME exhibited a number of transparencies by means of the oxyhydrogen lantern, commenting on technical points of interest bearing upon practical photography. Prefacing his remarks with a statement of his belief that the exhibition of "negative results and positive failures," and a discussion of their cause and cure, had a considerable educative value, Mr. Hume argued that while doubtless the bringing forward of successful results and finished pictures tended to hold up for imitation a high standard of excellence, nevertheless, many who might be anxious to attain the same perfection did not learn as much as they might otherwise do of the methods by which such admirable quality might be obtained. After contrasting some examples of the flatness arising from over exposure with the harshness caused by under-exposure, Mr. Hume suggested that a weak negative, when full of detail, might yield, under judicious treatment, a thoroughly plucky and beautiful picture, and in illustration of this view exhibited a brilliant transparency, and the feeble negative from which it was made. Passing on to suggest the action productive of flatness and harshness, slides exhibiting so-called "halation," and others in which the contrast of the natural scene was so great as almost to preclude a successful mean exposure, were thrown on the screen. One picture, a reach of the Tay at Aberfeldy, with dark foliage on the banks, suggesting the need for treatment known as auxiliary exposures for the darker portions of the subject. He also explained a method of finally obtaining contrast in the case where a very short exposure on a strongly contrasted subject necessitated the employment of a developer comparatively weak in pyro and strong in alkali, and showed that the weak resulting negative might very successfully be locally intensified by oiling the portions which should remain transparent, and then immersing the negative in an aqueous intensifying solution, thus taking advantage of the physical repulsion exercised by oil upon water. Having briefly exemplified the value of a natural background to a portrait, whether of man or beast, Mr. Hume also insisted upon the importance of taking the requirements of good composition into account in masking off injurious superfluities in the finished transparency, maintaining a pleasing proportion to be greatly preferable to a plethora of fact. While stating his preference for rapid exposures and slow development, Mr. Hume was careful to point out the danger of mistaking the clever registration of a motion for a picture. This he demonstrated by the exhibition of a slide, showing a man, a boy, and a dog in the act of leaping over a lawn-tennis net. Here, he pointed out, the very truth of the attitudes, fixed and immovable, though indicating rapid action, produced an impression which, if not positively

annoying, was in direct antagonism to artistic taste, which requires that a true picture be possessed of a feeling of repose. Leaving the photographing of near objects in comparatively violent and unstrained effort, Mr. Hume touched upon some of the causes of failure to which one is liable when aiming at the reproduction of more distant if almost equally fugitive effects, specially instancing the utter unsuitability of a short-focus lens for off-shore subjects. Mr. Hume then exhibited some beautiful slides of icicles, and also a lightning flash, and the effects of a lightning stroke upon a boy's arm, remarking that all photographers who had the leisure, the opportunity, and the skill, should endeavour to secure photographic records of any interesting natural phenomena that came in their way, for these were sure to be appreciated in the proper quarters. Finally, Mr. Hume exhibited two extremely happy examples of the successful combination of artistic effect with skilful technical handling—one being a sky of great power and gradation, the other a broad, soft, mystical rendering of a sunset view of Duddingston.

Mr. Hume was cordially thanked for his exhibition and remarks.

THE first popular meeting of the session was held in Queen-street Hall, on Thursday, January 17, Mr. W. T. Bashford, Vice-President of the Society, occupying the chair, when Mr. David McGibbon, F.S.A.Scot., delivered a lecture on *Scottish Castles*, illustrating his subject with a series of transparencies, kindly lent for the occasion, free of all charge, by Messrs. G. W. Wilson & Son, Aberdeen, and by slides made from Mr. McGibbon's own drawings.

The lecture was preceded by a short musical entertainment provided by Mr. McGlashan. The singing was very well received by the audience, especially the "Laird o' Cockpen," by Miss Bessie Simpson; the duet, "Maiden Fair," by Mrs. Wilson and Mr. Barr; and the song, "Oh, why left I my Hame?" by Mrs. Wilson, was enthusiastically encored.

Mr. Turnbull presided at the oxyhydrogen lantern, and very materially contributed to the success of the evening.

Correspondence.

✎ Correspondents should never write on both sides of the paper.

THE JENA OPTICAL GLASS.

To the Editor.

SIR,—So much has been written about the marvellous properties of the new Jena Optical Glass, not only for microscopical objectives, but also for photographic lenses, that doubtless many of your readers will be anxious to send to Germany for some of these recently puffed-up lenses. From the glowing accounts which have appeared in the various journals devoted to photography during the last three months, many of our readers must have hesitated to part with their money for English lenses, which they greatly wanted, until the mystery attached to the Jena glass lenses has been cleared up.

About a fortnight ago I requested a friend of mine, who was going to Berlin, to call on Hartnack and Herr Miethe and purchase one of these new lenses for me at any price. On his return he met me with a long face, and explained that he could not get a sample, for the simple reason that only one had been made, and that they did not intend placing any on the market, at least not for some months, if at all. With regard to the one lens which had been made, the reply was so unsatisfactory that my friend has serious doubts as to whether it has ever been made at all. Of all the forty-four kinds of glass catalogued by Schott & Co., I find the only kinds protected by patent are, with a single exception (a heavy barium silicate), those containing boron, and these are only seven in number, hence the greater number of kinds can be manufactured in this country, and, excepting two, they include all the specimens with a refractive index above 1.61 for the D line. Still, for all lenses working with a very large aperture the Schott glass undoubtedly seems to afford certain advantages, if one may judge by the covering power. Mr. Swift, Mr. Crouch, and Mr. Suter, have for some considerable time past made their photographic lenses of the new Jena glass, and I worked with one of these lenses all last summer, and it certainly fulfils all that Herr Miethe claims for him; but whatever they do in Germany, I am certain we can beat them with their own glass in England. It is a very significant fact to my mind that the chief photographers in Berlin, whose studios I visited last spring, were (and are still) working with Dallmeyer's lenses, some of them recently purchased, and preferred them to the best German makes, although the latter certainly have the advantage in price. All our leading opticians are experimenting with this glass for photographic lenses, and we may be certain whatever advantages they possess the practical common sense of the Englishman will speedily discover and adopt. One thing is certain, that so long as the German photographer finds it worth his while to send to London and pay Dallmeyer's price for his lenses, when he can get the new Jena objectives on the spot, we may keep our minds in peace and spend our money at home.

When Carl Zeiss startled the microscopists with his apo-chromatic oil immersions two years ago, Mr. Powell procured some of the Jena glass and beat him on his own ground, as was unanimously acknowledged by those present at a meeting of the Royal Microscopical Society, and if that can be done in microscopic objectives we certainly need not fear competition in photographic lenses.—I am, yours, &c.,

14, Stratford-place, Oxford-street, W. G. LINDSAY JOHNSON, M.A.

GAS EXPLOSIONS.

To the Editor.

SIR,—I thank you for sending me an account of the latest gas explosion, of which I had not previously heard in these remote parts. The letters of Mr. Chadwick and Mr. Baker, with your own leading article, leave nothing more to be said on the subject, except, perhaps, to caution lanternists against using condensed oxygen in conjunction with coal gas or hydrogen in a bag, which they might be tempted to do if a second bottle were not at hand. Supposing one hundredweight to be on the bag, that would be equivalent, perhaps, to seven inches of water, whereas the "O" gas would be issuing from the cylinder at, say, forty inches of water, and this inequality might, I think, lead to a portion of the oxygen finding its way into the "H" bag.

I have heard of two awkward accidents happening from cylinders of condensed "O" used with ether. One was several years ago, and the gas was turned on too quickly without any regulator. It rushed through the indiarubber tubes and ripped them up from end to end, but the pumice chamber prevented the flame passing back into the Broughton tank. The other accident happened last year, and in this case also there was no regulator on the cylinder. The operator turned off the taps at the end of the lecture, and he says he made the mistake of turning off the "H" tap before the "O" tap (which is what I myself regularly do). The flame backed down the tube into the Ives' saturator, and melted a big hole in one end of it; there was no pumice extinguisher.

Messrs. Cutts & Sutton sent me one of their porous saturators, and I have used it since, in order to give it a fair trial. I honestly believe that it is safe as regards a dangerous explosion, but it is not as perfect an instrument in the working as the vapour tank. The oxygen left in the barrels seems to act on a portion of the ether, and render it less volatile, so that even if you employ the lightest methylated ether, free from water, after a time you notice that the "saturation" is not so complete as it was when the saturator was new and lately filled, so that you are obliged to alter the taps two or three times during the lecture, whereas, with the vapour tank, the proportion of ether keeps up so steadily that it is not necessary to touch the taps at all during the whole of the lecture.—I am, yours, &c.,

F. HARDWICH.

Shotton Vicarage, Castle Eden, Co. Durham, February 22.

COMPRESSED GASES IN CYLINDERS.—A SIMPLE TEST APPARATUS.

To the Editor.

SIR,—As it is now admitted that there is no danger whatever attending the use of compressed gases (oxygen and hydrogen), so long as they are contained in separate cylinders and not mixed; but the question arises, "How can one tell easily and safely that they are not already mixed when delivered to the purchaser?"

The first thing that should be done, before using, is to try the gas by the sense of smelling. If hydrogen (which should be in a cylinder coloured red), it soon betrays itself when a little is let out; but if oxygen (in a black or green cylinder), it should have very little smell. If either are the least doubtful, I use the following simple test apparatus, which any one can make for themselves:—Procure about six inches of quarter-inch soft rubber tubing; next two stopcocks or gas taps, and bind one to each end of the tube; then fasten a stouter piece of rubber tubing to one of the taps for connecting to the cylinder nozzle. When connected, open the tap nearest the cylinder, and close the other. Now turn the valve of the cylinder carefully until the gas slowly expands the rubber tube between the two taps (but not sufficient to burst it), then turn all off again, and you will have a small sample of the contents of your cylinder. To test same, remove the apparatus from cylinder, and, supposing it to be pure oxygen, place a piece of brown paper, lighted, and at arm's length, opposite and close to one of the taps. When opened, the gas, if pure oxygen, will simply cause the flame to burn brilliantly; but if mixed gas, and therefore dangerous, it will explode with a sharp report, the quantity being too small to do any harm. If hydrogen only, it will burn quietly, like a common house-gas jet. For those who do not care to make the apparatus themselves, the whole can be purchased from Messrs. Archer & Sons, Lord-street, Liverpool, for the sum of 2s. 6d.

I may say, in conclusion, that I have never yet found any cylinder with wrong gas in, and think it improbable for a mistake to occur in filling.—I am, yours, &c.,

W. J. ARCHER.

February 19, 1889.

P.S.—Making the cylinders with different sized threads or connexions would not avoid their being filled wrongly, as they have all sizes at the works, and it is little or no trouble to couple on any size. It would be much better to make the oxygen cylinders with right-hand threads, and the hydrogen with left-hand. This would make it impossible to connect wrongly by mistake.

RETOUCHING.

To the Editor.

SIR,—Number 1502 of THE BRITISH JOURNAL OF PHOTOGRAPHY contains some remarks by the Archbishop of York on retouching, which I

consider sufficiently weighty to awaken the attention of the photographic profession.

Retouching as it is now going on is quite enough to spoil the reputation of the photographic art. There will be a box of negatives brought in for the retoucher, and it is expected from him to work them up in half a day or a day's time. He gets no idea how the person looks, nor even a print as proof to look at. Remains there any guaranty that the likeness will be not spoilt? how is it possible to do the work in such a way consistent with the law of art? A lot of negatives which would have been cast aside in former times are now stippled up and used as worthy representations (?) of the photographic art.

Should it not be the duty of every photographic association holding an exhibition to set apart a section for unretouched photographs?—I am, yours, &c.,

Liverpool, February 25, 1889.

PERMANENT HYDROQUINONE.

To the Editor.

SIR,—We read recently in your JOURNAL two letters from Messrs. A. & M. Zimmermann, the English agents of Messrs. Schering of Berlin, calling in question the chemical purity, and by inference depreciating the efficiency of Dr. Byk's "permanent" hydroquinone, which for some months we have been supplying to photographers in this country.

We had not intended taking any notice of these letters, but a communication received from Dr. Byk, bearing on your leading article of the 15th ultimo, has induced us to trouble you with these few remarks, which we trust you will do us the favour of inserting in reply.

In introducing the permanent hydroquinone for photographic use, Dr. Byk was actuated by the desire to provide a preparation which should be more reliable in its character and possess greater uniformity of action without losing in the slightest degree its efficiency—than those hitherto in the market; in fact, his object was to study the practical requirements of photographers rather than to advance that scientific accuracy which appears to form so great a point in Messrs. Zimmermann's creed.

That Dr. Byk succeeded is shown by the greatly increased demand we have had for the "permanent" article, by the recent general adoption of hydroquinone where previously it had been shunned, and by the fact, as proved by your own examination of some months ago, as well as by innumerable more recent testimonials, that it is at least equal in quality to any other make.

It is amusing to us to find our good friends and rivals suddenly assuming the rôle of champions of "chemical purity." It is not so very long since Messrs. Zimmermann, speaking of Dr. Byk's ordinary hydroquinone, informed a member of our firm that its extreme purity was unnecessary to the photographer, yet now, ostensibly in the interests of science, they object to the presence of an infinitesimal trace of a valuable preservative which is in no sense an adulterant, and too small in quantity to prove in any way detrimental.

They are not, however, even accurate in their complaint, since they state that "several per cents." of sulphurous acid have been found in the new preparation. We are not acquainted with our friend Dr. Byk's method of manufacture, but we have it on his authority that the preservative agent is present in the proportion of about $\frac{1}{2}$ % (one quarter per cent.), and that it does not in the slightest degree affect the developing power. These statements are quite in accordance with the various accounts, including your own, that have been received of it in this country and elsewhere, all of which go to prove that "permanent" hydroquinone is a boon to the photographer, and promises to become the standard article as well as the favourite developer for all purposes.

If Messrs. Zimmermann are so keenly interested in the scientific side of the question, and so jealous of the absolute purity of chemical products, they might, at least, be content to permit others to turn their attention to practical efficiency. If the extremely "delicate" preparation sent out in such a state of purity by Messrs. Schering be not preferred by photographers to the impure (?) article emanating from Dr. Byk's laboratory, it is proof only that practical men look more to working results than to sentimental considerations; and that though chemical purity may be a very excellent "watchword," it does not form the sole secret to commercial success. Apologising for taking up so much of your valuable space.—We remain, yours, &c.,

BRENNSTEIN AND VOGT.

27 and 28, Jewry-street, London, February 26, 1889.

THE BRIGHTON PHOTOGRAPHIC SOCIETY.

To the Editor.

SIR,—I am sorry to occupy your space with a controversy which is of very little interest to your readers, but I am compelled to answer Mr. G. Foxall's letter which appeared in your last issue. Why did he not say anything about the attempts made last June or July to form the Society? or has he joined the Society since, and the success so far due to this? Mr. Foxall knows nothing about my introduction to the promoters of the Society. I was the first to communicate with them—no one was present at my interview with Mr. Rean, and that meeting did not last five minutes. Mr. Foxall evidently has "much to learn" about the formation of a society—especially the right of members to discuss its rules. It

should be borne in mind that most of its members were elected at the meeting on the 7th—before the rules were discussed and passed—but as they were not members (so Mr. Rean argues), they were not invited to attend, and this is what I maintain is unfair—the most natural inference drawn from the form of application of membership, that all applying before the 7th would be members without election, as subsequent applicants would have to pay an entrance fee of two shillings and sixpence. Furthermore, the first regular meeting was convened for the 14th; this should show that any previous meeting was irregular.

One would think from the tenor of the letters that I was in opposition to the Society—on the contrary, I am working for it; but I am afraid that the small subscription (five shillings) will not defray expenses, unless some "good Samaritan" give the use of rooms free, and even then the postage alone will be a large item in the expenditure. I personally think it would have been better as a Club, with a minimum of officers; but the "beer and bacca" (this is the expression of the intelligent scientist referred to in my last) might mitigate against the success. I am not a "beer or bacca" consumer. This letter must be considered also a reply to Mr. Rean. In consequence of the extraordinary proceedings of the 7th, the Society has lost, by resignation, the cleverest amateur in England.—I am, yours, &c.,

A. L. HENDERSON.

P.S.—Mr. Rean should have sent invitations to the gentlemen proposed, so that if they were elected they could have taken part in passing the rules.

COLLODIO-BROMIDE.

To the Editor.

SIR,—In your number of the 18th ultimo (received here to-day), I see a letter from Mr. W. Brooks repudiating all liability for the formula for collodion emulsion for transparencies mentioned by Mr. F. C. Beach in his discourse to the New York Society. I presume Mr. Brooks imagines that the formula is my invention, and so he designates it as "most ragged in the extreme." Now, unfortunately for Mr. Brooks, the formula is one given to me by one of the leading lights in photography in England, and was, I believe, first published by Mr. J. Nesbit. I have tried the formula and sent my first results home to the North London Society (of which I have the honour to be a member), and they were pronounced "excellent," so it only shows that even Mr. Brooks's judgment is not to be relied upon in everything.—I am, yours, &c.,

FRED. D. DUNSTONVILLE.

Madras, February 6, 1889.

Exchange Column.

*. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

12x10 studio camera (extends three feet) and lens; wanted, accessories and back-grounds.—Address, C. F. HEWITT, Weymouth.

Wanted to exchange 8x7 cloth backgrounds and interiors for others same size.—Address, E. J. HOLMES, Post Office, Cranbrook.

Will exchange Lancaster's half-plate camera, complete, for B-flat clarinet, by good maker.—Address, CAMERA, 110, Southgate-road, N.

Half-plate portrait lens, by Pillisher; wanted, posing chair or other accessories in exchange.—Address, RAWSON, Photographer, Sudbury, Suffolk.

10x8 mahogany bellows-body camera, one single slide, or eleven-inch burnisher, in exchange for good tripod for 12x10 (sliding preferred).—Address, A. E. BARNSTEN, 66, Oxford-street, Southampton.

Wanted, a half-plate bellows-body camera, double slide, tripod, and rapid rectilinear lens; exchange, silver lever chronograph, compensation balance, &c., jewelled actions, perfect order.—Address, BAIROS, Penn-road, Wolverhampton.

Answers to Correspondents.

*. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

J. WOOD.—It is probable that Aspinall's enamel will be the best for your purpose.

F. E. J.—A good soda developer is to be found on page 629 of the last issue of our ALMANAC.

SILVER.—You will find the information you desire in the article on Daguerreotype in this issue.

CABINET.—A mount of medium stiffness is invariably to be preferred, but it is largely a matter of taste.

HYDRO.—You will find valuable information on this subject in an article by Mr. Swan, in another page of this issue.

MATHERBANK.—Our knowledge of the various iron printing processes is confined to those published in our ALMANAC.

J. F. BLACKMORE.—We believe all the portrait lenses on the list may be depended on as being good and reliable.

R. RAYNER.—The Ordnance maps are all produced by photo-zincography. They are not printed from type-blocks, as you have been told.

F. D.—The stains are caused by the prints lying in the bottom of the fixing dish, which has prevented the hyposulphite of silver from being removed.

GEO. R. SPENCER.—We understand that there is a likelihood of Mr. Henderson writing a work upon ceramic enamels on his return from a contemplated trip to Australia.

THOMAS.—There is now no difficulty in obtaining good and reliable hydroquinone. It may be had from any dealer in photographic goods. Refer to our advertising columns.

CARBOX.—1. Full directions will be obtained from a manual sold by the Autotype Company, who also supply the requisite tissue.—2. Cyanide of potassium and iodine.

R. SMITH.—1. You will find the subject treated upon, chemically, on page 177 of our volume for 1881.—2. Not much, unless the emulsion has been exposed to light.—3. Not materially.

REX.—Move the lantern and screen further apart and you will get a larger disc, or, if room will not permit of this, employ a lens of shorter focus. The size of your condenser is no detriment.

C. DAVIDS.—In working the single transfer carbon process the prints will be reversed unless the negatives themselves are reversed. For ordinary negatives the double transfer process must be employed.

S. STEVENS asks if fusible metal will answer for taking casts from gelatine reliefs, and where it can be procured.—Fusible metal will take very sharp casts from gelatine reliefs. It may be had from any operative chemist.

P. McNALLY.—Common glue is not a reliable mountant for photographs. It is usually acid, besides containing other impurities which may act injuriously on the picture. Use a good sample of English gelatine, such as Nelson's.

JAS. TAYLOR.—Cut an aperture of the desired form in a piece of cardboard, and interpose it between the lens and the sensitised surface; by moving it slightly to and fro during the exposure a softer vignette will be produced.

SIXA.—The French *mètre* is more than a yard, being 39·4 inches. The focal length of the lens is about equivalent to fifteen and a half inches, and it will, with a moderate stop, cover a twelve by ten-inch plate, or at least it ought to do so.

HYPO.—Zinc will do very well for a washer provided it receives a good coating of Brunswick black. Yours have evidently not been protected in that way. Solder up the holes and coat it. Lead or any other metal will answer if thus protected.

AXAX.—The lenses mentioned, while all of them are good, fetch so small prices in the London market and auction rooms and at the various second-hand dealers' stores, that we would be chary in offering any opinion as to their market value. About one-third of their catalogue price would be a liberal estimate of their value.

A. T.—Very few lantern slides are now made by the albumen process. It has generally been superseded, for commercial work, by wet collodion, by collodio-bromide, and specially prepared dry plates as advertised. The albumen process, though giving excellent results, is considered by most people too troublesome for general work.

W. Y. writes: "Four ounces of hyposulphite of soda to the pint is usually recommended for fixing prints. Would a bath of six or eight ounces to the pint make the prints more permanent?"—No, not if sufficient time be allowed for the weaker solution to do its work. The stronger solution would be liable to reduce the prints or affect the tones.

S. G. F.—The print is fairly good, although the development has been carried rather too far. Fix for five minutes; no toning bath is required. Instead of attempting to burnish a developed print, squeeze it upon a sheet of glass which has been well cleaned and rubbed over with powdered French chalk, which must afterwards be dusted off. The print is allowed to dry for at least twelve hours, then stripped off.

ARMENIAN says: "I made up some matt varnish according to a formula I saw in one of your ALMANACS, but I find that, instead of its giving a ground-glass surface, it dries perfectly transparent like ordinary negative varnish. Should it be applied to the plate while it is cold, or should it be warmed? I warmed the plate in the usual way."—This accounts for the transparency. The varnish must be applied to a cold plate. It is the "chilling" of the varnish that causes the matt appearance.

S. L.—Our opinion is that the spots completely spoil the photograph. If you wish us to indicate the cause of them, it is impossible to do so without some information as to how and under what conditions the print was produced, and when the spots first made their appearance. Careless manipulation will produce similar spots, so may an impure mountant or mount. As we have said before, it is impossible to indicate the cause of the spots from merely seeing two or three square inches torn out of a picture.

ALIQUIS writes:—"Will you allow me, through the medium of your columns, to thank these correspondents who have so kindly responded to my inquiries as to photographing in Norway? I must say I was somewhat perplexed on seeing such opposite opinions as those expressed by the Rev. A. M. Macdonald and G. A. K. Nevertheless the information furnished by these gentlemen, and also the entertaining letter of Mr. Kenric B. Murray, will probably prove useful to me, and will doubtless be interesting to the bulk of your readers."

REX.—1. The ground glass is intended to leave a hazy disc on the screen, during the continuance of which the picture is changed.—2. Send 1s. 6d. with two unmounted prints to our publishers, giving particulars of subject.

LANTERN writes: "Can you tell me if the copyright in Bartolozzi's engravings is still in force—I mean those printed in red ink? I have recently seen some reproductions from them, and I should like to make some slides from these."—The copyright in the engravings has long since expired, so that you can copy them as much as you like. There may, however, be a copyright in the reproductions from them, and you might get yourself into trouble if you copied those. By working from the originals you will get better results, and will, at the same time, run no risk.

T. S. says: "I will thank you for an answer to the following:—1. I have started painting photographs in oil colours, but am beaten for a good varnish for the same to use directly the colours have got dry. Can you give me a formula for a suitable varnish?—2. Also can you tell me the price and publisher of a book on carving and gilding picture frames? There is a book published, but I have forgotten who by."—1. Mastic varnish, which may be obtained of any artists' colourman. It is difficult to make in small quantities.—2. The *Carver and Gilder's Guide*, published by Kent & Co., Paternoster-row. The price, we think, is about three shillings and sixpence.

OPTIMUS puts the following queries: "1. Does pyro keep better in the dark when dissolved in water, and is it best stoppered or open? Same question regarding iron sulph. and potass oxalate.—2. How would you mix spotting colour so as not to come off in burnishing?—3. What kind of gas burner is suitable for enlarging with, and where obtainable? (I have heard of two circular flames, one inside the other. Is such a burner good?)—4. Which is best for studio curtains, white or dark material? and, 5. What is the best colour to paint studio?—6. Are combination lenses preferable to separate lenses? I mean those which interchange to make several foci."—Replies: 1. The solutions should be kept in closely stoppered bottles. The light will not materially affect them.—2. Mix the colour with albumen.—3. An argand burner will be suitable.—4. All depends upon the aspect of the studio. If, for example, it faces the south, white blinds will not stop out the sun, therefore dark must be used. For a north light, white, or very light, will answer.—5. Any unobtrusive colour, not too dark, such as a French grey.—6. Not preferable, but, as a matter of convenience, they are useful.

REV. ELI EADES says: "Would you be so kind as to inform me whether you know of any apparatus or camera for taking direct enlargements of insects of the size of a bee—and by reflected, not transmitted, light—of still-life, or otherwise; or could I take them the same size from life in any of the detective cameras? I have not found an apparatus at present to do such work. I want to work for transparencies three and a quarter inches square, when I can see my way to do so. I see some excellent articles in the ALMANAC which seem to show the practicability for an amateur to print from book engravings by magnesium or flash light, and should like to get an effective camera for such work. It has occurred to me that a camera could be attached to a lantern aplanescopescope and the object brought to the opening or stage as a *carte-de-visite* now is, and that thus one might get direct enlargement by reflected light; but I do not know of any such. It would be a queer-shaped affair, but, if effectual, would be very useful. Could you favour me with a hint as to its practicability?"—In reply: Let us assume that the object to be enlarged is a bee which has been attached to a suitable background, say a piece of cardboard, with a camera of any dimensions, but, preferably a small one, and a lens of short focus, say from three to five inches. Focus the image on the ground glass; observe that to obtain the image of the same dimensions as the original the lens must be twice its focus from the object, the same distance intervening between the lens and the ground glass of the camera. This is the rule for copying an object its own size, but you wish also to produce an enlargement of the object; in this case the camera must be pushed forward so as to bring the lens a little closer to the object, and the ground glass drawn much further out. The precise degree of enlargement depends entirely upon the extension of the camera and the proximity of the lens to the object. For example, if the bee is half an inch, the focus of the lens three inches, and the enlargement to be four diameters, i.e., two inches, then must the lens, measuring from its centre, be three and three-quarter inches distant from the object and fifteen inches from the ground glass; but any other dimensions and distance can be determined by experiment.

ERRATUM.—The article in last week's JOURNAL attributed to W. Lane, jun., should have been W. Lang, jun.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, March 6, 1889, will be on *Hydroquinone*. Mr. J. B. B. Wellington will read a short paper on this subject.

RECEIVED.—A *New Principle in Heliochromy*, by Frederic E. Ives; *South Africa*, by Ed. P. Mathers; *Dictionary of Photography*, by E. J. Wall; Fleming's Explosive Gas Tester (J. H. Steward); Grinstead's Improved Shutter. These in our next.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1505. VOL. XXXVI.—MARCH 8, 1889.

THREE SYSTEMS OF MOUNTING PRINTS.

THERE are three systems by which prints may be mounted, all of them possessing advantages peculiar to themselves.

That in general use is the time-honoured one of applying paste by means of a brush to the back of a wet pile of prints placed one on top of the other as a matter of convenience, and then deftly transferring each print thus treated from the top of the pile to the mount, upon which it is laid down in position and pressed into contact by a pad or rubber. No special precaution or care is requisite in carrying this system into effect beyond seeing that the paste is free from hard particles and is freshly prepared. Glue or gelatine, which is employed by some as a mountant in preference to starch or paste, requires more dexterity in its employment.

A second system, introduced about sixteen years ago, consists in sizing the mounts with any suitable adhesive of the gum or dextrine class, these being kept in a state of preparation always ready for use. The print requires no pasting or other treatment, but may be taken while simply in a wet or moist state and laid down in its place on the dry mount, followed by the rubbing requisite for ensuring contact. This system is very convenient in many cases, especially for one who desires the occasional mounting of a few prints without having to experience the trouble of preparing paste, and going through the whole operations consequent upon the act. We are glad to know that mounts ready gummed are now commercially procurable. Those who desire to prepare mounts for themselves must be careful in selecting a gum of a suitable nature. It may be applied by a sponge or large flat brush, although preferably so by a little machine for the purpose introduced by a Halifax firm, and exhibited at some of our societies a few years ago.

The third system is one which is adopted much more extensively in America than in this country, and is highly suitable when large quantities of prints are to be mounted. As witnessed in operation in the States six years ago, when many thousands of prints were undergoing this process, we specially noticed its neatness, the rapidity of its action, and the impossibility of producing cockling. The backs of the prints are coated with ordinary starch paste and allowed to dry. The prints are then trimmed and laid *in situ* on the paper (or card) mounts to which they are thenceforth to be permanently attached, which mounts, however, have first been rendered slightly damp. A number of prints thus prepared are then run through the rolling press, and the operation is complete.

PHOTOGRAPHIC APPRENTICES.

A somewhat important question comes to us from a professional photographer in one of the provincial towns, which may be

worthy the attention of those who are in the habit of taking apprentices, as to the working of the indentures. Our correspondent says:—

"Two and a half years back I took a young fellow, aged seventeen, with a premium, as an apprentice for a term of four years, paying him a weekly salary, increasing each year. He has worked with me in the studio and out of doors, assists in the retouching and printing, and is now a very useful hand. He has, I find, been offered higher wages than I am paying him by another artist in the place. . . . The friends of the youth have just given me notice, that unless I agree to cancel the indentures and return the premium, they will take legal proceedings, because, they say, I am not teaching him every branch of the art, according to the agreement. The friends say he ought to be taught to prepare his own plates, sensitise paper, work the collodion process, platinotype, and to do enlarging. I, like every other photographer, buy my plates; I use ready sensitised paper, and always have; and have never tried the wet process in my life, as I commenced photography since that was discarded; neither do I work platinotype, or do my own enlarging."

The foregoing involves questions as to what an apprentice can legitimately be expected to be taught in a photographic business. Clearly, in the one in question, there is not much to command a high premium and low wages for several years, seeing that only dry plates and silver printing are employed, and for the latter the paper is purchased ready sensitised. In the wet collodion days an apprentice had much more to learn than he has at present; but he was not usually taught obsolete processes, such as the daguerreotype or calotype for example. Can the wet collodion process, however, yet be considered obsolete, seeing that it is still being extensively employed in some establishments? Are the preparation of dry plates and the albumenising of paper things which an ordinary apprentice must be taught? "Every branch of the art" is a very comprehensive term, as it embraces every form of photography, as well as all the different processes of printing and enlarging. If the term were applied literally, it is a question whether some of the photo-mechanical processes would not have to be included, or at least the truly photographic portion of them.

In drawing up indentures of apprenticeship, the deed should be clearly worded as to what branches of photography are to be taught, and these even should be strictly defined, particularly as photography has now so many ramifications. Such vague terms as "every branch of the art," "thoroughly teach the trade," &c., should be strictly avoided.

PRACTICAL CONSIDERATIONS IN STUDIO BUILDING.

In its broader aspects the subject of studio building has been treated with a certain amount of fulness by various authorities; but when a photographer once completes such a structure, even when erected after his own instructions, he often finds

that improvements might have been made that are not included in his plans, and, almost as often, that improvements which are included were accompanied by certain drawbacks in practice that were not foreseen. Some of these less frequently noted points will be dealt with in these articles, not so much with the intention of presenting them in the light of novelties, as with the purpose of supplying a hiatus in the literature of the subject by dealing with them in a regular consecutive manner.

ORIENTATION. The direction with regard to the points of the compass is the consideration that would naturally first seem to demand attention, as all building plans will be founded upon it. Too frequently the direction in which a studio can be built is not a matter of choice at all, hard facts in the shape of bricks and mortar intervene, and it must be built in a certain way or not at all. But, again, when there is some little room for the exercise of judgment, there is danger that owing to the worship of a certain fetish a plan may be chosen in which the best capabilities of the site are not made use of. Of the special topic we are now dealing with there is, perhaps, no branch upon which more unreasoning dogmatic assertion has been made than that of the orientation, and yet, when we come to examine the advice and the practice of those whom all would deem authorities, *ex cathedra*, we find them strangely at variance. Each one has written from the practical experience of one or two studios in which his first ideas have been carried out, and the facility which practice has given him he rather puts down to the advantages of the mode of construction adopted. We need scarcely say that the fetish we alluded to is a "North Light." But at the outset we ask, What does a north light mean? When the dominant light comes from the north, some will reply; but how is this to be understood when the main skylight may slope either to the sitter's feet or to one side? We believe it is most frequently understood to mean a light so arranged that the sitter faces the north. But at once we must say that, under most conditions, this is a decidedly disadvantageous way of planning a studio, for reasons that we will presently make plain. These reasons will also show that, although the direction of the studio is the point that first appears to claim notice, many other considerations come in, and must be dealt with before it can be decided. Indeed, it will be necessary for several subjects to be discussed before we could say that this or that direction was the best.

We must at once draw attention to the fact, too frequently ignored, that no studio in which the dominant light cannot be directed to either side of the face at pleasure is able to allow full justice to be done to all sitters. This is a point that admits of no dispute. Some faces, taken not full, are best lighted by the major side being in light, others by its being in shadow. Even a full face may be far better represented when lighted from one side than it would be from the other. Hence, to be condemned always to take, say, the left side of a face if "Rembrandt" effects are not wanted, seriously cripples the power of the artist who wishes to please his friends or his clients. Much might be written upon this subject alone, but now we must, if we wish to confine our topic within reasonable bounds, content ourselves by reminding our readers that, as almost all faces are unsymmetrical, so in a photograph, which neither moves nor blinks, no matter how it is scrutinised, these departures from symmetry will be more noticed than in the original, which both moves and blinks, and never affords the opportunity for close examination which the immobility of the portrait renders easy. This asymmetry may be greatly dis-

guised by having a full controlling power over the direction in which the light falls upon the countenance.

There are two ways in which this power may be gained. First, by glazing the studio in such a manner that, without moving the sitter, the light by means of blinds or screens may be caused to fall upon either the left or the right side as may be desired. Second, by having such an arrangement of studio that a similar variety of illumination of the face is produced by causing the sitter to move to a different part of the room. Both plans have their advantages. It is clearly more agreeable to a sitter not to have to move about the room from spot to spot to get a suitable effect of light; the average sitter finds the whole affair sufficiently harassing and embarrassing without this additional burden. To plant himself by a chair or other support, and then to have the light arranged by the photographer, without his intervention, is obviously one means of retaining some little of his self-possession and *savoir faire* (too frequently conspicuous by their absence in portrait photography). On the other hand are to be considered the increased difficulty of keeping out the sun when both sides of the studio are glazed, with the consequent difficulty of keeping down the temperature, and also the fact that if the direct rays be kept out and the light modified by some sort of screen, it is very difficult, without one of sufficient thickness to materially "slow" the light to be used, to avoid the light falling in such a way as to approximate a modified sunlight and be so powerful as to destroy the more delicate tones and shades. In our next article on the subject we will further show the practical bearing of these points.

MR. FREDERICK HUDSON, well-known in the photographic world some ten or fifteen years ago as a most successful photographic landscape artist, has just died in Ventnor, Isle of Wight, at the age of sixty-seven. Settling in Ventnor some thirty years ago, on his return from America, he devoted himself principally to the study of landscape work, for which he found great scope in the beautiful scenery around him, and in which branch he soon made himself a name, as he produced some of the finest negatives of the picturesque spots in the island. These were mostly of a large size (20×16), taken direct by the wet collodion process, and gained for their author medals from the exhibitions in Southampton, Cornwall (2), London, and the International Exhibition at Philadelphia, U.S.A., 1876, besides the patronage of the Empress of Austria while staying in the island. Mr. Hudson, through failing health, retired from business some few years ago.

DURING a discussion at a recent meeting of one of the provincial societies a speaker mentioned that out of the six lenses, portrait and landscape, he possessed, only one of them had the visual and actinic focus coincident. If the lenses are of modern manufacture, and by makers of repute, the statement will take many by surprise. If, on the other hand, they are of very ancient date, the matter is by no means astonishing, as, at one time, lenses with non-coincident foci were the rule. It has been remarked by more than one that if the camera used by this gentleman were carefully examined, it might possibly prove that five of the instruments *did* work to focus, and that one only did not. We have little hesitation in saying that there are far more modern cameras in use in which the dark slides are not in register with the focussing screen than there are modern lenses, by good makers, in which the optical and chemical focus is not coincident.

PHOTOGRAPHERS, as a rule, appear to pay very little heed to the accuracy of their dark slides, and this often leads to the condemnation of the lenses. How many ever think of testing a new camera before taking it into use, or verifying it after it has been a year or two in

use? Lenses are now, it is true, usually employed with such reduced apertures that a slight variation between the plane of the ground glass and that of the sensitive plate often passes unnoticed in practice. But if by chance a lens with a large angular aperture be substituted, it is frequently condemned without its being in any way at fault. Whatever may be the angular aperture of a lens, it is manifest that it must always be worked at a disadvantage unless the dark slides are in perfect register with the focussing screen, however trifling may be the error.

It is the simplest thing imaginable to test the register of dark slides, and takes far less time to do than to describe how it is done. All one has to do is to cut a narrow strip of cardboard, three or four inches long, to a wedge shape. Then to place a straightedge—a side of one of the slides will answer—across the focussing screen and pass the wedge between the ground glass and the straightedge, making a mark with a pencil where the latter intersects the card. Next place a plate in the slide to be tested, draw the shutter, and repeat the operation. If the points of intersection coincide, the slide is in accurate register. If not, the amount of alteration will at once be seen.

It is somewhat of a shame that no public records exist relative to the early history, the rise and progress of photography. True, there are numerous articles and portraits in the possession of private individuals who feel an interest in what we may designate the archaeology of photography, but there is nothing of this nature to which the public have access. Mr. Lindsay Johnson, in a note to us, signifies his intention of making an endeavour to induce the Photographic Society of Great Britain, as the oldest corporation extant in this country, to make an effort and take the necessary steps to supply this much-felt want, and in this we sincerely hope he will be successful. Mr. Lang, of Glasgow, could afford valuable aid in the making of such a collection.

At the penultimate meeting of the West London Photographic Society the question was put as to whether the "continuing action of light" in carbon printing is utilised commercially. A short time back we were informed that, in one establishment where the cheap carbon pictures on opal glass are produced, during the past few months this property has been taken advantage of to the extent of seventy-five per cent., or more, in the exposure. The prints are exposed for one-fourth, or one-fifth, only of the time that would be necessary were they developed at once. They are then kept in the dark until they become deep enough. By this means four or five times the number of prints from each negative are obtained in a given time, and of course only a quarter of the number of printing frames are required under this system of working.

There is no question that a large number of photographs, which are used commercially, do fade, and that rapidly too. A short time back we had the following query put to us by a lay friend, who had been supplied with some portraits of his family which had become badly spotted within a year or so after delivery: "Can I not," he said, "proceed against the artist for the return of the money, seeing that the work was imperfectly executed?" Our advice was to return the prints and, no doubt, others would be supplied free of charge. This was done, and the result satisfactory. No respectable photographer, we imagine, would refuse to replace pictures which have deteriorated in an unduly short period, if only for the sake of his reputation. Now that there are several processes by which really permanent prints can be produced, it would, perhaps, prove a knotty point as to liability in a case of fading if the question were contested in a court of law.

ECHOES.

Our leading article on *Explosive Silver and Iodine Compounds* forms a reasonable warning to dabblers in photographic chemistry whose zeal is greater than their chemical knowledge, though in these days of commercial plates and cut-and-dried formulae the number of such experimentalists is far fewer than in years gone by.

That accidents may easily happen from the unwitting formation of such substances as those named, even to such as have a fair knowledge of all-round chemistry, without any special acquaintance with particular departments, is amply proved by the past records of photography, and many mysterious explosions and cases of "spontaneous combustion" are, no doubt, traceable to this cause.

I can give an instance in my own personal experience, dating back a good many years to my "salad days" in photography, in the shape of an unexpected incident which remained a mystery to me for a length of time, and which, though unattended fortunately by any more serious consequences than a little personal discomfort of a temporary nature, might well have proved far more disastrous.

It was, I need scarcely say, in the "good old wet plate days." I was making a batch of collodion and found I was short of iodide of ammonium, and the photographer of that period was not unacquainted with the necessity for making many of the materials he employed, sometimes because it was the only way, or frequently the readiest of obtaining them. In my case I should have had to travel or send some miles to the nearest chemist who was likely to keep the salt I wanted, so my best plan was to compound it from materials I had at hand.

My method and ingredients were to me apparently common sense ones, and the operation presented no special feature of difficulty. A quantity of iodine was thrown into some liquor ammonia in a glass measure, and its solution and combination hastened by pounding with a glass rod. Of course a due amount of care would have been exercised in the final adjustment of the proportions of the two elements, and in the process of crystallisation if only time had been allowed me, which, however, fortunately—I say it advisedly—was not the case, for, thanks to my vigorous use of the glass rod, but a short period elapsed before there was a dull report and a general "ruction" of some sort, the contents of my measure glass being scattered all over the place. Thanks to the power of the ammonia fumes, my face was not in too close proximity, so I escaped with only the suffering that resulted from the pungent vapour of iodine and ammonia that saturated the atmosphere and temporarily diverted my optical arrangements from their normal duties.

Collodion making was necessarily relinquished for the time, and when resumed, it was with a sample of iodide obtained from other sources, and the precise cause of the upset remained a mystery for some time, until I discovered that I had been proceeding upon the orthodox lines for the manufacture of one of the most dangerous explosives known to chemists. Had I been in a less hurry, and allowed the mixture to stand a few minutes before applying the glass rod, there is no knowing what the result would have been; but the incident shows that even out of two such comparatively harmless and well-known substances as iodine and ammonia a vast amount of risk may come.

I read with a good deal of interest the description of Mr. J. W. Newall's standard sensitometer, because now, more than ever, the necessity exists for some instrument which can fairly be designated by such a title. It would be absurd to claim that anything like a reliable "standard" exists. The readings of the Warnerke instrument have a certain approximate value to those who thoroughly understand it, and who conform to certain necessary conditions, but so slight a variation in those conditions as a difference in the composition of the sensitive film renders it altogether useless for purposes of practical comparison.

That refers simply to variations in the character or proportions of the various haloids employed, as the phosphorescent tablet is notoriously partial in its behaviour to bromide, iodide, and chloride of silver. But if we now add orthochromatic plates to those to be tested, it is not too much to say that the phosphorescent surface is worse than useless. Yet after very careful trials this was selected by a committee appointed for the purpose as being the most practically convenient form of illumination.

What is wanted is no doubt what Mr. Newall has aimed at, namely, an instrument capable of giving a reading in definite terms of such a duration of exposure to a standard light, preferably daylight if that can be standardised. But there lies the difficulty. I know very little, practically, about the "pentane" standard, which may be reliable enough for merely photo-metrical purposes, but for testing photographic

surfaces I imagine its chemical intensity, as compared with daylight is as liable to vary to iodide, bromide, or chloride of silver as the luminous tablet or any other form of artificial light.

The nearest approach we can make to the character, if not the intensity, of sunlight—at least in convenient form—is the magnesium light, and I think from recollection that the sensitometer committee of 1880 spoke well of this as a practical standard. No greater difficulty exists in the case of magnesium in getting a fixed amount of duty out of a given quantity than out of a given quantity of coal, and it certainly has the advantage over other artificial lights of exerting an action on the different haloids more closely resembling that of sunlight.

But the mechanical arrangements of Mr. Newall's instrument, though ingenious, are to my mind unnecessarily complex, and, moreover, require a delicacy of adjustment in order to secure accuracy in time exposures that places it practically out of court for everyday use.

Nothing could well be simpler nor more accurate in its graduations of time to the most minute fractions of a second than the revolving disc pierced with apertures bearing definite relations to the whole circumference of the circle. With such a revolving screen, pierced with holes increasing in size gradually by increments of 3.6 degrees of arc, it is possible without any elaborate mechanical contrivances to accurately divide a second into hundredths; for no matter what the speed of revolution, each 3.6 degrees of opening will give an exposure of one one-hundredth of the total time given. Such a contrivance was described some years ago before one of the London societies—the Photographic Club, I think—by Mr. W. Bedford, and would be difficult to improve, except in detail.

At the last meeting of the Photographic Society, or rather in the report of that meeting, I notice that pyrogallic acid is described as "the former salt." Either the speaker or the reporter is rather out in his phraseology, I think.

The question of treating hydroquinone colloquially as quinol is one that may very well be considered seriously, for the proposal made in more than one quarter to condense it to "hydro" is supremely absurd, and yet not more so except in its newness than either "pyro" or "hypo," all three prefixes being equally meaningless when employed alone.

Quinol, however, answers every purpose, being short and concise as well as being the real name of the substance; but there is, of course, the usual "conservatism" of photographers to be overcome even in the case of so comparatively new an introduction as hydroquinone.

The proposed Parent Society's museum would be a good idea if properly carried out, for an immense amount of interest centres in all objects of an "antiquarian" nature, if such a term can be applied to things photographic. But I should be strongly inclined to join with Mr. Arnold Spiller in wishing to keep clear of South Kensington. The "historical collection" got together for the Inventions Exhibition was, I believe, to be—or it was so proposed—relegated to that great national headquarters of "fossildom;" if it got there it certainly appears to be lost.

Chairmen of meetings have various uses, ornamental and practical, but a new one with a *souçon* of danger, or at least excitement about it, has been added to the list. Mr. Haddon, we are told, at a late meeting of the London and Provincial Association utilised the Chairman as a weight to hold down a box while he exploded some gun-cotton in it. Happy and obliging Mr. Chairman!

JUNUS.

HOOKE'S CAMERA, 1694.

To whom should we ascribe the camera in its portable form? This appears to me a question much more easily put than perhaps satisfactorily answered. From what Porta says regarding his darkened chamber and the images obtained therein, it is perfectly apparent that the Neapolitan philosopher realised the fact that the camera obscura would be of great service in assisting any one to draw or sketch. In the seventeenth book of his *Natural Magic*, which treats of strange glasses, and in that part of it which bears more directly on the various experiments he made with the camera, we find him distinctly stating, "If you cannot draw a picture of a man or anything else, draw it by this means" (English translation, 1689). It

is quite apparent that in the arrangement put forward by Porta, the thing to be drawn would require to be brought to the vicinity of the darkened room and placed in a suitable position, according to the light, before that its image could be reproduced on the whitened tablet destined to receive it.

Who, then, conceived the idea of taking a portable camera to the place where it might be wanted? It would almost appear as if we were indebted to an Englishman for the suggestion, but, be this as it may, it is sufficiently interesting to refer to the instrument which Dr. Robert Hooke brought under the notice of the Royal Society on December 19, 1694. The accompanying picture is a reproduction of the plate which figures in the work, *Philosophical Experiments and Observations of the late eminent Dr. Hooke, S.R.S., and Geom. Prof. Gresh.*

These memoirs of Hooke were published in London, in 1726, by W. Derham, F.R.S. As the title implies, its contents are varied; we may simply refer to a few of them:—"On the invention of the Barometer in 1659; Description of his Weather-wiser; on Hailstones that fell in London, May 18, 1680, with plates; on Instruments for Sounding great Depths of the Sea; on Telescopes and Microscopes; on Amber," &c., &c.

The title of the article in which we are more especially interested is as follows:—"An Instrument of Use to take the Draught or Picture of anything," communicated by Dr. Hooke to the Royal Society, December 19, 1694. After referring to the very imperfect way in which books of travel are illustrated, in a style which to say the least is verbose and which would simply weary the ordinary reader to quote *in extenso*, he goes on to say:—

"It is therefore, the Interest of all such, as deme to be rightly and truly informed for the future, to promote the Use and Practice of some such contrivance as I shall now describe, whereby any Person that can but use his Pen and trace the Profile of what he sees ready drawn for him, shall be able to give us the true Draught of whatever he sees before him, that continues so long time in the same Posture as while he can nimbly run over, with his Pen, the Boundaries, or Out-lines of the Thing to be represented, which being once truly taken, 'twill not at all be difficult to add the proper Shadows and Light pertinent thereunto. By the same Instrument also the Mariner may very easily and truly draw the Prospect of any Shore, and from Time to Time denote the Rising thereof, as he does nearer and nearer approach it, and the Depression or Sinking of it, as he does recede.

"The Instrument I mean for this purpose is nothing else but a small Picture-Box much like that which I long since shewed the Society for Drawing the Picture of a Man, or the like; of the Bigness of the original or of any proportionable Bigness that should be desired, as well bigger as smaller than the Life, which I believe was the first of that kind which was ever made or described by any. And, possibly, this may be the first of this kind that has been applied to this Use; tho' upon the first Institution of the Royal Foundation of Christ-Church I propounded it to the Governors there for the use of the Children: But Sir John More undertaking to write an Institution, and having omitted it, it has not there been brought into use."

Hooke must have taken it for granted that his picture of the instrument would be sufficiently explanatory, for in the text no description of any kind is to be found regarding the instrument. The size of the aperture, depicted in the cut, would of necessity indicate that there was a lens of some sort placed in the opening. It would be interesting if we could trace something regarding the "picture-box long since shewed the Society," but so far as I have been able I have not found anything regarding it in the printed records of the Royal Society.

It is unfortunate that a fuller description of the instrument has not been given us, but it will be apparent to any one that, in the illustration above shown, an early prototype of our modern camera is clearly to be seen.

Some details regarding Dr. Hooke may not be without interest. He was born at Freshwater, in the Isle of Wight, July 18, 1635. He showed at an early age a decided turn for mechanics. The Hon. Robert Boyle made use of his services in the construction of his celebrated air pump. This was about the year 1655. Later on he applied the balance spring for the regulating of the movement of watches. In 1662 he was appointed curator of experiments to the Royal Society. In 1665 Hooke was appointed Professor of Geometrical in Gresham College. The great fire of London took place in the following year, and Hooke had, it seems, an excellent plan for the rebuilding of the city. Although highly approved, it was the celebrated architect Wren's plan that was adopted, but Hooke got a po-



as surveyor of the works. He was secretary to the Royal Society for five years, having been elected to the post in 1677, and in 1681-82 the papers read before that body were published by him under the title of *Philosophical Collections*. In 1686 the Royal Society made him a grant, so that he might complete his philosophical inventions. This he never seems to have accomplished. Hooke died on March 3, 1703, and was buried in St. Helen's Church, Bishopsgate-street, London. Our philosopher's mind was of a higher order than his body, for it is recorded of him that he was of crooked figure and had shrunken limbs. His scientific work was in character too varied for him to thoroughly complete what, in many cases, he was the originator of. His principal writings are *Micrographia*, 1664; *Lectiões Culverianæ*, 1674-79; and *Posthumous Works*, published by Waller in 1705. The work from which we have taken our illustration would, according to the preface, seem to have been principally compiled from the papers which Mr. Waller had not made use of in the *Posthumous Works*.
W. LANG, JUN.

CHEMICAL VIGNETTER.

PROCEED thus:—Make a square cone of tin, cardboard, or wood, all blackened, similar to diagram, to fit into the inside of your camera, back part to catch behind focussing glass inside, and front part made to project about half length between lens and sensitive plate.

Now make a *carte-de-visite* vignette the usual size, and made of cardboard, and inside of front groove insert it so that it will move up and down and slightly sideways, so as to admit of the reflection being well centred on your plate.

Focus a sitter for cabinet size, usual head, and mark distance by scratch on camera bed. This is done so as to know afterwards the correct size for more of the same pattern.

Now place a very slow sensitive plate in your holder, cabinet size, and having placed a white sheet of paper a few feet from the lens' mouth, expose for a few seconds, and moving it slightly so as to show a pure white on plate. Develop with usual developer, but double pyro, so as to secure great density.

You will now, if you have proceeded properly, have a film of bare glass with a beautiful soft vignette pear-shaped in the centre of your plate. Success lies in as little exposure as possible with prolonged development, so as to get as grading an edge as possible.

Use this plate when dry as a printing mask, with which to get the reverse as transparencies.

Place your plate in a printing frame, put a thick clean glass between it and your sensitive plate, so as to secure additional softness. Now expose to a flame of gas full up, say six seconds, about four feet off. Develop with double pyro to great density, and fix as usual. You will now have a plate with clear pear-shaped vignette in the centre and dense margin; you can repeat this plan and obtain any amount of vignettes all the same size from your first plate. By either making your inside tube telescopic, or making different sized front cardboard vignette holes, you can obtain all the sizes requisite. The last is the best plan, as they are always softer when exactly between the lens and plate. Any old plates can be used for this purpose on condition of their being free from pinholes.

Should you obtain a soft margined negative as mask, but still not dense enough, either paint within an ace of the outline or paste paper on same conditions, as the object is to obtain very soft gradual outline with dense centre. Any little holes can be filled up easily. Paste your vignettes on cardboard, and use just as the old glass stained vignettes were used. Any quantity of these vignettes can be made in your spare time.

ROBERT MORRISON.

PHOTO-MECHANICAL JOTTINGS. IV.

For etching zinc blocks the following apparatus is necessary, and should be procured before commencing work, as one of the prolific causes of failure in this work is trying to do it without suitable tools:—A whirler, a printing frame, box pattern, with extra thick plate glass front, and the hinged bars fitted with screws instead of springs, a spirit stove, a type-printers' roller, an inking slab, a leather litho roller, a glazed roller, a flannel roller, a wooden tray, lined with pitch, on rockers, for etching, and a hot plate heated with gas. Zinc plates seventeen or eighteen gauge, photo-transfer, soft, and hard etching acids are also necessary.

For printing on zinc there are two processes, viz., bichromated albumen for ordinary line work, and bitumen for fine line work, and

for tint or half-tone work; for printing in albumen, the white of one egg, beaten and mixed with eight ounces of water and one ounce of a saturated solution of bichromate of potash, well-filtered, makes the best mixture. The zinc plate polished, first with fine emery cloth and turps, followed by pumice powder, is grained in a bath of nitric acid, one part; alum, one part; water, one hundred parts; then, after washing, is placed in the whirler, coated, whirled, coated again, again whirled, then removed and dried at once over the spirit stove.

Expose in the sun from four to eight minutes, in the shade from twenty to sixty minutes, then ink up with the type-printers' roller, the ink being thinned with turps. The film of ink requisite for a zinc plate is very thin; indeed, it must not be thick enough to prevent the zinc being seen underneath. The development is effected by putting the plate into a dish of cold water, and rubbing gently with a pad of cotton wool, which clears away the ink from the whites, leaving the image on the plate, and if the exposure has been sufficient it will require a considerable amount of friction to remove the image. This method is not the best for very fine line, or for tint, or half-tone work, on account of the liability of the ink to choke up the finest lines. Therefore, for such subjects the bitumen process must be used instead. Now bitumen has been used for even a longer time than albumen as a sensitising agent for metal plate printing, but when used in its crude state is so very insensitive that it is practically useless. But when the crude bitumen is purified by being washed in ether, it is only about one-third slower than albumen.

To purify the bitumen it is powdered, put into a wide-mouthed bottle, and sufficient ether, S.G. 735, as will cover it is poured in, stirred well, and allowed to stand a few hours, then well stirred, and the blackened ether thrown away. Another lot of ether is then added, the mixture stirred, then allowed to stand, then again stirred, and the liquid thrown away, the set of operations being repeated, until the ether, after standing for a few hours, is nearly colourless, when the residue of bitumen is poured into a clean and dry tin dish, and put away in a warm corner of a dark room to dry. When the purified bitumen is dry it is jet black, very friable, and thoroughly soluble in benzole. The best proportion of bitumen required for each ounce of benzole cannot be given, as each sample must be used in the proportions that suit it; therefore each sample of purified bitumen must be tried before deciding upon the proper quantity, fifteen to twenty-five grains of prepared bitumen to each ounce of pure benzole being a good guide. Whenever there is any difficulty in procuring pure benzole, benzine collas, sold by chemists, will be found an efficient substitute, but ordinary benzine of commerce is best avoided, as it is an uncertain compound. The bitumen dissolves readily and should be filtered before use.

The zinc plates are polished with fine emery cloth and turps, then with washed whiteness, moistened with a mixture in equal parts of turpentine and mineral naphtha, then put in the whirler, dusted, then coated and whirled for two or three minutes, when the film will be dry ready for exposure.

To coat the plates without a whirler will be a useless waste of time and material, as unless there is a thin, even film all over the plate a good print cannot be obtained. The best form of whirler, costing only about three shillings, is that illustrated in *Photo-engraving*, published by Messrs. England Brothers, Nottingham.

Bitumen prints are developed by immersion in a dish of turpentine, and occupies from fifteen minutes to an hour, according as the exposure has been short or long, the effect of over exposure being only to prolong the time of development, under exposure, of course, telling its own tale by leaving the zinc bare.

When the development is judged to be finished, wash the plate under a powerful rose, then immersion in a dish containing water one hundred parts, nitric acid one part, and a few seconds will reveal the fact whether or not the development has been carried on sufficiently far. If not, the plate is returned to the turpentine.

Prints in albumen are first of all gummed in and dried, then rolled up with the leather roller charged with soft etching ink, worked as stiff as possible. After this immerse in water—in which is sufficient nitric acid to just taste—for one minute to clear away the gum, &c.; then wash well, back and front, rubbing with a soft sponge, dry, and make any alterations or retouching that may be wanted—protect the back with white hard varnish, also the margin and any of the broad whites; then gum in again, dry, and again roll up, dust with powdered resin, after which the etching is proceeded with. The first two or three etchings are the most important, and require patience and a weak acid bath.

With a bitumen image the first etching is done before rolling up, so there is every chance of getting the fine lines sharp. The subsequent operations of gumming in and rolling up are the same as for albumen.

The flannel roller is used with thinnish ink when the etching has progressed too deep for the leather roller to properly touch the lines, the glazed roller being brought into use after the resist is cleared off the plate, which is made hot; then the glazed roller charged with the hard ink brought to working consistency with turps, and the etched plate on the hot plate is rolled up, the object being to touch the tops of the lines only, so that the burr caused by each successive etching may be removed without danger to the surface.

The production of negatives—grained negatives for tint or half-tone blocks—requires great care, but the making of the screens is even more difficult. The usual idea of these screens is that they must be very intense; but this is quite a mistake. The thinner they are the better; that is, within due bounds. The operator should have a selection of them varying in density and use them to suit the particular picture to be copied, the rule being the flatter the original the thinner the screen.

W. T. WILKINSON.

THE PROPERTIES OF DETECTIVE CAMERAS.

No. III.

We now conclude the summary of the properties of detective cameras. In answer to the question:—

22. *What improvements in the construction of the detective camera can you suggest?*

(a) "A method of construction so that operator could observe the whole field of the plate and focus at the same time that the exposure is made."

(b) "The ideal camera would be one carrying two lenses of seven and four and a half or five inches focus respectively, with an automatic arrangement to bring the plate to a fixed focus at the same time that the lens is changed. An automatic arrangement to bring a fresh plate or breadth of film into place after making the exposure, the shutter at the same time setting itself for a second exposure, would be a god-send. In other words, twelve pressures on the exposing trigger or bulb should expose twelve negatives, without the necessity of manipulating the internal arrangements, either by the clumsy process of opening the box, or by working slides, buttons, or levers on the outside. A strong spring, wound up at starting, could do this. A figure, seen through a slot, could visibly register the number of exposures made. A thoroughly self-contained automatic camera could be disguised in an endless variety of portable cases, and used without attracting attention, and so justify the name of a 'detective camera,' now so grossly misapplied in nearly all instances."

(c) "A swingback that would work automatically when camera is tilted."

(d) "A very difficult question to answer. A detective camera, to be useful, should not have any plate holders, but should be so constructed that it carry within itself at least two dozen plates, and so arranged that these plates could be easily transferred from one part to another of the camera with a slight movement of the box. Provisions for focussing lenses from four inches to eight inches. A great luxury would be a moveable or sliding focussing screen that could be brought into use in a moment."

(e) "My objection to the detective camera is, that not being able to focus sharply as with my regular view camera."

(f) "A detective camera should have a shutter of positive movement, balanced to prevent excessive shock, yet capable of moving fast enough to take a trotting horse passing the camera at right angle to the axis of the lens, without blur of image. Plate holders and slides should be dispensed with and means provided for bringing the sensitive surfaces into position rapidly. There should be provided temporary means for preventing the light striking the plate when the shutter is set or a self-shutting shutter arranged. Special devices are needed for easily releasing the shutter without jarring the camera at the instant of exposure."

(g) "1. That they be so arranged that at least six plates can be exposed without opening the box. 2. That the shutter can be timed accurately. 3. That it can have a practical double swing. 4. That the finder is actually in proportion to the size of the plate and absolutely correct in position. 5. That the bellows have freedom enough in movement to take a wide angle or rectilinear lens."

(h) "What I want for my own work. 1. A camera to carry fifty films (the new celluloid), with certain and rapid means of exposing them in succession. I prefer these films to roll-holder paper or films, and find that they work as well in the detective as glass plates. 2. Some easy and satisfactory way of focussing the image up to the very instant of releasing the shutter. The arrangement for focussing by estimating distance has been very unsatisfactory in my hands, and I invariably lose the view that I want the most and 'estimate' for most carefully. A camera thus fitted up needs no 'finder,' of course. 3. A shutter release at once firm and delicate, not to be set off by a jar, and yet working so easily that you do not move the camera in operating it."

(i) "Anything that will contain a satisfactory substitute for glass plates, in a roll or otherwise, in quantity sufficient to make twenty-five or fifty exposures without opening camera to change holder, and consequently will be more light-tight than present cameras and holders. Also a focussing finder which will change as the camera bellows change, so as to enable one to focus on an object instantly by looking in the finder."

(j) "The shutter should work in the centre of the lens or back of it; a more noiseless shutter would be advisable."

(k) "Slide to close the two finder eyes of camera when not in use. Shadowing hood to the finders to keep the sunshine off the ground glass of same when

sun is shining over your back or overhead. To have the top of the lid divided and hinged, so that you can introduce a holder quickly at any focus without opening entire camera box, and a means of withdrawing quickly the holder other than by your finger nails. Also an indicator to show whether or no the shutter is set without having to try the same. To have drawn on top of camera lines showing the angle of view included by lens, so that without use of finders you can be sure to have an object on the plate—a very necessary thing in quick snap work on the streets. Also a small roll holder to slide in place of plate holders. The present roll holders make the camera too bulky."

(l) "I don't think the perfect detective camera can ever exist, except in the imagination; it requires 'too many more improvements,' many of which conflict with one another. My 'detective' and other camera experience has been quite varied, and has taken all my leisure time since 1881, but it appears to me that I have mainly learned how much there is to be done in this direction. There is a wonderful fascination about the work, however."

(m) "One that will take lens from 5 to 8 inches; carry at least two dozen glass plates; set shutter and release from outside of box; expose plates without opening box or drawing slides; no external brasswork; and lock so that it will be impossible to meddle with it without key; colour, dead black."

(n) "Make it less complicated, so that it can be used instantly. When I need my detective most my experience has been that there is not time to work a complicated camera. It usually happens that by the time I am ready to shoot, the effect I particularly wanted cannot be obtained, the game has got out of range. One cannot usually sit around all day waiting for good things. They come suddenly and unexpectedly, and must be caught on the fly to be worth getting. This cannot be done if the camera will not admit of being worked quickly and easily. By the time a lens was changed, a swingback adjusted, the shutter regulated to a minute fraction of the twentieth part of a second, the slide drawn, &c., even a rheumatic mud turtle would have crawled out of sight and been lost for ever. My experience points only in one direction, viz., to the need of extreme simplicity in construction of the camera, a fixed focus, a good shutter that will let in lots of light when open, and none at all when closed, some means of pulling the slide without having to open the box, if possible a flexible film that does not need stripping, and when these are provided it will be easy and pleasant work to get good pictures with a detective camera."

(o) "I would suggest that the bellows of the camera should be made of longer draw, so that objects less than eight feet could be photographed readily, and perhaps some copying done. The shutters on most detective cameras do not have the proper shaped opening, and I think that a shutter which works between the lenses is preferable to most of the shutters now used. I would also suggest that the lenses should be of longer focus than are generally used, say 7½-inch equivalent focus for a 4 × 5 plate. The ways on which my camera slides are made of soft wood, which in summer swell and make focussing almost impossible. If these were made of brass the camera would work easier."

(p) "Some invention to enable one to take many pictures without having to change plates or films, to avoid the weight of glass and yet not have the complication and expense of the roll holder. I think the celluloid film and the promised contrivance for carrying the same in one holder to the extent of about four dozen films will solve the problem."

(q) "If the future of plates is to be the ivory film, we want a case holding, say, twelve films, separated by, say, ferrotype sheets, so that a spring may push one at a time up into focus and make a dozen exposures at once. With all my admiration for the detective, and after three years' use of the same camera, I am the more convinced that instantaneous work is only an episode in the work of the amateur photographer. Time pictures are the cream of the camera, and however careful to focus with the detective, there is that difference between the two kinds of work which adds to the richness and depth of the time picture."

(r) "Dispensing with all clap-trap attachments. Less bulk and weight."

(s) "A camera in which can be carried films or other flexible plates without the necessity of independent plate holders, where no stripping would be necessary, would be the most desirable feature of any improvement that I could suggest."

(t) "A lens which would remove any necessity of taking any focus. Guessing at your focus is very unsatisfactory in my experience, and it is very inconvenient to have to go through the operations necessary to look through your ground glass and take an accurate focus. The plate on which the handle of my focus works is marked 6 to 10, 60 feet, and experience enables me to be pretty accurate, but I have found several pictures ruined by being out of focus when I guessed at the distance being about 25 or 30 feet. I saw an English (?) lens this summer that entirely obviated this difficulty. Any object at a distance of 10 feet was in perfect focus, likewise any object at a distance of 100 feet or more. This seems to me to be the chief fault and annoyance of a detective camera. I think also an arrangement by which you could carry more than three plate holders in your box would be a great improvement. I can carry but six plates in my box, and any carried in any other way run the risk of being injured unless one gives one's undivided attention to them. I ruined many such this summer in going off for the day, when I wanted to take many pictures and carried ten or twelve plate holders in a bag. Of course it would add somewhat to weight of camera box, but I should think six plate holders might be carried without inconvenience."

(u) "Not having any experience with the commercial varieties, I can only state what I find desirable and have adopted in my own models. The box should be light, rigid, and strong. All parts to be easily accessible with a key. At least one dozen—six holders—plates to be carried in the box. The front of the box to have a hard rubber shutter or cap, properly speaking, which covers both lens and finder, and by one movement uncaps both, so that whenever you see an image on the ground glass of finder you may be sure the large lens is exposed. For the vertical finder I have a separate cap, but as this is seldom used, the habit of moving the large rubber cap is not forgotten. Front of box to hinge and lock, allowing tension of shutter to be adjusted, if necessary, for slow work. Top of box provided with handle—leather. In front to have a piece of plate glass, hinged, and closing level over pointer attached

to lens shutter. Glass to be marked off with a diamond scratch into distances for 10, 15, 20, 30, 40 feet focus. Ground glass of horizontal slider to be at side, and protected from direct light by hood, right-hand side. The thumbscrew for moving by rack and pinion, the shutter and lens to be bevelled. Door, running the length of bottom of box, provided with lock to compartment for storing extra holders. Small door, with lock, for the introduction and withdrawal of holder at back of camera; vertical slider. Back, locked door, width of box, for focussing when required. Left-hand side perfectly plain. Bottom string release to shutter."

(e) "The shutter can be set and the diaphragm rotated through plate glass opening on top of box. A vertical pointer is screwed into centre of shutter, and work smoothly beneath the glass. The exact distance for which the lens is in focus is thus always indicated, and permits of the focus being rapidly changed without disturbing the position of the box while viewing the object in the finder. The centre part of each plate is marked on the finder, which is a great convenience. The rack and pinion have a movement of one and a quarter inch, so that a great range of focus is provided for."

(w) "That the focus be so arranged as to permit the use of the longest and shortest lenses adaptable to the size of the plate, and to be quickly adjusted from the outside. A lens mount adjustable for moderately narrow and wide angles. Some manner of hood or cover over the aperture in front of the camera, and be arranged to work automatically with the shutter as well as independently of it. It is presumable that all that one can suggest as real improvements have already been achieved by some one, and were all the best in one and the same camera it would leave little to be desired; but, unfortunately, cameras, like other appliances, have patents upon them, and different stock houses have control of the excellencies."

(c) "1st. Better mode of concealment than anything now in the market. In fact, I know of no detective camera that cannot be detected on sight—would recommend a satchel as mode of concealment, but not of as cumbersome a pattern as the one now sold by one of our stock houses. 2nd. Means of removing the camera proper from the box or place of concealment without loss of time for the purpose of mounting it on a tripod for landscape work. 3rd. Arrangement for changing lenses without loss of time and attracting attention. 4th. Rotary stops for the lenses and for instantaneous exposures. 5th. Larger finders, with lenses to correspond with the increased size of the finders. 6th. Swing back, so adjusted as to swing from the centre of the vertical side of the ground glass frame."

(v) "The general fault that I have found in detective cameras is the fact that the lenses do not cover with large opening the plate called for, and in consequence it is difficult to obtain a fully exposed plate of any subject, except in very bright light. If, however, a much larger lens than was necessary was used you could open it fully and have a finely cut and fully exposed plate, and be able to take an object much further off in consequence of the focal length of the lens being longer. Of course this would necessitate the box being made a little longer; but what I think desirable is that the result would be much better. The most interesting objects for the detective box are studies of everyday life, and as in many cases they keep pretty well in the shade, &c., the foregoing remarks are made applicable."

(i) "I would suggest some simple means of carrying quite a number of plates, and some device for changing them conveniently in the open air. In this way a large number of plates could be carried with but few plate holders."

(m) "The different parts requiring attention, focus, time, &c., are too scattered; they should, if possible, be so placed that they can all be seen at a glance."

(b) "Should I ever build another for my own use, I would put in two shutters—one having a range from 1/100th of a second upward would be placed between the lenses; the other, with, if possible, a range from 1/100th downward to say 1/10th, would be placed in front of the lens, and act also as a hood. What is wanted more than anything else is a plate holder for the new films capable of carrying a quantity (two or three dozen) in small space, and some arrangement whereby they can be quickly changed."

In the foregoing, the names of the various respondents to Mr. Duffield's queries are not given, as, with one or two exceptions, they are unknown to English readers; but they comprise some exceedingly able and clever workers, who occupy leading positions in several of the societies of the United States.

DAQUERRETYPE.

[A Communication to the Birmingham Photographic Society.]

It is instructive to trace the progress of a discovery from the first indication of the truth to the period of its full development and of its application to purposes of ornament or utility.

The progress of discovery is ordinarily a slow process, and it often happens that a great fact is allowed to lie dormant for years or for ages which, when eventually revived, is found to render a fine interpretation of some of Nature's harmonious phenomena and to minister to the wants or the pleasures of existence. Photography is peculiarly illustrative of this position. As in this year of grace, 1880, we celebrate the Jubilee of our art-science, it has seemed to me to be a suitable occasion to trace briefly the steps by which we have advanced to our present knowledge.

The progress has been slow and laborious, but it has been steady. And while we rejoice in the perfection of our apparatus, in our instantaneous plates and rapid lenses, in our ability to depict every phase of nature and art, from the bullet in its rapid flight to the mapping of stars which must ever remain unseen by the human eye, we ought never to forget the men who laid the foundations of all this. In asking your special attention to-night to the elegant process devised fifty years ago by the great Frenchman, Daguerre, I shall also briefly mention the work of other men who aided in the birth of photography, the infant of fifty years ago, the giant of to-day.

The philosophers of antiquity appear to have had their attention excited by many of the more striking effects of light, yet we have no account of their having observed any of its chemical influences, although its action on coloured bodies—deepening the colour in some cases and discharging it in others—must have been of everyday occurrence. The only facts which they have recorded are that some precious stones, particularly the amethyst and the opal, lost their sparkle by prolonged exposure to the rays of the sun. It has been stated, but on doubtful authority, that the jinglers of India were for many ages in possession of a secret process by which they were enabled in a brief space to copy the profile of any individual by the action of light. However this may have been, it does not appear that they know anything of such a process in the present day. The alchemists, amidst the multiplicity of their manipulatory processes in their vain search for the philosopher's stone and the *elixir vite*, stumbled upon a peculiar combination of silver with chlorine, an element unknown to them, which they called horn silver, as, by fusion, the white powder they obtained by precipitation was converted into a horn-like substance. They observed that this horn silver was blackened by light, and as they taught that silver only differed from gold in being mercury interpenetrated by the sulphurous principle of the sun's rays, they concluded that this change was the commencement of the process by which their dreams were to be realised. Failing, however, to produce gold from horn silver, the fact of its blackening was simply recorded, and no further investigations were made into this remarkable phenomenon. The illustrious Schéele, in his admirable *Traité de l'Air de Feu*, gave us the first philosophical examination of this peculiar change in the salts of silver, and showed the dissimilar powers of the different rays of light in effecting this change. In 1801, Ritter proved the existence of rays a considerable distance beyond the blue end of the visible spectrum, which had the property of speedily blackening chloride of silver. These researches excited the attention of the scientific world. M. Bérard, Seebeck, Berthollet, and others, directed their attention to the peculiar condition of the different rays in relation to their luminous and chemical influences; while Sir William Herschel and Sir Henry Englefield investigated the calorific powers of the coloured rays, and were followed in these investigations by Seebeck and Wunsh. Dr. Wollaston pursued and published an interesting series of experiments on the decomposition effected by light on gum guaiacum. He found that paper washed with a solution of this gum in spirits of wine had its yellow colour rapidly changed to green by the violet rays, while the red rays had the property of restoring the yellow hue. Sir Humphry Davy observed that the puce-coloured oxide of lead became, when moistened, red by exposure to the red ray, and black when exposed to the violet ray; that hydrogen and chlorine entered into combination more rapidly in the violet than in the red rays; and that the green oxide of mercury, although not changed by the most refrangible rays, speedily became red in the least refrangible. The revival of gold and silver from their oxides by the action of the sun's light also occupied the attention of Count Rumford, who communicated two papers on this subject to the Royal Society. These and some curious observations by Morichini, Confalachi, M. Bérard, and Mrs. Somerville, on the power of the violet rays to induce magnetism in steel needles, are the principal points of discovery in this branch of science previously to the announcement of the Daguerreotype.

A statement has been made by the French to the effect that M. Charles was in possession, about the year 1790, of a process by which portraits could be obtained by the agency of sunlight producing a dark impression upon a prepared surface. This is, however, exceedingly doubtful; and even the Abbé Moigno, in his *Repertoir*, states that M. Charles never disclosed any fact connected with his hypothetical discovery, and that he left no evidence behind him of ever being in possession of such a secret process.

In June, 1802, Mr. Thomas Wedgwood, a son of the celebrated porcelain manufacturer, published, in the *Journals of the Royal Institution, An Account of a Method of Copying Paintings upon Glass, and of Making Profiles by the Agency of Light upon Nitrate of Silver, with Observations by H. Davy*. This was certainly the first published account of any attempt to produce images by the decomposing powers of light. Mr. Wedgwood made use of white paper or white leather moistened with a solution of nitrate of silver. He found that white paper or white leather moistened with a solution of nitrate of silver underwent no change when kept in a dark place, but on being exposed to the daylight it speedily changes colour, and, after passing through different shades of grey and brown, becomes at length nearly black. When the shadow of any figure is thrown upon the prepared surface the part concealed by it remains white and the other parts speedily become dark. The images formed by means of the camera obscura were found to be too faint to produce in any moderate time an effect upon the nitrate of silver. Davy made some important additions to Wedgwood's work. He found that the chloride was much more sensitive to light than the nitrate of silver. Both Wedgwood and Davy attempted to secure the pictures formed within a camera upon paper coated with these salts of silver, but without success. Davy, however, using the more concentrated light of the solar microscope, readily obtained images of small objects upon paper prepared with silver chloride. But there was a fatal objection to this method which not even Davy, with all his chemical knowledge, was able to surmount. When the copies obtained were exposed to daylight the same agency which had produced the picture proceeded to destroy it. Davy clearly recognised its capabilities, for he writes:—"Nothing but a method of preventing the unshaded parts of the delineations from being coloured by exposure to the day is wanting to render this process as useful as it is elegant." In this copying process, devised by Wedgwood and improved by Davy, we see the germ of the ordinary method by which our negative photographs on glass are made to yield a positive proof or impression upon sensitized paper.

(To be continued.)

W. THOMAS HORTON.

HYDROQUINONE.

[Discussion on Mr. T. Charters White's paper at the Camera Club. See page 124.]

Mr. MASKELL said: I should like to bring under the notice of the meeting a formula for hydroquinone development with which I have obtained very satisfactory results. It is one which I obtained in Paris last September from M. Mercier, a chemist in the Faubourg Montmartre. It is very simple, consisting of four hundred grains of carbonate of soda, three hundred and sixty grains of sulphite of soda, and forty grains of hydroquinone; no bromide. Though somewhat prejudiced at first, I was entirely converted to the use of

by hydroquinone during my visit to Paris. Whether or no in the hands of the most experienced workers superior results might not be obtained by the pyro process, especially with difficult subjects, I am not prepared to say, but I am convinced that for the ordinary amateur, even of considerable experience, much more uniform and satisfactory results will be obtained. With pyro and ammonia, or pyro potash, how many amateurs could be trusted to obtain equal and good results from the exposure of two plates on the same subject and with the same light, giving to one plate one second and to the other twenty seconds' exposure? Yet I hold that this can be done with ease by the proper use of the hydroquinone bath. This developer has the advantages, amongst others, of permitting great latitude of exposure, of being cleanly, not staining the fingers, of affording an easy and regular development, of obviating the necessity of continuous rocking of the dish, and of cheapness, as I shall endeavour to show. It may, indeed, be said to be almost automatic in its action. The great latitude of exposure permitted is surprising, and this is counteracted by the use of new or used baths. That is, indeed, the whole secret of the certain success which may be obtained: for instantaneous exposure a new bath; for prolonged exposure an old one. It is my practice to keep a number of three-ounce bottles with developers of varying degrees of age or use; on each I note the number of plates for which the contents have served; I keep them filled to the stopper, which preserves the contents from alteration. If I am uncertain of the exposure a plate has received, I place it in an old bath, and if at the end of three or four minutes nothing comes up, I try a newer one, and so on. It is not difficult to judge, nor is this process so tedious as might be imagined. Great cleanliness of materials and dishes is essential, and the developer should be filtered after use. No pyro, iron, or hypo should come near it. The dish need not be rocked, neither is the plate stained as with pyro, if the developer does not flow over evenly at once. If, as I admit, the development is sometimes very prolonged, never mind; cover up the dish, leave it to itself for half an hour or an hour, which you can employ in other ways. You can develop twenty or more plates at a time, especially if you use a grooved dipping bath, and allow a short interval between placing each plate successively in the bath. By these means you have them under perfect control. It is cheap, because the same bath can be used so many times. I lately developed eighteen lantern slides with the same three ounces of developer, the last as easily as the first. Thomas's hydroquinone developer is sold at 3s. for two pints; you can make the two pints for about 1s., say ten ounces for 3d., which would develop at least twenty-four lantern plates and be still serviceable, say two plates for a farthing. Removing the plate from the developer at intervals, and allowing it to remain in a dry dish is good; raising the temperature also is good, for under-exposed plates especially. Hydroquinone is a good and clean developer for bromide and Alpha papers, and I should say the very best for lantern slides, less troublesome than ferrous oxalate, to prepare, to use, or to keep. If you wish to utilise your old baths give prolonged exposures. Fogging is rare; almost impossible. I remember in my early experiences of photography, my plates often veiled over very quickly; now, with an unexperienced hand the plates can go into the hypo with the shadows and rebates bright and pure. I prefer myself that they should be slightly veiled over, the results are softer. I intended to show two lantern slides for information concerning the difference of tint; but I have unfortunately forgotten to bring them: one was a good black, the other pink. It seems to me there are four factors, or conditions, to be considered in the production of different tints; that is, long exposure with new or old bath, and short exposure with a new or old bath. But I do not know how to regulate the conditions of tint. I think that hydroquinone is a step in advance towards the realisation of a perfect automatic developer. The idea may be ridiculed for the moment, but I can quite conceive the time arriving when the question of exposure may become (within limits) almost a negligible quantity. That is to say, that (within limits) given any exposure, short or long, a reagent may be found which will automatically bring out, with correct and proper gradations, all that the light has impressed on the sensitive surface. When that time arrives it will be a triumph of chemistry, but I venture to say that a great deal of the interest of development will be gone.

Mr. ELDER said that he did not think, in spite of Dr. Elder, that resorcin could be used as a developer, for he had tried it, and it had failed to produce any image on the plate; however, he meant to try it again. Pyrocatechin, the other isomer of hydroquinone, had been used successfully, but its price, 5s. a drachm, was an almost insuperable bar to its use. No doubt, however, if a demand arose for it, it would be reduced. With regard to Mr. Charters White's statement, that he had found a greenish-brown deposit in the hypo bath, it was possible that that might be green hydroquinone—a very beautiful crystalline body formed when hydroquinone in solution is carefully oxydised, e.g., by ferric chloride. Lately a great deal had been said about the use of caustic soda or potash instead of the carbonates of these alkalies with hydroquinone. Four years ago the speaker had found the advantage of using these alkalies in the developer; however, he had supposed that it was well known, and had not thought it worth publishing except in a letter to the maker of the plates he was then using. He was rather surprised to find the use of these alkalies recommended as something new. With caustic alkalies hydroquinone was a first-rate developer for positives, whether on paper or glass, but it was not so good as pyro for negatives.

Mr. WILSON NOBLE spoke strongly in favour of hydroquinone for developing bromide papers. He found no tanning action, acid and alum were not needed, and there were no blisters. The colour, too, was better than with ferrous oxalate. With ferrous oxalate the deeper shadows appeared to come first, and so on to

the half tones, but with hydroquinone all the detail appeared to come together, and then to gather density without fogging. He had kept the developer standing three days, and found little or no difference in using it.

Mr. LYONEL CLARK said he was sufficiently conservative to still refuse to believe that hydroquinone would oust their old friend pyro. In France it had certainly made very great and considerable advances, but there it had a much feebler enemy to contend with, for, as every one knew, ferrous oxalate was the favourite developer on the Continent. And his remarks that evening would be on hydroquinone as a substitute for ferrous oxalate, and especially for the development of bromide prints. He had tried a good many experiments on bromide papers with varying proportions of hydroquinone. Considering that it is an undoubted advantage, if equal results can be obtained, to use a quick development, he had confined his experiments to the use of the hydrates, or, as they are more commonly called, the caustic alkalies. The first point he had ascertained was that, in order to get best results, exposure should be, for an average negative, about four times as long as would be given if ferrous oxalate were used. This was the keynote of the whole affair, and showed the immense advantage that hydroquinone possessed. The great difficulty in ferrous oxalate development has always been that if the negative were at all dense, and sufficient exposure were given to enable the light to act through that deposit, on development the shadows would be bunged up before the detail in the high lights showed. Although not an impossibility, it was a most difficult thing to get a satisfactory print from a hard negative when using ferrous oxalate. With hydroquinone, on the contrary, if this salt be kept down, it is perfectly possible to bring out all the detail first and then gradually allow density to gather. He had found that about two grains of hydroquinone gave very good results when the salt had twice its weight of meta-bisulphite, or eight times its weight of sulphite added as a preservative. The alkali used was caustic potash, the ordinary K₂CO₃. Hydric. Dep. of commerce; about five to six grains per ounce appeared to give good results, but, like the alkali in a pyro developer, it can be added gradually and as required. With a developer as above described, up to twelve grains of potash could be used, but when this amount was added, black blotches began to be formed in the shadows. He (the speaker) was inclined to put this down to the corrosive action of the caustic alkalies on all animal matter, such as gelatine, and thought an explanation of the phenomenon shown by Mr. Elder to be due to the same cause. The effect of lessening the quantity of hydroquinone was to make the colour of the deposit of a brownish colour, and also to slow the development. This was a very noticeable fact: below a certain point any increase in the quantity of hydroquinone considerably quickened development, although no further alkali was added. In fact, with normal exposure it was almost impossible to get anything but a shadow when less than one grain of hydroquinone was used. One point in development of bromide paper was the uneven way in which the image appeared. Commencing usually at the edges, they darkened up rapidly to full intensity, and it was some time before the centre would follow suit. However, on completion no signs of unequal deposit were shown. He would also hand round a few specimens of Alpha paper developed by this salt. The colour was very rich and pleasing, and varied from a reddish to a rich brown directly as the amount of hydroquinone present, and he considered that it would be most valuable for use with this paper. In conclusion, Mr. Maskell had mentioned Mr. Balagny's claim that hydroquinone was an automatic developer, and had further expressed a hope that in the millennium of photography we should have a developer that would develop all exposures. If such was to be the millennium, he (the speaker) thought it would be as great a failure as a good many other hoped-for millenniums; and if such a developer did exist, he should be sorry to have to use it. He considered the great point in all development was that we could integrate its composition, and obtain any desired results, and he advocated hydroquinone in preference to ferrous oxalate, for the sole reason that it was "tentative" in its action and non-automatic.

Mr. DAVISON said there was very strong staining and tanning action with hydroquinone if it were allowed to act long. He did not agree with Mr. Maskell as to the use of old baths, as the state of energy of these was not known. He recommended the use of hydroquinone for lantern-slide work, and also particularly for developing Alpha paper.

FIFTY YEARS' PHOTOGRAPHY.*

In 1843, Herschel published a process whereby what are known as breath pictures were produced. It would be most interesting to reproduce many of these early results. We could have plenty of material for our meetings if some enthusiastic member were to take up some of these bygone methods and show them to our members. The suggestiveness of all the work which Herschel did in this way is only known to those who have taken the trouble to go into the literature of the subject; but we must hurry on. It just remains for us to say, that Herschel *secundus* died in the year 1871, on the 11th of May, at Collingwood. He was born in the year 1792, and was, at the time of his death, close on eighty years old. The nation, in giving him a place among the great men interred in Westminster Abbey, have shown their appreciation of his worth. His remains have been deposited close to those of Sir Isaac Newton. The biography of Sir John Frederick William Herschel has yet to be written. The same applies to the father, Sir William Herschel.

* Concluded from page 145.

The action of light on bichromates, in presence of organic matter, is the basis of carbon printing, Woodburytype, collotype, and analogous processes. The fact that light could impress an image on paper saturated with a solution of bichromate of potash had been known for a considerable period before anything practical resulted from it. The name that has been associated with the reaction indicated, is that of Mungo Ponton, and, curiously enough, the year 1839 saw this announcement also.

Another early worker, and one who has just recently passed away, was Robert Hunt, his death occurring in the year 1887. Born in 1807, he had reached the ripe age of eighty. I regret I am unable to show his portrait. A record of his experimental work is to be found in his *Researches on Light*, the first edition of which was published in 1844, and this was followed by a subsequent edition in 1854, containing almost as much as double the amount of matter contained in the original. He was a voluminous writer in his day, but it would extend this communication to an undue length were we to particularise these. Hunt was the first to draw attention to the use of sulphate of iron as a developer, and this was as far back as the year 1844. As you are aware, in the collodion process this chemical is employed to the present day. In his experiments the action of the solar spectrum on silver salts, with or without admixture of other substances, was fully gone into. It may interest members to know that at the first meeting of the first photographic society in Glasgow, on March 8, 1851, Hunt was present and addressed the meeting. Though we may call ourselves the heirs of that Society, still we are not the true descendants. The Glasgow Photographic Association can date from 1862, seeing it was only a revival of the older Photographic Society of Glasgow. At the meeting in question, Jabez Hughes read a paper on *The Prospects and Progress of Photography*. At that time Hughes had his studio in Glasgow, and Sheriff Bell was the chairman of the evening.

To return to Hunt. From a photographic point of view we think it unfortunate that an original investigator such as he did not remain true to his first love. He drifted, ultimately, into a different scientific channel altogether. He was a geologist as well as a photographer, and as he received the appointment of "Keeper of Mining Records," the work of his later years lay in quite an opposite direction. He edited *Ure's Dictionary of Arts and Mines*, and his latest work was *British Mining*, published in 1884. Hunt was a member of the Royal Society. To those of our members who may wish to get suggestive material for new processes and new reactions, we know of no treatise or treatises which can compare with Hunt's *Researches on Light*.

We will now cross the channel and see what was being done in France by two men whose names are now a record of the past, Abel Niépce de St. Victor and Edmund Becquerel. Niépce the younger, as he has been called, was not, as generally recorded, Nicéphore Niépce's nephew, but the son of a nephew, Bernard Niépce. Niépce de St. Victor was a soldier, but studied chemistry, and inspired no doubt by what Niépce the elder had done, busied himself with photographic matters. In 1847, he presented to the French Academy a memoir of a process in which starch spread on glass holding the silver salts was made use of. In 1848, he announced the albumen process, in which the starch was replaced by the white of eggs. Niépce de St. Victor is usually credited with being the first to use glass, but I think this honour should be given to Herschel, as already pointed out. Niépce de St. Victor worked hard at the still unsolved problem of heliochromy, or photography in natural colours. A certain amount of success attended his efforts, and I believe specimens of results obtained are to be seen at South Kensington; however, as these experiments for the most part refer to a period beyond that at which I shall have to close this communication, we shall rather pass on and consider the work of Edmund Becquerel, which dates from the year 1848. Niépce de St. Victor died on April 6, 1870.

Becquerel was a French physicist, and his father, Antoine Cesar Becquerel, was also a man famous for his scientific researches, which were chiefly electrical. Becquerel the younger, on February 7, 1848, presented a memoir to the French Academy of Sciences on the coloured photographic image of the solar spectrum. He experimented with Daguerreotype plates, and by means of a layer of chloride, or, rather, what is known chemically as a subchloride, he was able to reproduce in a more or less perfect manner the colours of the spectrum which had been allowed to fall on the plate. Another memoir was submitted in the following year, viz., 1849, and in this he gives full details as to the preparation of the colour sensitive chloride. His mode of preparing this was an electrical one, and consisted in placing the plate in a solution of hydrochloric acid, connecting it with the positive pole of two Bunsen cells. Opposite the silvered plate a platinum conductor of the same size was placed in solution, and the current in passing decomposed the acid, and the chlorine given off attached itself to the silver plate, giving the form of chloride susceptible to colour influence. We need not go further, but enough has been said to show how early in the day the search after colour photography took place. As the matter stands we are apparently no nearer the unsolved problem than in the time of Becquerel, notwithstanding the fact that succeeding workers have spent years of study and research on the subject. So far photography in natural colours has proved a veritable *ignis fatuus* to the photographic traveller. Is this to be the permanent state of affairs, and are we to accept the fact that the thing is impossible? I do not wish to be dogmatic, but taking it for granted that heliochromy were to-morrow an accomplished fact it could

not impress me more than does the fact that our photographic plate is now so susceptible to light radiations that an exposure amounting to only the fractional part of a second can give a picture. Would colour photography be one whit more wonderful than this everyday occurrence in our photographic work? Science, to my mind, has performed feats much more difficult of accomplishment, and seemingly more impossible than what this appears to be. Take the telephone; even the most sanguine electrician did not conceive it possible that speech could be reproduced at the end of a wire miles apart from where the original words were delivered. Take the phonograph; what could be more wonderful, or even more weird, than the fact that we are enabled to put away the tones and voice of a human being, and reproduce them, it may be years afterwards, when the speaker has been called to his fathers, and the voice is hushed for ever!

In conclusion, we should refer to Dr. John William Draper, the famous American, and his photographic work. I purpose, however, breaking off at this point, and will leave the consideration of what he did to another occasion, when I shall be able to show his portrait by means of the lantern.

W. LANG, JUN.

HYDROQUINONE AS A DEVELOPING AGENT.*

CLOSELY bound up with the quality of energy is that which I mentioned as coming next after energy in importance, but which, in reality, is inseparable from it—namely, the property of only acting where the light has acted. It is a very great merit in a developer to develop cleanly—to only take notice of that provocation to action which the impact of light originates.

We all know that it is a weakness of some developers, especially those of an energetic kind, not to discriminate between the effect of light and the effect of various malefic influences which tend to what is called fog; and it is undoubtedly an element of great advantage in a developer if it refuses to recognise those fog-producing tendencies, and only pays respect to the disturbance set up by light. I claim for quinol this quality in a very high degree; in fact, I think it far excels all other strong developers in this respect.

In proof of this I pass round two negatives, they are both produced on the same plate (No. 3), which was cut in two. Equal exposures were given to the two halves, and one was developed with pyro and ammonia, and the other with quinol. The negative developed by pyro shows, on the margin entirely protected from the light, and in all the deep shades, a strong fog—copper colour by reflected light, and violet by transmitted light. The other negative—that developed by quinol—is perfectly clean, the chemical action being, in it, restricted entirely to the parts affected by light. It is, in fact, a perfectly good negative, particularly clean in the non-lighted parts, and this difference is not due to a difference of energy in the two developers used, for the quinone developed image has quite as much of the true effect of light brought out in it as the fogged image developed by pyrogallol.

I send round a second illustration of this point (No. 4), but showing the difference in the effect of pyro and quinol on a plate with a strong tendency to fog of another kind, namely, to surface fog, that very troublesome kind of fog which some plates are liable to, and which generally manifests itself after plates have been kept a long time, and have been acted upon by air.

In the plate developed by pyro, this kind of iridescent fog is seen very unpleasantly. It mars the negative a good deal, but does not entirely spoil it. The other negative, cut from the same plate and developed with quinol, is absolutely free from any taint of fog of any kind—it is perfectly bright and clean. Now this property of quinol of not producing fog on plates which would ordinarily be foggy, is an exceedingly valuable one, and I desire to give strong emphasis to it. All things being equal, I think it is a very decisive ground for preference being given to quinol as a developing agent.

Before I pass on to another point, I will send round a very interesting negative, No. 5. It was produced a few days ago upon a plate coated on January 31, 1880. It was, therefore, nine years old before being used. It has been cut in two after exposure in the camera, and one half developed with pyro and the other with quinol; both halves are quite good, but the quinol half is much the cleaner and brighter of the two.

I now pass round two negatives marked 6 and 7, which show the effect of varying the proportion of bromide and of omitting it altogether. No. 2 you have already seen; it has the normal proportion of bromide in its developer, and should be compared side by side with the other two, one of which had more and the other less than the normal proportion of bromide in their developers. It will be observed that the effect of the bromide has been to slow the development and brighten the image. As these were all developed for the same time, namely, two and a quarter minutes, it is not

* Concluded from page 143

evident from this experiment whether the bromide only retards development or definitely enfeebles it. If more time had been given, possibly more detail in the shades would have been developed with the solution containing bromide. Here are another pair of negatives, marked 8 and 9. These illustrate the effect of varying the proportion of sulphite of soda, and they are particularly interesting. They show the immense effect of sulphite of soda on density and colour. Mr. Green says with regard to this that "Sulphite plays a most important part in quinol development. Its efficacy in preventing discolouration is, I think, very well understood, but I have not observed that any attention has been drawn to one of its principal features, namely, its influence upon density. A comparison of 2, 8, and 9 will show how essential it is that this should be thoroughly understood, and the importance of using only the purest samples of sulphite soda."

This property of sulphite of soda in the quinol developer provides a means of compensating for over exposure by varying the proportion, using, to begin with, as little as will suffice to prevent stain.

While I am speaking of sulphite of soda, I may as well also speak of meta-bisulphite of potash. Meta-bisulphite cannot be substituted for sulphite with good effect in a quinol developer. It has not the same virtue in connexion with quinol that it certainly has in connexion with pyro.

It has a great preservative action upon quinol by undoing the effect of oxidation, which is to produce quinone, but unless used very sparingly indeed it destroys the developing effect of quinol almost entirely. See negatives 10 and 11.

I now come to my last series of negatives, marked 12, 13, 14, 15, and 16. They illustrate, comparatively, the effect of potash and soda in the caustic state, and in the state of carbonate. In this set the development was continued during three minutes instead of (as in the case of all the other negatives except the actinometer negatives) two and a quarter minutes. With this exception, you will understand that all the plates I have shown were alike to begin with, and that they were all exposed for the same time.

This series, 12, 13, 14, 15, and 16, shows clearly the superiority of caustic potash as a stimulant to development. The feebleness of carbonate of soda relatively to carbonate of potash (used in equivalent proportions) is remarkable. It is possible that this may in some measure be due to a difference in the action of the citrate of soda formed in the one developer and the citrate of potash in the other, and that in the absence of citric acid as an ingredient in the developing solution the same difference in the action of the two carbonates might not have existed.

There does not appear to be any marked inferiority in the extent to which detail is brought out in the faintly lighted parts by the carbonate of potash as compared with caustic potash, although there is a great difference both in the colour and the strength of the image. On the whole, preference will probably be given to caustic potash. With regard to a definite formula for a quinol developer, I may say that Mr. Green has made innumerable experiments with a view to arrive at a formula that would most generally meet the wants of the photographer in the studio and in the field, that would give a fine quality of image a good colour, and develop in the same time as pyro and ammonia. The result of these experiments is the following formula:—

A.
Hydroquinone (quinol) 80 grains.
Citric acid 10 "
Sulphite of soda (recrystallised) 80 "
Distilled water 20 ounces.

B.
Caustic potash (fused) 160 grains.
Sulphite of soda (recrystallised) 160 "
Distilled water 20 ounces.

C.
Bromide of potassium 24 grains.
Distilled water 1 ounce.

D.
Caustic potash (fused) 160 grains.
Distilled water 20 ounces.

Fixing solution:—Hyposulphite of soda, 1lb.; water, 40 ounces.

For normal exposures use equal parts of A and B, adding five minims of C for every ounce of solution.

For over-exposed plates use D instead of B, with an extra quantity of C.

For under-exposed plates, omit C, and, in extreme cases, add six

or eight grains more of sulphite of soda to every ounce of developer.

Plates showing a tendency to frill should be immersed for one minute in a five per cent. solution of common alum between development and fixing; washing before and afterwards.

Note.—The object of decreasing or increasing the quantity of sulphite is to give greater or less density.

Gentlemen, I have spoken of several of the advantages of quinol as a developing agent, but I have not spoken of all. I have said nothing of the advantage of getting rid of the fumes of ammonia in the dark room, nor of the greatly less tendency of quinol than pyro to stain the film during protracted development. I have not mentioned the development of positives on gelatino-bromide paper nor of diapositives for the magic lantern, although I have examples here which show the excellence of quinol for these purposes, but I hope I have said enough and shown enough to lead those of you who have not yet tried quinol as a developing agent to give it a fair trial.

J. WILSON SWAN, M.A.

THE DETECTION OF BRONZE POWDER ON MOUNTS.

THE time is past when it was needful to warn photographers to beware of the insidious pest, bronze powder, or mosaic gold; but a few words on its detection may still be found useful.

Some time ago I heard of a photographer who was in great distress because all the prints that he sent out became spotty within a few months. He tried all the remedies he could think of without avail. He washed his prints for an unreasonable length of time, and tried all sorts of mounting materials, but the evil was in no way decreased. As his mounts were printed in brown, and had no trace of gilding about them, it did not seem at all reasonable to suppose that bronze powder could be the cause of all the trouble. And yet such was the case. One of the mounts was sent to me for examination. I may here remark that the uninitiated have a very touching faith in the powers of the analytical chemist. A zoologist once showed me some tiny white granules which he had found inside some beast; perhaps there was altogether half a grain or so of material. These granules, he explained to me, consisted of an outer and an inner layer of different structure. He wanted them analysed, and could not I contrive to analyse the two layers separately? This by the way. The problem in the present case did not prove quite so hard, though the quantity of material to be dealt with was probably very much smaller than that which my friend the zoologist placed at my disposal. The most careful inspection with the naked eye revealed nothing, but patient search with a lens of high magnifying power (perhaps about twenty-five diameters) revealed a few minute spots of a coppery, metallic lustre. So very small were these specks that, even after they had been seen, it was far from easy to discover one again unless a mark was made to indicate its position. From their appearance it was obvious that these spots must consist either of leaf metal or mosaic gold. They were first treated with hydrochloric, and then with nitric acid, both as strong as could be applied to paper without rapidly disintegrating it. As the spots remained unaffected they were evidently not Dutch metal, which would have dissolved readily. A globule of mercury was next rubbed over the part of the mount which had been treated with acid, but the metallic specks remained unchanged. Gold would have amalgamated, and either disappeared or turned white. These tests practically exclude everything except bronze powder, but for further confirmation a drop of sulphide of ammonium was applied, and it was found that the spots very slowly disappeared, thus proving that they consisted of sulphide of tin. The bronze powder in this case had probably come from the press used in printing the mounts, which may have been used for stamping in gold previously. This obnoxious substance is so light, and clings with such pertinacity to any support, that once it has been introduced among any photographic materials I should say there is no remedy but to destroy the lot. As a preventive measure, I would say that presses used for stamping photographic mounts should never be employed for printing in gold.

Why sulphide of tin or bronze powder should destroy prints it is not easy to say, but perhaps the following is an explanation of the action. The sulphide may be very slowly oxidised, being converted into oxide of tin, sulphur being set free. This latter might then also be slowly oxidised, forming sulphurous, and eventually sulphuric acid, which would attack the metal of the image.

Whatever the explanation may be, the evil is a very real and great one, and I hope that the above remarks may give some assistance to photographers in their efforts to detect and banish the enemy.

C. I. BURTON, B.Sc., F.C.S., F.R.S.E.

ON DETECTIVE OR HAND CAMERAS.

As many readers may be contemplating the working of "detective cameras" during the coming season, and may wonder how they act, a few words from an old hand may be of some little service, and knowing the urbanity of our worthy editor, I will venture to give my experience, not, however, without a certain amount of reluctance, as some readers will in all probability have views different to mine; but, after all, there will be nothing new in this, as there is diversity of opinion in all things, and none more so than in the camp of photography. It is well such is the case, or else our existence would become monotonous; uniformity would create weariness, healthy competition would be gone, and our photographic literature would become defunct.

Finders.—I have observed among some amateurs a tendency to discard this—I consider—very necessary instrument, and I fear, in the majority of cases, dispensing with it means an increased production of unsatisfactory work, unless plates of larger dimensions are used than is intended to be shown in the trimmed prints produced from the negatives, as it would be almost impossible to get the picture properly centred. The result necessarily must be, in the majority of exposures, either too much or too little foreground, or the absence of that nice adjustment or balancing of parts which conduce to the production of true artistic effect, and which it would be impossible to judge of without seeing it first reflected in the finder. Who does not know the change in the composition of a picture by moving from any given position, even a few feet? In fact, such a method of procedure, to my mind, resembles a sportsman, who, at the moment he should be sighting his gun, shuts his eyes and takes a random shot. Granted then the finder is requisite, first carefully examine it and see it represents identically the same extent of view as the lens shows on the negative, using a piece of ground glass in the dark slide for that purpose in the usual manner, and should it—the finder—be found to embrace a more extensive view than is produced on the negative, carefully block out the excess.

A true vertical line ruled somewhere about the middle of the finder, and another placed horizontally about one-third from the base of the picture, will be found of considerable service, as the former, with the assistance of the outside edges, will ensure an upright picture, and there are always some leading features present which will enable this to be effectually carried out. The latter will be found serviceable for such subjects as shipping, or any other where the horizon line should be kept perfectly straight.

In taking street views or scenes in which there are many moving objects, avoid "firing" when conveyances or other prominent objects are traversing across the picture, or the result will be disappointing. Objects moving obliquely or parallel with the lens can generally be secured perfectly sharp, even with the shutter working at what might comparatively be described as slow speed. When you consider the grouping is satisfactory, again turn your attention without loss of time to the finder, observe the buildings are in true vertical position, with the assistance of the lines indicated, and granted you have not overlooked that sufficient foreground is included, "fire," but not before you are certain the camera is steady.

In this manner, after a little practice, you can secure a much larger proportion of successes than most workers, and it is much more gratifying on developing the fruits of your labour to find you have on the average about nine perfect results out of every ten exposures, all fit for enlargements, than it is to take chance shots, many of which would, but for some slight neglect, have made excellent pictures. I cannot sufficiently impress the advisability of keeping the camera perfectly steady at the time of setting off the shutter. Hold the camera with your left hand, preferably against your side, and on no account attempt to fire—however tempting the grouping may be—until you feel assured your body is perfectly still. Hurry to secure a subject you are not fully prepared for means certain failure.

We will now take up the question of the most suitable focus of lens for this special work. This is one on which much might be written. Both long and short foci have their special advantages, and having been accustomed to both, I have come to the conclusion that the shorter focus is the most suitable for those who can have but one camera, as there are several points in its favour, the principal ones being, the compactness of the apparatus—which most of us know how to appreciate—and, secondly, on account of the lens embracing a wider angle for a given size plate, and, consequently, greater suitability for embracing views of buildings of any magnitude, or street views, particularly those of limited dimensions, and most photographers know that frequently interesting pictures are to be obtained in such localities. For such work lenses of long foci would be practically useless. Although I have pleaded the claims of the shorter focus lens, the longer focus, under certain conditions, will give better re-

sults, but such are the exceptions, not the rule. The principal claim of the latter is its adaptability to secure groups in their natural positions, whether representing pleasure or toil, and the same remarks apply, as far as the grouping goes, to pastoral subjects—cattle, sheep, and such-like—as you have not to advance so closely as to draw special attention, and, therefore, owing to their being to some extent unconscious of your proximity, and, in the case of our fellow-creatures, of your manoeuvres, you obtain pictures which under other conditions would be almost impossible.

We will now touch on the question of focussing. Here and there we come across advocates of a "fixed focus;" true, every lens permanently fixed in a camera will give everything beyond a certain distance in focus, but more than this is desired by the vast majority of workers. Such advocates not only limit the scope of their lens, but absolutely forfeit many chances of admirable near-to subjects, and labour under other disadvantages of equal importance. In fact, they reverse the usual order of things, and give the operator the unnecessary trouble of focussing himself to suit the "fixed" ideas of the lens, instead of focussing the lens to suit his ideas and the view he would desire. I would strongly advise every one to have a camera that has a moveable focussing arrangement, and let him carefully mark various distances on the indicator, either himself or with the assistance of a friend, should he have any doubt about his ability to accurately decide where to make the marks. When testing, do not focus for the centre of the ground glass, but a little on one side, as a better all-over focus will be obtained, which will be apparent in the negatives. As for distances, start with, say, ten feet, then fifteen, twenty, thirty-five, mid-distance, and extreme distance. A little experience and occasional reference to the distances named will soon accustom the eye to accurately estimate them, and the cultivation of the faculty thus acquired will not be lost.

It would be a considerable advantage to the vast majority of photographers, and one that would be fully appreciated, if some means were devised which would simplify the method of reversing or changing the backs which carry the sensitive plates in "detective cameras," or, still better, if they were superseded and the plates changed without any troublesome manipulation. Those who are in the habit of practising this description of work are supposed to become indifferent to the scrutinising looks and remarks of bystanders, but it requires some tuition before the equanimity or assurance to change or reverse the dark slides under the public gaze can be acquired. In towns these drawbacks can, in a measure, be obviated by retiring to some secluded spot to effect the operation of changing. Seaside resorts are, however, most unfavourably situated in this respect. Here are to be found those seeking relaxation, sweetly enjoying the balmy breezes, or leisurely and aimlessly strolling about, who, having satiated their eyes with the natural surroundings of the neighbourhood, are on the alert for some trivial incident to enliven their curiosity. Having been discovered, you are at once an object of interest—to the juveniles a mystery. *Paterfamilias*, who on the seashore is to-day "secured" in some attitude conducive to the merriment of the youngsters, mysteriously develops a studied mien on your appearance on the morrow, having in the interval been taken into the confidence of one who considered it incumbent to convey the intelligence. To endeavour to secure negatives which might be described as "personal" is a system that deserves condemnation. The legitimate use of a "detective or hand camera" is to obtain views and groups, and not portraits of strangers, whose sense of propriety forbids them remonstrating with you—an unpleasant undertaking at best. Single figures, representing in varied characters labour and recreation, might be taken at all times. There is an endless number of subjects to be obtained in every direction without making the operator objectional. A little discretion is only requisite to get together a collection of negatives as miscellaneous in character as in interest.

In describing and recommending a short-focus lens as being in general the most useful, let it be understood that for a quarter-plate negative a five and a half inches equivalent focus is meant. Nemo.

ON THE VALUATION OF COMMERCIAL HYDROQUINONES.

[A Communication to the Photographic Club.]

You will no doubt recollect that at our last meeting I had the pleasure of informing you that I have, for some time past, been engaged in examining various samples of hydroquinone, with a view to establish some method enabling one to form an opinion as to the value of a given sample. I now beg to lay before the Club the results of my investigation, and I will deal more especially with two samples which were entrusted to me by members of this Club.

I had thought at first that hydroquinone, being essentially useful in photography, because of its reducing properties, the determination of the value of a given sample might be arrived at by endeavouring to find out what quantity of a standard solution of potassium permanganate would be decolourised by a weighed portion of the hydroquinone. I therefore proceeded to dissolve equal weights of both samples in water, to which a small quantity of sulphuric acid had been added. A titrated solution of permanganate was run into the solution, but I very soon found that there did not appear to be any satisfactory termination to the reaction. The final pink colour was obtained, but vanished soon, and could be reproduced at pleasure, vanishing again in approximately the same length of time as before. I think that this is mainly due to the fact that gradual oxidation transforms hydroquinone into quinone, and that the latter compound is not without action on the permanganate, especially in presence of the sulphuric acid, which is indispensable in the titration by permanganate. It is, of course, impossible to operate in an alkaline, or even neutral solutions, as these would darken so much through oxidation that the final rose tint of the permanganate would be obscured completely.

Schorlemmer says that by acting on hydroquinone by nitric acid, oxalic acid is produced, whereas quinone yields a mixture of oxalic and picric acids. It is not, however, stated whether one, two, or three molecules of oxalic acid are produced by this reaction, and if only one or two molecules, what the other products may be.

In order to ascertain whether the residue of the oxidation by nitric acid could be made use of as the starting-point of an analytical method, I weighed out a small quantity of each sample, and oxidised it with dilute nitric acid at first, and after evaporating it to dryness, it was twice thoroughly moistened with nitric acid, and evaporated to dryness each time. I must now allude to the two samples under consideration.

The first was a product sold as permanent hydroquinone, and is in fairly large crystals; very bright and lemon coloured. Under the microscope it showed magnificent prismatic crystals, well-defined and perfectly regular all through the slide. The prisms showed plainly a well-marked longitudinal striation.

The second sample was given to me as an entirely new preparation of hydroquinone. It is snow white, and shows the same crystalline form under the microscope as the previous sample, the longitudinal striation being also visible. The crystals, however, are very much broken up, and the sample seems to denote that very rapid crystallisation, and perhaps mechanical separation from the mother liquor, have been resorted to in its preparation.

I had the curiosity, also, to examine a sample of hydroquinone, bought when this chemical was much more expensive than it is now. This was also quite white, and exactly similar in appearance to the one just described, only very much better crystallised. Having now described the physical appearance of the two samples, I will revert to the results afforded by oxidation by nitric acid. The white sample gave remarkably constant results. The oxalic acid obtained titrated by permanganate seemed to show that one molecule of hydroquinone only yields one molecule of oxalic acid. I shall revert to this later on. The yellow sample, designated as "permanent hydroquinone," on the contrary, yielded figures differing so much that it did not seem possible to place any reliance on them.

I then proceeded to make an elementary analysis of both samples, and I must state that this compound requires a good deal of care if good results are to be obtained by burning it in copper oxide. A high temperature is requisite, and even then there is a tendency to molecular deposition of carbon. I resorted in each case to a stream of pure oxygen through the combustion tube, after the process seemed complete in the ordinary way. The results were as follows:—

	Permanent Hydroquinone.	White Hydroquinone.
Carbon.....	47.755	57.300
Hydrogen	6.745	6.196

The composition of hydroquinone, calculated from its formula, would be—

C ⁸ H ⁶ O ²	Carbon.....	65.454
	Hydrogen	5.454
	Oxygen	29.092
		100.000

It will be noticed at once that the results of both analyses differ considerably from the actual composition. However, the amount of hydrogen shown by the analysis is greater than what it should be, and this excess may be due to water of crystallisation.

Admitting this, and calculating the amount of hydrogen required for the quantity of carbon found, the two analyses show as follows, the oxygen in each case being determined by difference:—

	Permanent Hydroquinone.	White Hydroquinone.
Carbon	47.755	57.300
Hydrogen	3.716	4.770
Oxygen	21.259	25.095
Water.....	27.270	12.835
	100.000	100.000

By calculating from these figures the composition of the samples, after abstracting the water, it will be seen that the hypothesis of the presence of water of crystallisation is correct, the figures being in close agreement with the theoretical ones.

	Permanent Hydroquinone.	White Hydroquinone.	C ⁸ H ⁶ O ² .
Carbon	65.592	65.596	65.454
Hydrogen	5.140	5.481	5.454
Oxygen	29.268	28.923	29.092
	100.000	100.000	100.000

The two samples would therefore consist of—

	Permanent Hydroquinone.	White Hydroquinone.
Hydroquinone	72.730	87.165
Water	27.270	12.835
	100.000	100.000

The white sample therefore would appear to be the better of the two.

I will now refer again to the transformation of the white sample into oxalic acid. One gramme of this, oxidised three times by nitric acid, yielded by titration .600 of a gramme of oxalic acid. Theoretically, one gramme ought to give .673, if only one molecule of oxalic acid is produced, the remainder of the hydroquinone being transformed into compounds which have no effect on the permanganate solution. The discrepancy in the yield of oxalic acid would amount to 11.7 per cent. of water in the sample. The composition would then correspond to—

	Sample.	C ⁸ H ⁶ O ² .
Carbon	64.600	65.454
Hydrogen	5.434	5.454
Oxygen	29.966	29.091
	100.000	100.000

Of latter years great importance has been given to the determination of the melting point of organic compounds. Schorlemmer gives 165° centigrade as the melting point of hydroquinone. The two samples afforded the following results:—

	Permanent Hydroquinone.	White Hydroquinone.
Melting point	172.5° C.	165.25° C.

A member of the Club having inquired whether the statement that the permanent hydroquinone contains sulphite of sodium is correct, I tested the sample both for sulphur and for fixed alkali. The latter is absent, as the sample burns without leaving any residue. I found one quarter per cent. of sulphur, and no trace of sulphurous acid, so that the sulphur must be due to sulphuric acid. The quantity being very small, sulphuric acid may be a simple impurity.

ADOLPHE M. LEVY, C.E.

ART IN RELATION TO PHOTOGRAPHY.

[A Communication to the Photographic Club.]

ART is, without doubt, a happy theme to dwell upon, but many before to-night have made shipwreck of it and themselves ridiculous, and I have a sort of presentiment that before reaching the end of my short paper I shall find myself rowing pretty much in the same boat. To the oft-recurring and still vexed question as to what really constitutes art, I do not intend to make anything more than a passing allusion, for I take it that he indeed would be a bold man who would dare to come forward with an avowal that he was prepared to offer a comprehensive and satisfactory explanation of the problem. I think myself quite safe, however, in hazarding the assertion that never before in the world's history has the faculty of art been developed to such an extent, or such extensive demands made upon its resources, as at the present moment; and I will even venture a step further—this is ticklish ground I know—and say that no more powerful auxiliary has been or is now operating in the development of this result than photography. Man is, by universal consent, a religious animal, and I maintain that he is also an art animal—by that I mean that he is a being constitutionally endowed and inherently imbued with art faculties, robbed of these he would at once descend to the lowest level of the brute creation. Art and civilisation are twin sisters, inseparable and incomprehensible, springing into existence simultaneously, and at the moment when our first parents committed their first sin art played the leading character of that mystic programme, and the first creation of genius was the result; and at what a priceless value would that relic of ancient art, that historical apron of fig leaves, be held if it could only be found and identified! and who knows but what even yet some enterprising antiquarian, who would not think of allowing such a trifling thing as time to thwart his purpose, may discover it hid away in a lumber room belonging to the antediluvian ages, and bring it before the admiring gaze of the sometimes too credulous worshippers of ancient art and consecrated relics of antiquity.

It may be fairly argued that the age we live in is essentially a scientific one, that, however, affords no reason for supposing that the art instincts of man are blighted and impaired; on the contrary, there is abundant evidence to prove that they are not only in existence, but in active exercise. Art has

independent rights of her own; she is, I was going to say, her own creator, and I don't know that I should be very far wrong if I did; she is her own nurse, her own teacher and demonstrator, and she even feeds and flourishes upon her own creations. Now I really don't know what else there is you could say so much for. The universality of art is an established fact. It is a somewhat significant circumstance, and it frequently happens that the very productions which are regarded by some as crowning efforts of genius are looked upon by others with feelings akin to pity as being the emanations of a disturbed balance of intellect, or what is even more damning, denounced as fraudulent impositions to catch the nifty; pity 'tis possible to make art subservient to such artfulness. There seems to be a desire on the part of some who take an active interest in photography to circumscribe its art capabilities, to hedge it in as it were, within the narrowest possible limits, to fix by figures and measurements what shall and what shall not be ascribed to art. This, I think, is greatly to be deplored—why? than that it would be no more absurd to attempt to give us the number of square miles contained in space, or a method by which to calculate how many years go to make up eternity. The universality of art prohibits entirely any such system of treatment, and precludes the possibility of its being contained within any limits which man can prescribe. Where, then, shall art be found? Let me tell you. Not only in the great centres of civilisation, where its trophies are congregated together; not only at the seats of learning, where the highest order of intelligence is naturally looked for; it may also be found in yon almost deserted old drifftway, actuated by its genial and occult influence that poor little peasant boy, who in his ignorance never perhaps heard the name of art, and has no idea of its existence. Regard him for a moment with his rusty, old billycock hat and red woollen comforter twisted carelessly round his neck. He is breathing, although unconsciously, the very atmosphere of art, whilst surrounded with its choicest creations. See! he goes to the hedge-row and provides himself with a stick which somehow he has taken a fancy to, and now—

"He perches himself on the top of a gate,
And whilst murmuring a rustic lay,
He applies his old knife to that hickory stick,
And he whittles and whittles away."

And what is the result? Why, he has produced, in a humble form I admit, a veritable work of art; he has carved some original devices in the soft bark of that stick which may possibly become historical, and be handed down as an heirloom in his family. Ignorant of the fact himself, his art instincts have been at work, oozing out at his very finger ends. This is no unfair stretch of the imagination; it is a picture true to the life. From such and similar haunts have come the brightest satellites that ever graced the firmament of art. Although art is an innate quality of human nature, capable of further development, it does not necessarily follow that it can be brought to a high standing of excellence in all its possessors, neither is it essential that one should be able to produce results in any of its branches to prove himself a repository of art instincts; he may have true feelings of art, yet lack altogether the mechanical ability to put them into tangible shape or form. One may have his very soul aflame with poetic fire, and yet be utterly unable to give it expression.

(To be continued.)

WM. CONN.

LORD RAYLEIGH ON EXPERIMENTAL OPTICS

II.

Last Saturday, at the Royal Institution, Lord Rayleigh delivered the second of his lectures upon the above subject, and said that Herschel in his spectrum experiments worked with sunlight, and that Professor Tyndall in his researches worked with the electric light, which is richer in the heating and ultra-violet rays. Perhaps there is not so very much difference in these two kinds of light, but sunlight has to pass through our atmosphere and perhaps through other media before it reaches our eyes. The more refrangible rays of the spectrum have little heating power, but they have an influence on certain photographic preparations, and to these rays the phenomena of fluorescence are due. These phenomena were first explained by Professor Stokes, if not first seen by him. To exhibit them in lecture experiments a very bright spectrum is desirable; Lord Rayleigh obtained this by placing the slit nearer to the light of the arc lamp than usual, and by employing a better lens than usual; he then showed how paper painted with sulphate of quinine became self-luminous in the invisible part of the spectrum beyond the violet, also that a glass trough filled with solution of sulphate of quinine and placed in front of the electric lamp cut off all the rays of the spectrum which produced the fluorescent effect just mentioned. Herschel found that a solution of sulphate of quinine placed in sunlight emitted a bluish light near the surface of the liquid; he also found that light passed through one trough of the solution could not afterwards excite the luminosity in a second trough of the solution; he called it "epipolised light." At this stage of the matter Stokes took it up, and explained that it was the conversion of invisible into visible radiations; he entitled his original paper on the subject, *A Change in the Refrangibility of Light*. Stokes found an immense number of substances to be capable of producing this effect, and that they gave a great variety of appearances; he

also found that the light produced was less refrangible than that to which it owed its origin. He found that ordinary glass is by no means entirely transparent to these ultra-violet radiations, and that some of the most refrangible it cuts off entirely; he found quartz to be much more transparent than glass to these rays; he also employed reflexion from metals in his experiments, and discovered that the real spectrum is enormously longer than that transmitted by glass.

The phenomena of fluorescence can be exhibited by means of resucine; the pure substance need not be used, for it suffices to take some pump water, and merely to stir in it some pieces of the bark of the horse chestnut; such an infusion is quite good enough for the optical purpose. Leaf green, or chlorophyll, extracted by alcohol from the green leaves of plants forms a dichroic solution; in small thicknesses it looks green, and in large ones red; it also exhibits a remarkable blood-red fluorescence. Fluorescence may be distinguished from dichroic effects by the fact that the light in the former case shines in all directions, and is seen when the liquid is looked at sideways. A comparatively new coal-tar dye, uranine, gives a beautiful green fluorescence. Lord Rayleigh illustrated this by dropping a few grains of uranine into a glass trough filled with water, through which a concentrated beam from the electric lamp was passed; an exceedingly beautiful green fluorescent effect resulted.

Becquerel, said the lecturer, investigated phosphorescence, which is a kind of exaggerated fluorescence; that is to say, the luminous effect does not cease when the original cause is cut off; he also invented a clever instrument, the phosphoscope, whereby he could measure short durations of phosphorescence in a substance; he could measure, in fact, from $\frac{1}{100}$ to $\frac{1}{1000}$ of a second.

The speaker next dealt with the velocity of light, and told how it was first discovered by Römer, a Danish astronomer, by means of the eclipses of Jupiter's moons: these eclipses seem to occur later than their proper time when Jupiter is on the opposite side of the earth's orbit; in fact, light takes sixteen minutes thirty six seconds to traverse the diameter of the earth's orbit, consequently light is about eight minutes coming from the sun to the earth. He then explained how Foucault and Fizeau measured the velocity by instrumental means. Thus, he said, light is not instantaneous. Laplace proved by calculation that gravitation, if not absolutely instantaneous, is enormously greater in speed than light, yet, said the speaker, gravitation probably has a velocity. Within the last ten years two American observers have made some splendid experiments to determine the velocity of light.

Michelson, 1879.....	299 910 kils. per sec.
" 1882.....	299 853 " "
Newcomb, 1882.....	299 860 " "
Cornu (Lisings), 1878.....	299 990 " "

He had added the latter determination as one of the best of the older ones. He considered the skill of Messrs. Michelson and Newcomb to be remarkable, and that if Europe does not look out, it will soon be eclipsed by American experimentalists. He then proceeded to describe the nature of waves of light, their lengths, amplitudes, and times of vibration.

Our Editorial Table.

A NEW PRINCIPLE IN HELIOCHROMY.

By FREDERIC E. IVEY, Philadelphia.

MR. IVEY is well known as being one of those to whom photography is indebted for its power of reproducing colours in their adequate gradations of light and shade. The work before us is not devoted to isochromatic or orthochromatic photography, but to *heliography*, or the production of a photograph in the colours of nature. The idea favoured is one based on the suggestion originally made in our columns by Henry Collen, that three negatives be taken each by the action of red, yellow, and of blue light, and transparent colour prints be made by printing from each pair of these negatives in combination, afterwards superimposed on a white surface. We shall afterwards take occasion to speak at greater length concerning Mr. Ivey's valuable researches.

DICTIONARY OF PHOTOGRAPHY.

By E. J. WALL.

London: Hazell, Watson, and Viney, Limited.

It not being the first time that a *Dictionary of Photography* has been noticed by us in these pages, we may be permitted to hope that Mr. Wall (or his publishers) has "squared it" with the proprietors of the copyright (as regards title) of the original *Dictionary* which is still in force, and to the existence of which work a few words of acknowledgement would have been graceful, for it was edited or compiled by a man (Thomas Sutton) who was a giant, although perhaps unknown, even by name, to many of the photographers of 1880. In looking over this the third volume bearing the above name which is now on our shelves, we discover many differences which notably arise from the advance made between those days and the present time.

In this dictionary Mr. Wall shows that he has been an assiduous student of contemporaneous literature, and has noted much that is excellent; but in optical matters the first page to which we referred showed that he had not quite grasped the meaning of any existing writer on the subject, owing, presumably, to his not having made an intimate practical acquaintance himself with this branch. As an example: if one thing is better known to the users of lenses or has been more insisted on by opticians, it is that one main function of the diaphragm or stop is to accentuate the definition of the oblique pencils of light, the axial rays in any lens corrected for photography being almost invariably able to take care of themselves; yet here we find the employment of diaphragms recorded thus: "They are used to prevent the transmission of any but those rays which are parallel to the axis of the lens." It goes without saying that, if such were the case, no covering power would exist in any lens whatever when a diaphragm was used. We do not know what was in the author's mind when he penned such a sentence, but we advise him for his own sake to mark it for being deleted in any subsequent edition of the work, should such be called for. We feel well assured that he desires his little volume to be ultimately reliable.

There are other shortcomings, such as attributing the flare spot to the Iria diaphragm, &c., which a greater experience with practical photography will soon enable the compiler to rectify; but with such exceptions the *Dictionary* is calculated to be useful to many.

The compiler says in his preface, "I shall feel grateful if those finding errors in calculations or formulæ will communicate with me through the publishers, in order that in subsequent editions corrections may be made." The book, as a whole, is one which will be useful and suggestive to the inexperienced photographer, for whom it is mainly intended.

SOUTH AFRICA AND HOW TO REACH IT.

"To reach it" of course by the "Castle" line is at once understood when we say that the work above named (written by E. P. Mathers, F.R.G.S.) is sent to us by Donald Currie & Co., the managers of the "Castle" line of ships trading between London and South Africa.

There are numerous photographers in this country who are now seeking for "fresh fields and pastures new" in which to develop their industrial proclivities. This work does not afford any information as to their prospects in that peculiar field with which this JOURNAL is so intimately associated; but if any photographer goes to that country and can resist the temptations of the diamond and gold fields of the locality, we doubt not that, roughing it for a time, he will be eventually be enabled to sing of that *otium cum dignitate* to which so many aspire.

FLEMING'S EXPLOSIVE GAS TESTER.



A DESCRIPTION of this instrument was given on page 100 of our number for February 15. Since that time we have received the instrument itself from Mr. J. H. Steward, its maker. Its construction is shown in the above cut. To test the suspected gas the reservoir is connected with the inlet pipe on the left, the vessel having been first filled with water. When the oxygen issues from the burner its purity is ascertained by its behaviour when made to play against a piece of smouldering brown paper, as described by Mr. Baker in the article on the page above referred to.

LANTERN SETS AND LECTURES APPERTAINING TO AMERICA.

By F. York & Son, 87, Lancaster-road, W.

It is now very easy to go abroad and see the world without stirring from one's fireside, and no one has contributed more to this state of

felicitous travelling than the firm—especially its senior member and founder—before named. Before us are a series of views, most of them taken by Mr. F. York on the occasion of a recent visit to the United States of America, printed as lantern transparencies, for which purpose the negatives were specially taken. With these we have also suitable lecturettes compiled to afford a brief explanation of each subject. It is problematical whether even any resident in New York, who can "blaze away" whenever it suits his ideas to do so, has a larger or better selected set of views of that city than those taken by Mr. York during a brief stay in the Empire City; and so with other localities in the New World, from Maine to California. The subjects are selected with a view to showing on the screen with effect, the quality of the slides being unexceptionable. In the lecturettes the information given is accurate, ample, and telling.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3309.—"Improvements in Photographic Cameras for use with Wide-angle lenses." W. J. SMITH.—*Dated February 25, 1889.*

No. 3347.—"Perforated Books for Exhibiting and Selling Photographs." H. W. TAUNT.—*Dated February 25, 1889.*

No. 3349.—"An Improved Slipping Frame, to be made in any kind of Wood or any kind of Metals, for Magic Lantern Slipping Slides with Two or Three Glasses pulling from One End." J. GREEN.—*Dated February 25, 1889.*

No. 3369.—"Machine for Casting Gelatine Dry Plates." Complete specification. M. KATTENTIDT.—*Dated February 25, 1889.*

No. 3398.—"Improvements in what are known as 'Instantaneous Photographic Shutters.'" J. H. TAYLOR.—*Dated February 26, 1889.*

No. 3465.—"Improvements in Processes for Reproducing Pictures and Designs." H. J. LE BOULCH.—*Dated February 26, 1889.*

No. 3532.—"Improvements in Apparatus for Timing Photographic Exposures and Taking Observations." T. YOUNG.—*Dated February 27, 1889.*

No. 3537.—"An Improved Arrangement of Mirrors and Structures for Obtaining an Optical Illusion." J. E. TAYLOR.—*Dated February 27, 1889.*

No. 3541.—"A New or Improved Photographic Camera." H. HERBERT.—*Dated February 27, 1889.*

No. 3542.—"A New or Improved Changing Back for Photo-cameras." H. HERBERT.—*Dated February 27, 1889.*

No. 3719.—"Improvements in Illusion Devices." T. HOWELL.—*Dated March 2, 1889.*

PATENT COMPLETED.

A PROCESS OF PHOTOGRAPHING IN COLOURS.

No. 4537. JEAN BAPTISTE GERMEIL BONNAUD, 39, Stroud Green-road, Finsbury Park, Middlesex.—*March 24, 1888.*

By this invention, which is simple, I am enabled to produce a painting from photographs which it is next to impossible to distinguish from an ordinary painting done by hand in the usual way.

According to this invention I proceed as follows. Having obtained positive and negative transparent proofs of the picture to be coloured, I take a solution of—

Distilled water	200 cubic centimetres.
Solid glucose	40 grammes.
Chemical gum	24 "
Bichromate of potash (very pure)	24 "
Liquid ammonia (pure) 6 drops specific gravity 0.880.	

Instead of the glucose other similar organic matter may be used, such as honey, sugar, treacle, &c.

The solution prepared as above is carefully filtered and spread on a sheet of well-cleaned glass or other substance non-porous, and having a polished surface, which is then slightly heated in any suitable apparatus until it is no longer sticky or tacky, in fact, until the finger may be passed across it without feeling a stickiness; it is then exposed to the action of light under the photographic transparent positive, and when the edges of the glass (which should exceed the size of the picture by about half an inch) have become dark brown from the original yellow colour the picture is ready to receive the colours, as hereafter described. The glass is then taken from the printing frame in which it was placed with the positive proof for exposure to the light, as above described, and then the following series of novel and curious transformations commence.

Having selected the colours which are required in the picture according to the requirements of the picture, that is to say, those tints which are specially applicable to the subject of the picture, as for instance, in the case of a portrait of a negro I begin with dark brown or brown-black tints, whereas for the portrait of a white man I begin with a pinky grey colour according to the depth of colour required; again, if it is desired to copy the picture of an old master, it is necessary to begin with darker tints than in copying a more modern picture, all of which the operator will soon find out by practice.

The necessary colours—which should be vegetable colours in powder—are prepared in dishes, and the dusting on is effected with a large-sized brush made of soft, fine hair, commencing with the dark shades and following with the half tints; the operation of dusting on the colours should be performed as rapidly as possible, the glass (which has now the picture upon it, but without any groundwork, and which hereafter I call the picture) is then again dried, but with less heat than before (in warm, dry climates this second drying is not necessary), and the picture on the glass is again exposed to the light, but this time under the negative photographic proof, which must of course be reversed

and placed on the glass so that the subject may correspond. This is what is conveyed by the provisional specification, where it is stated that a proof of the negative is laid over the proof of the positive.

The picture obtained by the first dusting protects the shades, and the reverse of the shades so obtained from the exposure under the positive is obtained from the negative, and by a second dusting after this latter exposure the different degrees of tints are obtained necessary to complete the picture—this is done by dusting on the more light colours representing the lighter shades in the picture, such, for instance, as flesh colour. The juxtaposition must be absolutely correct if the negative and positive are obtained from one another.

When the picture has undergone the two exposures aforesaid, I pour on the picture a mixture composed of boiled linseed oil and varnish dissolved in ten times their weight of spirits of turpentine, which is allowed to evaporate; any details, such, for instance, as a gold chain in a portrait which may be wanting must now be painted in by hand from oil colour in tubes as is usual. The picture, thus finished, is removed from the glass by means of a collodion composed exactly as follows:—

Guncotton.....	2 grammes.
Alcohol at 62°.....	40 cubic centimetres.
Ether at 40°.....	60 " "

This collodion is poured on and is then left for some minutes to evaporate, and then I proceed as follows in order to transfer the film with the picture from the glass to the canvas, wood, or other desired material. I steep the glass carrying the picture in water to get rid of the organic matters and the chrome salts, and when these substances are completely dissolved I steep (for a minute at the most) the glass and picture in another bath which will subsequently destroy the collodion film; this bath is composed as follows:—

Water.....	1 litre.
Common soap.....	20 grammes.
Chloride of lime.....	20 " "

This solution I prepare hot and use cold, and for the purpose of removing any particles of chloride of lime I carefully filter same through flannel before using; I then wash in fresh water the glass carrying the picture, and the film with the picture on it is then transferred on to canvas, wood, or other material. This is done by placing the material on to which the picture is desired to be transferred in a bath of water and by steeping the glass with the film (carrying the picture thereon) downwards; the film will become detached from the glass, and sinking through the water on to the canvas, wood, or other material, will adhere to it, and the glass is taken out of the water when the film has become detached from it and sinks.

Should the picture be required on wood or a material of less specific gravity than water or on a flexible material such as canvas (which should be stretched on a frame), this material must be weighted so as to sink in or lie at the bottom of the bath.

I can obtain pictures by the use of a positive proof only, and painting the same on the provisional support in the manner above described after the oiling and dusting, which is quicker and more simple, but the results are less vigorous and not so true.

I would also remark that when I wish to imitate an oil painting I first paint the material, on to which the picture is required, all over with white paint so that when the picture is transferred thereon it shall show the brush marks as in an ordinary hand painting done in oil.

When I wish to imitate water-colour paintings, after the two exposures and dustings hereinbefore described, I dispense with the linseed oil and varnish and oil colours and transfer the picture immediately after the exposures and dustings direct on to the desired material by the aid of the collodion film, as above described.

After the picture is finished it is varnished in the usual way if to represent an oil painting.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The alternate use of the positive and negative proofs to produce a complete painting with the aid of light, substantially as described. 2. The use in some cases of a positive only and painting on the same provisional support, substantially as described. 3. The process for imitating an oil painting, substantially as described. 4. Removing at one operation, and transferring the complete picture to canvas, wood, or other material prepared for the purpose, substantially as described. 5. The process hereinbefore described for the production of paintings.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 11.....	North Middlesex Club.....	The Iron Room, Stroud Green.
" 12.....	Great Britain.....	54, Pall Mall East.
" 12.....	Bradford.....	55, North Parade.
" 12.....	Derby.....	Society's Rooms, 3, Derwent-street.
" 12.....	Manchester Amateur.....	Manchester Athenæum.
" 12.....	Newcastle-on-Tyne & N. Counties.....	Mosley-st. Café, Newcastle-on-Tyne.
" 12.....	Bolton Club.....	The Studio, Chancery-lane, Bolton.
" 13.....	Photographic Club.....	Anderson's Hotel, Fleet-street, E.C.
" 14.....	Birkenhead.....	Free Public Library, Hamilton-st.
" 14.....	Cheltenham.....	
" 14.....	Manchester Photo. Society.....	31, George-street.
" 14.....	London and Provincial.....	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

On Thursday night, last week, at the ordinary weekly meeting of the above Association, held at the Masons Hall Tavern, City, London, Mr. A. Hadlon presided.

Mr. J. J. Briginshaw exhibited one of Zaehndorf's self-binding mounts issued by the Eastman Company.

A question in the box was:—"What is the cause and cure of the enclosed failure in enamelling?"

Mr. WILLIAM ENGLAND said that the gelatine did not adhere to the collodion.

Mr. A. COWAN thought that the gelatine solution had not been strong enough, and that the print and glass had not been brought together beneath the liquid. Enamelling was not conducive to the permanency of the prints.

Mr. W. H. PHRESTWICH said that some kept well, but, as a rule, enamelled prints faded more rapidly than others.

Mr. F. P. CEMBRANO stated that he had just been photographing in Spain; some of the subjects had been very difficult, such as arches with brightly illuminated objects beyond; he had had to stop down the lenses to get detail, and to use backed plates thickly coated; he had to develop nearly every negative with the brush, and to take from twenty to thirty minutes over the work. He met a German photographer there, who said that he had been photographing in France without much hindrance until he went near the frontiers, where they would not even let him take pictures of the insides of the cathedrals. Four good negatives a day were all he (Mr. Cembrano) could get over difficult subjects; he wished that he had had one of the class of lenses with him that covered more than they were advertised to cover, as it would have enabled him to make better use of the rising front of the camera.

Mr. W. H. HARRISON asked if life were safe in certain districts in Spain remote from towns, also whether Madrid were not livelier than Paris, and what was the quality of Spanish photographic work.

Mr. CEMBRANO replied that life was as safe in Spain as elsewhere. The quality of what photographic work he had seen in Spain was "very average," but neither London nor Paris could beat Madrid in photographers' show cases; they were of a gorgeous description, well got up to attract the public. The Madrid people are lively enough to go to bed at about three in the morning and get up at three in the afternoon; the amusements are plentiful and cheap; a stall at the theatre costs about a shilling an hour. One of the five Captain-Generals of Spain died while he was there and had a great state funeral; in the procession were ministers and officials, and from ten thousand to twelve thousand soldiers. He took some views of the funeral and would probably exhibit them to the Association at a future time. The amateur element is little developed in Spain. The photographic dealers' shops are as well supplied as any in London, but the prices are enormous, sometimes four or five times higher than in London. He could not get English plates there, which surprised him, as they could be sent there by steamer for a mere trifle; he supposed there was some import duty. In one place he found some English half-plates at fourteen francs a dozen, and some French ones at five francs. Sometimes he was supposed to be an American, sometimes an Englishman; occasionally he was recognised as a Spaniard, and a Spaniard he was. On the Spanish railways only thirty kilogrammes of luggage are allowed free, and the carriage of anything over is enormously expensive; he had but three or four pounds' weight over, yet occasionally had to pay as much as ten shillings excess. The railway travelling in Spain is good, but the lines are single ones only; the first-class carriages are well warmed.

Mr. ENGLAND exhibited some flash light pictures, and took two of the assembled meeting by means of three flash lamps fired off at once.

CAMERA CLUB.

On Thursday, February 28, Rev. J. PERKINS, M.A., read a paper on *Lenses*. Dr. G. Lindsay Johnson was in the chair.

The lecturer treated of depth of focus, the cause of flare spot, the relative rapidity of different forms of lenses, and other points of interest, giving mathematical formulae, and explaining the subject by diagrams, negatives, prints, and various forms of lenses, some of which were kindly lent for the occasion by Messrs. Hinton & Co.

A prolonged discussion followed, Mr. Taylor, of Leicester, and Mr. W. E. Debenham adding some remarks upon the subjects treated by the lecturer. Others who spoke were Messrs. Elder, Lionel Clark, Davison, Ferrero, and the Chairman.

On Thursday, March 14, a lantern exhibition will be given at the Club. Meeting at eight p.m.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

At the meeting of this Club on Monday evening, the 25th ultimo, Mr. H. Beckett read a paper on *Posing and Lighting*.

In introducing the subject, Mr. BECKETT said:—

When posing and lighting are finished and well done the artistic portion of photography is virtually at an end, the rest is merely chemical and mechanical. What I more particularly intend doing this evening is to give you some idea of things to be avoided, leaving the rest to your own individual tastes.

Having described his studio as being a portable erection of wood and glass twenty feet long, by ten feet wide, by nine feet high, and the curtaining of it, he continued:

To be a good operator it requires a quick, artistic eye, that is to say, one that can at a moment's glance see which is the most pleasing style to give each sitter; and I would caution you against having a fixed set of poses into which to place your subjects indiscriminately. It is, to a certain extent, a gift, that of being able to pose. With regard to *eigrette heads*, the first point to be considered is, which is the better side of the face? (for it is, I think, generally acknowledged that nearly every face has a better side). In nine cases out of ten you will find the left side takes best, because on that side the features are, as a rule, more even; the nose, for instance, almost always inclines slightly to the left. Some writers go so far as to say that the eyes are not level, and I am inclined to believe this to be (with few exceptions) the case. Always be most particular to have the shoulders level. I think nothing looks worse than one shoulder appearing lower than the other, especially when the body faces the camera. It is advisable to turn the head in a different direction to the body, as that gives life to the picture—keeping in mind, of course, the fact that this, carried too far, gives the

after the appearance of having a stiff neck (a very objectionable feature in a picture). A great deal might be said about poisoning the head, but time forbids, and I must therefore leave it, as I said before, to the good taste of the operator. Never allow the camera to be tilted too much, looking down upon your sitter, as it were, or vice versa. Those of you who use tripods must, if possible, use a high chair, so as to keep the lens as near on a level with the head as possible. When looking at the sitter always place your eye on a level with the lens, not forgetting that looking down from a height gives a different view than that which your lens lower down portrays.

Mr. Beckett then explained the necessary lighting, with a sketch of the studio and curtains, showing how to obtain the required light, namely, one that "brings out the features in bold relief;" that, as he described, being the object of lighting. He continued:

In half and full length portraits always, where possible, allow the sitter to arrange himself or herself as much as is practicable, just making the necessary alterations and improvements afterwards.

He then answered numerous questions, and showed some exceptionally fine specimens of Rembrandt's lighting for which he explained.

Then followed a short discussion on drawing-room and outdoor portraiture.

Mr. F. L. FRIER, in proposing a vote of thanks to Mr. Beckett for his paper, hoped that a few observations from an art student would not be unacceptable. He could not help feeling that the qualities of the average photograph, after all the strictly chemical difficulties had been successfully overcome, were very far removed from those exhibited in the works of the great painters of the past and present. No doubt the absence of the distinct charm of colour went far to account for the difference, but an hour spent with the masters of the Venetian and Flemish schools would convince any one that other causes contributed to render the great majority of photographers wanting in artistic interest. He was pleased to notice that Mr. Beckett had made some reference to the so-called Rembrandt effects, because there was, no doubt, much to be gained by studying the works of this great master of light and shade. A very great deal of the success of some of the favourite portrait photographers of the present day may be attributed to their acceptance of the principles illustrated by his works—as, for instance, the enlargement of a portrait of Cardinal Manning, on view at Mr. Van der Weyde's studio. Such productions show a distinct advance in the art. What has been done once may be done again, therefore let the members of this Club emulate such works as these: for, judging by the specimens we see upon the table, there is every promise that by a careful study of the means employed by great artists, we may be able, each in his own way, to produce results excellent at least in their individuality.

Next meeting, March 11.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held on Thursday, February 28, at the new rooms, Crescent Chambers North, 3, Lord-street,—Mr. A. W. Beer in the chair.

The PRESIDENT, before proceeding with the business of the meeting, said:—

I have a sad and distressing duty to discharge this evening. Since our last meeting I have seen laid in his last resting-place William Page Riley, one of our most promising and enthusiastic members, and I am glad that this Association, whose welfare he had so much at heart, was not unrepresented on the sad occasion. To all who knew him he endeared himself by his unselfish nature and pleasant grace. It is not necessary for me, nor would it be seemly, to do more than refer to the irreparable loss of those intimately related to him, but to us, his fellow-members in this Association, colleagues in the Council or various committees, and particularly the House Committee of these rooms, his vacant place appeals most affecting to our hearts and minds, so recently was he associated with us in the work of the Association and the preparation of these premises. The Council have passed a resolution, embodying the feelings of the members, to be forwarded to his sorrowing family, which it is not requisite for me to formally put before you, as I am fully sure it meets your wishes in the matter.

Messrs. A. E. Chevalier, H. S. Craven, R. B. Daly, A. Fraser, B. Mackerell, W. Mollath, H. Poulton, S. Parry, W. A. Roberts, H. H. Williams, and W. D. Williams were elected members of the Association.

The PRESIDENT acknowledged with thanks the receipt of a "Chairman's mallet," of a very unique and useful pattern, presented by Mr. B. J. Sayce. He then gave a hearty welcome to the members on this the first meeting in the new rooms, expressing the hope that although the opening ceremony was to a certain extent informal and homely, yet the members of the Association could now feel "at home," and trusted that the possession of Club premises would conduce, not only to the rapid increase and prosperity of the Association, but also to the comfort and pleasure of the members. A proposition was made some eight or nine years ago to secure Club premises, but this was not attainable until now, as the Council were firmly resolved not to run the Association into debt or pledge future resources. Thanks to the House Committee and to Mr. Day, their valuable and painstaking Secretary, a number of works of art have been secured for the adornment of the room from various gentlemen well known for their artistic productions.

The elections of the Council to fill vacancies were confirmed, viz., Mr. P. Lange to be Vice-President, in place of Mr. H. M. Atkins resigned; Messrs. Tyerman and C. A. Timmins to the Council, in place of Messrs. Riley and Lange. Mr. H. N. Atkins was elected an honorary member, and a vote of thanks to him for his past services was awarded.

The medals were then presented to the gentlemen who were successful in the annual price competition, as follows:—Silver medals: Messrs. T. B. Sutton, A. W. Cornish, C. W. Huson, B. Sc., and Paul Lange. Bronze medals: Messrs. D. Cunningham (2), T. K. Glazebrook, and A. W. Beer.

The President announced that the presentation prints were received, and would be ready for distribution at the rooms on and after Tuesday next.

Letters were read from the "Liverpool Gynnasium" asking for assistance in the way of photographic prints and lantern demonstrations at their Fancy Fair; from the Boston (United States) Camera Club, offering to present a series of views, entitled *Illustrated Boston*, to the Association, in trust, which was accepted with thanks.

Circulars were also distributed relating to the American Exhibition, Gaedcke's lamp, Vlac's exposure table, &c.

The Rev. T. A. Bartlett, M.A., then read a paper entitled, *A Month in Normandy and Brittany*; and Mr. Jos. Earp read a paper on *Ten Days in Holland and Belgium with a Hand Camera*, illustrated by numerous slides.

The PRESIDENT strongly recommended members to secure a copy of the *English Magazine*, in a recent number of which was an able article on Normandy and Brittany, with beautiful illustrations.

Mr. Roberts showed two stereoscopic glass slides, prepared in 1865 by the original collodio-bromide process, as published by Mr. Sayce in 1864, of rare merit and as brilliant as when first made.

Mr. Kenneth Bean exhibited a print of the *Dance of Death*.

Mr. Rogers exhibited a compact detective camera, holding six plates and set of lenses.

Messrs. Atkinson, Sharp, and Hitchmough showed a number of photographic novelties.

BATH PHOTOGRAPHIC SOCIETY.

A MEETING was held at the Royal Literary and Scientific Institution, Terrace-walks, on Wednesday, the 27th ultimo,—Mr. Austin J. King, Vice-President, in the chair.

The CHAIRMAN, in opening the proceedings, remarked that the whole world might be placed under the category of those who understood photography and those who did not, and the object of the Society was to diffuse the knowledge of photography among the latter. We have here (said the Chairman) Mr. Talbot, who, very early in the history of this young Society, came forward and promised us his assistance. This was a great help to them, for his father, who was an honour to this country, was, for all practical purposes, the inventor of photography as at present practised. Mr. Talbot had presented the Society with about fifty of the very earliest photographs. These, owing to their great historical value as well as the clear manipulation of detail, rendered them quite unique, and the Bath Photographic Society was indeed fortunate in possessing such a rare collection. The pictures would be exhibited by the Society at the Jubilee Photographic Exhibition, which opens at the Crystal Palace on the 19th proximo.

These examples, dating 1844 to 1846, were then laid upon the table for inspection previous to dispatch to London. A portrait of Fox Talbot, produced by his own process of photo-engraving slightly modified by M. Dujardin, of Paris, from a *carte-de-visite* taken by Mollat, of Edinburgh, and two original *cartes* by Mollat, were also given by Mr. C. H. Talbot, also a copy of the biographical sketch of Mr. H. Fox Talbot which appeared in the *Transactions of the Society of Biblical Archaeology* in 1879, prepared by Mr. R. Cull, F.S.A., from materials furnished by Mr. C. H. Talbot, of Lacock Abbey.

The CHAIRMAN, having thanked Mr. Talbot for his valuable presents to the Society, Mr. TALBOT said he had a few examples of the photo-engraving process left, which he would give to the members if they so desired. He explained that his father's portrait was from the best of Mollat's negatives, and Dujardin had considerably modified the photoglyptic process, but he believed that his father's later improvements made it capable of much finer results, and he thought a good many of the processes used in illustrating newspapers were modifications, more or less, of the photoglyptic process.

The CHAIRMAN said that in looking at the calotype pictures presented to the Society he was not only impressed with the delicacy of the process but the permanency, which in many cases compared favourably with much that was seen now, although above forty years had elapsed. Notwithstanding the fact that some silver prints fade quickly, these had not done so.

Mr. TALBOT gave an outline of the calotype process by which the prints were made, and said they had been selected out of a great number as being suitable for exhibition. He said he had brought thirty-two still earlier specimens, mostly dated and signed. These were handed round, and details concerning each were given. The supposed earliest example was undated, but the paper bore the water-mark of 1835. Starting with this print, the others either bore dates soon afterwards or could be fixed by events, until the last (No. 32), dated September 1, 1840, which (said Mr. Talbot) came very near to the date of the discovery of the latent image, September 20 and 21, 1840.

The CHAIRMAN thanked Mr. Talbot for his paper and for showing these specimens, which, he said, were probably the first ever taken by any photographic process in England or anywhere else. There was a great difference between those early pictures and what was done now, but they were the germ of the present processes.

Mr. TALBOT, in acknowledging thanks, said that some of the pictures he had shown were amongst those his father exhibited before the Royal Society in 1839.

Mr. FRIESE GREENE remarked that in the very early specimens of photogenic drawing it was wonderful how well they had been preserved, and it was curious to notice that every colour which from time to time has since been adopted was to be found in these experimental photographs of Fox Talbot's, made previous to 1839 with ordinary salt, potassium, iodide, and silver nitrate. In one case the colour resembled that of the Bartolozzi engravings, which tint was now very much imitated by photographers.

Some remarkable photographs of lightning flashes taken by Mr. A. H. Binden from a window of his house at Wakefield, Massachusetts, U.S.A., were, through the courtesy of a lady member, shown. No. 1 was taken July 29, 1887, looking west across the Crystal Lake. The landscape and houses (distinctly visible) were lighted by another intensely brilliant flash which took place at the same moment in the opposite quarter of the sky. Nos. 2 and 3 were taken on June 23, 1888, and were the most perfect yet produced in the camera.

Mr. J. DUTTON said his earliest photographic experience was with the calotype process; he then detailed the wax paper process, which consisted in waxing the paper, then ironing it until the wax had soaked into the body of the paper; it was next soaked in potassium iodide and dried, sensitised by floating on a thirty-grain silver bath, acidified with acetic acid, and, after an exposure of half an hour or more, the negative was made by development with a cold saturated solution of gallic acid. A number of wax paper negatives taken in the locality between 1852 and 1856 were handed round and greatly admired. He also exhibited several collodion negatives on curved glasses in which a water lens similar to that referred to by Mr. Braham in his recent

lecture was used to form the image. Prints from these semi-circular glass negatives were shown and praised.

Mr. GREENE thought circular plates might be used in astronomical photography with advantage.

The HON. SECRETARY then explained the working of "Kruger's patent book camera" which, as its name implies, resembles an ordinary book. It contains twenty-four plates in metal sheaths which are exposed in rotation, each sheath is numbered and a coloured glass window permits the number of an exposed plate to be read without opening the camera. The lens is of the new Jena glass, and, by means of a safety shutter working outside the active shutter, either a very rapid or slow exposure can be made at will.

This little camera was examined with much interest, as also was a number of specimens taken in a similar manner.

The HON. SECRETARY stated that Marion & Co. had presented to the Society for their new dark room a quantity of concentrated developers and some sample boxes of Britannia plates. The same firm had further sent to the Society, on loan, two complete sets of granatine dishes, deep and shallow, up to 16 x 14 for use in the dark room. He also announced that Mr. Dyson, of Huddersfield, had sent the Society, as a present, a sample background of opaque cloth which could be washed with soap and water when required.

Messrs. Piper & Carter presented a copy of the current *Year-book of Photography*.

Circulars and entrance forms relating to the joint societies of New York, Boston, and Philadelphia Exhibition were announced, and placed upon the table, as well as a number of photographic journals and trade catalogues.

The CHAIRMAN then reviewed the business of the evening, thanked those who had contributed matters of interest, and, after congratulating the members on the unprecedented prosperity of the Society, the proceedings terminated.

BRIGHTON PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held at 35, Vernon-terrace on the 26th ultimo, — the President (Dr. Rean) in the chair.

Messrs. Fallbrook and Tate were elected members of the Society.

It was decided that the meetings for the future be held in the Lecture Hall, New-road.

A vote of thanks was awarded the President for placing his rooms at the disposal of the Society.

Dr. REAN, having briefly replied, proceeded to deliver his opening address, which dealt with several points of interest to photographers generally, and at the close an animated discussion ensued upon several of the points raised.

It was decided that the Committee report as to the feasibility of holding a photographic exhibition in Brighton during the autumn.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of the above Society was held at the Grand Hotel, Colmore-row, — Mr. E. H. Jaques in the chair.

Messrs. J. C. Newry, Thomas Taylor, and H. S. Gent were nominated for election.

Mr. A. W. WILLS, J.P., exhibited negatives he had taken on Carbutt's films, and remarked upon their lightness and ease of manipulation. There is no difficulty in developing or in the drying; he simply reared them on end, the same as an ordinary glass plate, and they dried perfectly flat. They are made of a substance similar to "Parkesine," which was invented by one of our townsmen some few years back.

Mr. W. J. HARRISON said he thought this was certainly the best improvement in films as yet, and he imagined they could be used with advantage in "Pumphrey's film holder."

Mr. A. A. BONEHILL presented a bound copy of *Anthony's American Annual* for the library.

Mr. H. F. HALL EDWARDS gave his paper on *Photo-micrography*, giving a practical insight of the whole process, exhibiting the apparatus, &c., used, and showing by the lantern many of his own and members' micrographic slides.

The next meeting will be on March 14. — Mr. E. H. Jaques on *Holiday Trips with the Camera*.

SHEFFIELD CAMERA CLUB.

THE ordinary monthly meeting was held on Friday, March 1. Dr. Morton presided, there being a good attendance.

About one hundred slides, the sole work of members, were projected on the screen. The contributor of each set of slides gave a short description of the process he had used.

The PRESIDENT employed hydroquinone for all gelatino-bromide lantern plates, and found it the best developer. He made two stock solutions: — The first, hydroquinone, half a drachm; sulphate of soda, three drachms; water, three ounces; the second, carbonate of potash (anhydrous), one drachm and a half; water, three ounces. An ounce of potash solution was mixed with an equal part of hydroquinone in a measure, and the combined two ounces would develop at least a dozen plates. He found no necessity for citric acid or bromide if the exposure were correct, but occasionally added a little old developer (one or two days' standing, which had retarding qualities) in case of over exposure.

Mr. C. YEMANS used pyro-alkaline and meta-bisulphite. The slides shown were of an agreeable brown tint, and, being mostly landscape, proved very effective.

Mr. J. O. ARNOLD had taken his negatives on Ilford ordinary and positives, Mawson's plate, developed with ferrous oxalate; principally snow scenes.

Mr. G. K. MACHAM sent a number of slides taken on Thomas's plates; developer, hydroquinone intensified with mercury. They were reduced from half-plate and 9 x 7 negatives and exposed to magnesium ribbon light.

Mr. WINTER's slides were a set of micro-photographs by contact from negatives of objects obtained with two-inch to quarter inch objectives. He preferred ferrous oxalate developer, but had occasionally used pyrogallol.

Mr. WHITTAKER showed various subjects by contact printing, Mawson's plate, and ferrous oxalate.

Mr. HARROP contributed several slides taken by contact, iron developer; as also Messrs. Taylor and Newell.

Mr. H. J. HARDY (Hon. Secretary) used Ilford for negatives and Mawson's lantern plate with satisfactory result.

As the evening was well advanced, discussion had to be postponed. Many of the slides exhibited possessed excellent qualities and evoked much applause.

YORKSHIRE COLLEGE PHOTOGRAPHIC CLUB.

THE meeting on February 28 was devoted to a discussion on *Fine Art in Photography*. The President (Mr. C. H. Bothamley) occupied the chair.

Messrs. H. P. Robinson, F. M. Sutcliffe, and H. Tolley sent for exhibition a large number of fine examples of their work, and examples of the work of Messrs. Green, Emerson, and Sutcliffe were contributed by the President. In fact, the exhibition was quite remarkable both in size and quality.

Amongst the questions raised in the discussion was that of fuzziness *versus* definition, the general opinion being distinctly opposed to anything in the shape of decided fuzziness. The prevailing tendency to over-crowd genre pictures with unnecessary accessories was also condemned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

AN ordinary meeting was held in the Professional Hall, 20, George-street, on Wednesday evening, February 6, 1889. Mr. J. M. Turnbull was called to the chair.

Four new members were elected.

The CHAIRMAN gave an historical sketch of the progress of film-photography, from its introduction to its latest development, and also indicated the general method of the manufacture of the films under discussion.

Mr. J. M'GLASHAN then proceeded to demonstrate the various processes necessitated in working with stripping films, and said: —

It is a great desideratum to photographers, especially those who have much outdoor work to do, to have a medium on which to expose their subjects which shall be at once portable and reliable and not entail too much after-labour. How far this Eastman stripping films fulfil these requirements will, I hope, be shown to you tonight by the demonstration, and the discussion which, I trust, will follow. In a new process such as this there is always a great deal to be learned by experience — what to do and what not to do — and we should not, blame the process if we fail at first and can find a remedy. Still, these films have now been on the market so long that we ought to be able to say by this time whether they are a perfect substitute for glass plates or not. I tried these films just as soon as they were in the hands of dealers, and my experience of them was most satisfactory. With the first few rolls I never had a failure. They all stripped beautifully, and are among the best negatives I have got. They were slower than plates a good deal, but that was an advantage to me in those days, as I was comparatively young at photography, and when I exposed a plate I liked to feel sure that I had got it there; I could easily afford the extra time. The consequence was that I got good results. In July last I went to West Sutherlandshire for a fortnight with two gentlemen of the Geological Survey, and, as I would have a considerable amount of tramping over rough country, I took stripping films with me as well as a few ordinary Ilford plates. We climbed a number of hills between two thousand and three thousand feet high, and as the hills there are mostly devoid of vegetation and rough in the extreme, it was no easy task. From the summit of Ben Stack there was a splendid effect which I tried to photograph. The whole country to the north was enveloped in clouds, which wore about five hundred feet underneath us, and it was beautifully clear above. The clouds began to disperse just when we were, so that it was perfectly clear to the south, and looking north it was like a sea of foam with black islands scattered here and there, formed by the peaks of the neighbouring hills peering through the clouds. Looking east and west, where the clouds were dissolving away, were wonderful effects, and I thought, "Now I will bring home something to astonish the Society!" I exposed a dozen films there and then, and, although the exposure was ample, as I thought, they turned out all under exposed, and when they were developed they would not strip, although I almost boiled them. Strangely enough, the plates exposed were nearly all over exposed, showing that the films were by no means rapid. It took me about a week to develop the six dozen of film exposures and I got scarcely a presentable picture in the lot. The quality of the negatives was further greatly marred by numerous small insensitive patches. Another advantage claimed for the films is that they completely prevent, or very greatly lessen, halation. With this I can hardly agree, as, under similar conditions, I have got fully as much halation on a paper-mounted film as on one on glass. [A couple of negatives of the same subject were here handed to the Chairman in which the halation was greater on the film negative than on that on glass.] Again, with prolonged development the developer acts to some extent through the back of the paper support, causing a grained appearance in the film after it has been stripped. Notwithstanding all these failures, I will still use stripping films when I am travelling and desire portability, because of late, having employed films which I was satisfied were new, I have been thoroughly successful.

Mr. M'Glashan having concluded, Mr. Bibbs exposed, developed, squerged to various supports, and stripped a number of "Transferotype" films, while the Secretary explained that this process was a modification of the stripping films used in the camera, and had for its object the transference of films from their original paper support to surfaces of glass, when they could be employed either as window transparencies or lantern slides; to canvas, wood, or cardboard, when they could be coloured; or to glazed porcelain ware and crockery, where the plasticity of the film permitted its adherence to curved or spherical surfaces. He further instanced the employment of this tissue on the production of a form of opal similar to that produced by the development of the gelatino-bromide film on a piece of porcelain, but at the same time he pointed out that the attachment to a grained porcelain and the removal of the paper support appeared to be attended with some difficulty.

Mr. Hadow next exhibited the Kodak detective camera, showed the mode of handling it, and explained its mechanism. This exhibit was viewed with curiosity and interest, the ingenuity of the shutter in particular being much

admired. Mr. Hallow also distributed a number of booklets on the subject among the members of the Society.

The annual dinner of the year was held in the Imperial Hotel, on February 15, when about thirty members sat down to an excellent repast. Mr. Blanc acted as chairman, and Mr. Dougall as croupier. While the loyal, patriotic, and photographic toasts were earnestly given and heartily responded to, the meeting was of a less formal and consequently of a more genial nature than is commonly the case. Several capital songs were sung, and harmony reigned supreme.

This second popular evening of the season was held in Queen-street Hall, on the 21st ultimo. One hundred and seventy-five pictures of more than average merit were thrown on the screen, some of them showing exceptional felicity of choice of subject and facility of technical skill. According to the traditional custom of the Society the necessarily somewhat monotonous succession of so many slides was at intervals broken by music. The singers on this occasion were—Miss Brown, Miss Carracher, and Miss Pearson; Messrs. Barr, Brown, and Meldrum. The proceedings were further slightly enlivened by a declaration of independence on the part of the lantern, largely due, however, to the inexperience of the Secretary, but, with the exception that the slides were passed through somewhat too rapidly, nothing occurred to mar the success of a very enjoyable evening.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A MEETING of this Society was held on February 6,—the President, Mr. Frederic Graff, in the chair.

The committee on lantern slides suggested the propriety, and recommended the formation of a special series of slides illustrative of the city of Philadelphia. There must be in the possession of members of this Society negatives of places and buildings of the greatest historical interest, and a collection could easily be made (if the interest and co-operation of the members is secured) which would be of the highest value. The series would include views in the park, as well as of public and private buildings in the city, and the historical importance of such a collection need only be suggested to be appreciated.

Mr. BURROWS (a visitor) showed a form of lamp which he had advised for use with flash-light compounds. The powder was inserted on a small funnel-shaped receptacle, the bottom being connected by a rubber tube with the usual bulb. A short distance above the cup for the powder a metallic ring about three inches in diameter was suspended, the ring being wrapped with asbestos fibre. The asbestos was wet with alcohol, which, when ignited, produced a large flame, into which the powder being suddenly forced, by pressure on the bulb, was instantly consumed with a most brilliant light. Powdered magnesium thus used was entirely consumed, with practically no smoke or residue. Mr. Burrows also showed another form of the lamp, which could be used with one hand, a trigger releasing a piston which, actuated by a spring, gave the necessary puff of air to blow the powder into the flame.

Mr. LEWIS called attention to the fact that with flash lamps of similar construction to that shown by Mr. Burrows a small portion of the powder was sometimes drawn back into the mouth of the tube, which, on being ejected the next time the light was used an instant later than the main charge, was apt to make a secondary dash, which was undesirable, if not detrimental to good work. To obviate this he recommended inserting a very small piece of absorbent cotton into the bottom of the powder cup, which being blown out with the powder would prevent any getting into the tube, and would also be entirely consumed with the powder. The cotton could also be used with lamps in which the flame was blown against the powder, to hold the compound and prevent any of it being blown away and not consumed. Mr. Lewis also mentioned having been troubled by a plate frilling at the corners, which he overcame by applying blotting paper. He thus absorbed the water from the film, and by gently patting it the film was made gradually to adhere again to the glass in its original position, free from ridges or other marks.

Dr. KRED showed what was apparently an umbrella, but on removing the case and unscrewing the handle it proved to be a tripod for use with a detective or other light camera. The legs were formed of light metal tubes, each made in two sections, so that it could be extended to the full height necessary for a practical tripod. The umbrella tripod was of English make.

Mr. BULLOCK mentioned that in toning some prints on a new brand of paper he was trying, on putting them into the fixing bath, which was of usual strength, he found the albumen immediately began to dissolve and leave the paper. Thinking the bath too strong he diluted it, only to make matters worse. A teaspoonful of salt was then added to the fixing bath, which instantly stopped the trouble, and excellent prints were obtained on paper which otherwise might have been condemned.

Mr. WALLACE thought if the silvering bath was too weak it was liable to cause the trouble referred to with some paper. He recommended the use of a minute quantity of alum in the silver bath to coagulate the albumen.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

At the meeting of this Society on February 12, Mr. Ernest Edwards, of the Photogravure Company, read a paper on *The Improvements in Photogravure Processes*, supplementing it with a demonstration before the audience. He presented to each person present a neat *souvenir* picture, commemorative of the occasion, representing a study of a tree, which was produced from a negative on Carbutt's celluloid film, originally taken by an amateur. He exhibited the negative, the photogravure printing plate, and printed from the latter in the press.

In reply to a question as to whether the amateur could print his own pictures in the same way, he answered that after spending fifteen dollars for the first outlay he could try it, but he did not know how much more he would have to spend before he could obtain satisfactory results.

Mr. Canfield exhibited a new oil optical lantern by Mr. J. B. Colt, which gave a well-illuminated disc. An Argand lamp inside of a true parabolic silvered reflector sent forward the rays in parallel lines, illuminating every portion of the slide equally.

A new Ross folding $6\frac{1}{2} \times 8\frac{1}{2}$ camera, loaned by Mr. Frazer and explained by Mr. DUFFIELD, had several novel features. The baseboard had a large circular aperture, on the inner side of which were metal projecting pins, in which the tripod legs fitted. Thus the weight of the tripod head and baseboard were dispensed with.

A McKellen camera and new focussing screen, sent by Miss E. Slade, was also exhibited, explained, and shown. A series of rubber cloth bands an inch wide are stretched across the face of the ground-glass frame. To use it the bands are separated, a portion going over the top of the head and the other portion under the chin.

The PRESIDENT announced the election of eight new members, and urged members to prepare exhibits for the Philadelphia Exhibition. He stated that a special ladies' meeting would be held the latter part of March, at which papers on photographic subjects would be read, and prints and lantern slides by ladies shown, and it was expected a lady would preside over the meeting. Examples of photographic fancy work would be shown. He then read a paper on *Lantern Slide Mat Cutters*, by Mr. Joseph P. Beach.

Following it, Mr. F. C. Beach exhibited specimens of the steel dies made out of dress steels bent around a wooden form. Ink sketches illustrating how the dies were formed were also shown.

A new shutter, called "The Queen Shutter," invented by Mr. Frank Burrows, and sent by Queen & Co., was also explained by Mr. BEACH. It is placed between the lenses, and operates on the open to close principle. It was very neatly made, and worked with little or no friction.

The PRESIDENT then read a paper on *Development by Separate Solutions*, by Mr. Bachrach, of Baltimore, in which some former statements were corrected; and after a motion was made and passed re-electing Mr. F. C. Beach as the representative of the Society in the American Lantern Slide Interchange for another year, the meeting adjourned.

Correspondence.

✂ Correspondents should never write on both sides of the paper.

OXYGEN CYLINDERS.

To the Editor.

SIR,—I have read the remarks of Mr. J. H. Steward about the precautions taken by Brin's Oxygen Company in refilling cylinders. It is said that the Company open the valves and empty every cylinder before refilling. I don't quite see how this can be when we are told that we can have our bottles refilled when part empty, and credited with the unused gas, also that they advise a certificate to be had of all bottles tested. I did not get any certificate with mine, nor do I know of a certainty that they have been tested. I was also assured that if an explosion did take place with a bottle it would only rip up, but the one at Dublin flew into pieces. I still think that the matter has not been thoroughly sifted, for nothing was said at the inquest as to what became of the other hydrogen bottle, which, I presume, was being used at the same time.—I am, yours, &c.,
G.

TOLLEY EXHIBITION.

To the Editor.

SIR,—Will you kindly make it known through your paper that the Tolley Exhibition at the Camera Club will close on Saturday, 16 instant?—I am, yours, &c.,
G. DAVISON, Hon. Sec.
Camera Club, Bedford-street, W.C., March 4, 1889.

ARCHER'S GAS EXPLOSIVE TESTER.

To the Editor.

SIR,—Just a word of caution to your readers about using this plan as described in last week's JOURNAL for testing the presence of explosive gas, for, in the first place, it would not be harmless if stout tubing were used; and, second, there is a danger of the tap being blown away, and possibly hitting the operator or any one should they be in its way. In the Fleming's test there is only a very thin rubber tissue to rend (such as used in the toy air ball).

I have now used the Hardwich ether tank ever since described in your JOURNAL, and have never met with any hitch whatever, and have had to resort to it on more occasions than one when I have been disappointed in the delivery of hydrogen in the compressed form, and on each of these occasions have given the greatest satisfaction, and redeemed the mistrust which is so prevalent in respect to this apparatus.

Since Brin's Company have compressed hydrogen, I have never had a cylinder, either of theirs or one sent to them, that has not been returned painted red. There are other compressors who never think of doing this, and on many occasions I have had to test, as the smell was so similar.—I am, yours, &c.,
R. R. BEARD.

RETOUCHING.

To the Editor.

SIR,—With regard to the proposal made by "J. B." in your last number that there should be a separate department at photographic exhibitions for unretouched photographs, it would be well enough, but would have no effect in determining the question whether it is necessary to

highly retouch in order to gain a prize. The only way to do that would be to let some good men send some unretouched pictures to compete with others that are retouched and mark the result. For my part, I think they would stand no chance, though, probably, pictures with only a very moderate amount of judicious working up would strike even the judges at an exhibition as being more natural and artistic than pictures where all the flesh in the face has been changed to cotton wool.—I am, yours, &c.,
JOHN MORAN.

To the Editor.

SIR,—I had often wondered why the photographs taken by an amateur friend appeared more natural about the faces, besides being better likenesses than those done at the professional studios, though perhaps not always as pretty-looking, but he tells me it is because at the shops they are all "stippled up" on the negative, so much as to make them as smooth as "elliptical billiard balls," as the Mikado would say.

I think this is very wrong, and likely to make all people with any taste disgusted, especially if it be true that it is, more frequently than not, done by persons having very little knowledge of drawing.—I am, yours, &c.,
Manchester, March 5, 1889. J. H.

NUMBERING LANTERN SLIDES.

To the Editor.

SIR,—I saw in a late JOURNAL a notice to the effect that a Boston photographer had devised some numbers for lantern slides. I am the man. I got them up myself, as I could not find anything of the sort among the stock dealers. "Illustrated Boston," of which I sent you a programme about ten days ago, was given on Wednesday evening before a very large audience, and is a success. The set for English societies will be shipped to the Liverpool Club early in March.—I am, yours, &c.,
Wm. GARRISON REED.

25, Kilby-street, Boston, U.S.A., February 15, 1889.

[Approves of this, we have slides in our possession made by F. York more than twenty years ago, which bear not only numbers, but also the titles printed on the edge of the mounts.—ED.]

AMMONIA FUMES.

To the Editor.

SIR,—On page 359 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, Mr. J. Watney Wilson, on *Ammonia Fumes*, said he would give a prescription for red and furred tongue in the JOURNAL. I would esteem it a great favour if you would inquire into it and get it inserted in the same. Trusting it will not give you much trouble.—I am, yours, &c.,
Ashford, Kent, February 26, 1889. S. W. BARNES.

[We sent the above to Mr. Watney Wilson, who favours us with the following reply.—ED.]

SIR,—In answer to Mr. Barnes's request, I send you the two following prescriptions given to me by the late Dr. B. Ridge, F.R.C.S., the author of *Glossology*; or, *The Study of the Tongue*.

When the tongue is white and furred, he recommends half a teaspoonful of bicarbonate of soda dissolved in a wineglass of water, to which add one teaspoonful of sal-volatile. Stir and drink before going to bed, or it can be taken after a meal, but not too frequently, as its action is lowering.

When the tongue is very red, and the patient is suffering from thirst and other feverish symptoms, take—

Dilute sulphuric acid	1 drachm.
Dilute phosphoric acid	2 drachms.
Tincture of Columba	2 "
Chloric ether	1 drachm.
Syrup of red poppies	3 drachms.
Water	6 ounces.

One tablespoonful in one of water three times a day. Should the tongue be scarified, three drachms of pure glycerine can be added.

I have found the above very beneficial, and take the red acid mixture when I suffer from hay fever; but as either prescription may be taken by some of your readers according to the indications of their tongues, they will have to act upon their own responsibility, and I confidently hope they will derive some benefit from these simple remedies. Should they wish to know more about themselves, they cannot do better than obtain one of the late doctor's works, viz., *Ourselves, our Food, and our Physic*, published, I think, at 1s. 6d. Apologising for taking up so much of your space.—I am, yours, &c.,
J. WATNEY WILSON.

14, St. Mary Abbotts-terrace, Kensington, W., March 4, 1889.

THE CONSTITUENTS OF AZALINE.

To the Editor.

SIR,—As the question of the constituents of "azaline" has been raised in a contemporary journal, or it has been stated by Mr. J. Spiller that he found it to be erythrosine or eosine, it may be of general interest to have other authority upon the subject.

The question is not whether I am entitled to sell any tincture of an eosine for photographic purposes, which, by-the-by, I hold that I am, but whether Dr. Vogel has supplied me with and I have sold, knowingly or not, a solution of eosine under the "pseudo name" of "azaline."

I am charged, when Mr. Spiller's and Mr. Edwards' letters are read together, as no doubt they are intended to be, to palm off a solution of eosine as being (Vogel's Br. Pat., No. 7963) the well-known azaline which is made up of quinoline red, and cyanic blue, and to obtain by this means results which could only be got by eosine, of which, according to the reading, Mr. Attout Tailfer is the "first and true inventor."

I may at once state that the sample from which this analysis is made is from the same stock solution as the one supplied Mr. Spiller.

Mr. Edwards' letter is of itself of no interest save as an illustration of how to make a loose assertion without any evidence whatsoever to support it.—I am, yours, &c.,
J. R. GOTZ.

19, Buckingham-street, Strand, London, W.C., March 5, 1889.

To MR. J. R. GOTZ.

"DEAR SIR,—I have made a careful examination of the 'azaline tincture' received on February 16th and 19th. I have investigated its physical and chemical properties, and have compared it with solutions of quinoline red, a large number of the eosine dyes, and mixtures of these with cyanine.

"I find that the said 'azaline tincture' is a solution of quinoline red in methylated alcohol. I was unable to detect in it the presence of any cyanine; but since the tincture has been made for several months, any cyanine that was put in may have decomposed. Such decomposition would be accelerated by the foreign substances present in the methylated alcohol. I was unable to obtain any evidence of the presence of any dye belonging to the eosine group.—I am, faithfully yours,
C. H. BOTHAMLEY.

"The Yorkshire College, March 1, 1889."

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, Dallmeyer's rapid and wide-angle half-plate rectilinear lenses in exchange for Norton's supplementary Arabian Nights, 6 vols., just issued.—Address, J. L. LEE, Victoria Works, Burnley.

Wanted, nine-and-a-half-inch Wray rapid rectilinear in exchange for nine-inch Beck autograph rapid rectilinear fitted with Barjeant's shutter; and five-inch mid-angle rectilinear by Taylor, in exchange for six-inch portable paragon by Swift.—Address, A. R. F. EVANS, 29, Roselya-hill, Hampstead, N.W.

Will exchange Humber tricycle and Selenopticon lantern, three-wick lamp, also oxy-hydrogen jet, for binocular lantern with oxyhydrogen jets.—Address, C. J. THORNTON, Photographer, Bridge-street, Walsall.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

INQUIRER.—Every Friday.

NOMINATION.—About five pounds.

ENGLE.—See Lancaster's advertisement.

MODERATION (Dublin) forgot to send his name.

H. C.—The Crystal Palace Exhibition closes on April 16.

ROMAN.—You will find paste better than gum for your purpose.

F. F. N.—Call when you come to London; a personal interview is more satisfactory.

INQUIRER S.—The surface of the paper has evidently been scratched after it had been albumenised.

S. D. G.—One of the symptoms of the bichromate disease is a "breaking out" upon the hands, mostly at the back.

IGNORAMUS.—The exposure for a gelatino-chloride plate under the conditions you mention will be about five minutes.

S. A. M.—Red fog and green fog are much the same. It is one colour by reflected light and the other by transmitted light.

SCOTUS.—The presumption is that the yellow deposit is gold, but we have not tried it. For backing plates, see answer to another correspondent.

JAMES TAYLOR (Toronto, Canada).—Mansell & Co., London, or Frith, Reigate, Surrey, England, can supply views of Jerusalem and the Holy Land.

J. WATLAND asks if commercial dry plates are ever prepared with a substratum before the emulsion is applied?—Some makes are while others are not.

VICTOR.—The initials are those of a Devonshire photographer who supplies the trade only. It is presumable that the pictures being sold to artists are not copyright.

R. M. (Liverpool).—To prevent the halation you speak of, coat the back of the plate with the following composition:—Spanish brown, gum arabic, glycerine, and water.

A. Y. The spots on the negatives sent are in no way due to the manipulation, but to the emulsion with which the plates are coated—the assertion of the maker notwithstanding.

ROBIN HOOD. 1. If you paint the glass white it will obstruct the light. Ground glass will be better.—2. Yes, use blinds.—3. Any semi opaque colour will answer for the blinds.

HARTSHORN inquires why English paper is not used for photographic purposes? The reply is that English paper makers do not make a suitable article. They could do so, no doubt, but they evidently do not care to take the matter in hand.

F. K. J.—The amount of moisture caused by simply breathing on the paper would not have wrought the destruction of the negatives by itself. No doubt the gelatine image contained a considerable amount of moisture. It is always risky to print from an unvarnished negative, by any process, unless the film be perfectly dry.

L. P. (DORK) writes: "I cannot get old gelatine films off the glass; I have tried soda, but it is not sufficient. Can you recommend anything?"—Answer: Use dilute hydrochloric acid, one to fifty; this will take the glaze off earthenware, so gutta-percha or lead is preferable. Do not allow the acid to come in contact with the skin.

STRATFORD ON-AVON asks if, when at Stratford, he will be allowed to photograph Shakespeare's house both internally and externally?—We hardly think you should gain admission to photograph the interior, but the rooms are very small. The best view of the house is that obtainable from the road, from other points trees are in the way.

W. R. P. states that he has to make some stereoscopic photographs of moving objects, but has only one camera. He says: "I have heard that stereoscopic photographs can be taken with a single camera; can you tell me how to act in my case?"—Answer: Instantaneous stereoscopic photographs cannot be taken with a single camera, you must have a binocular instrument for that purpose.

BRUNNER writes: "I am a beginner in photography, and wish to make a transparency from a negative; what is the requisite time of exposure to do this?"—In reply: As you do not say anything about the lens, density of negative, or speed of the plate, we cannot be expected to give advice about the exposure. Commence with one second and increase until the requisite exposure is found.

R. J. B. writes as follows: "I have a lens which I have been told is a whole-plate triplet, but it has only two glasses. There is a place in the middle of the tube as if there had been a lens in there. The front lens is smaller than the back, and it bears a London optician's name. Can you give me any information on the subject?"—The lens is no doubt a triplet minus the centre lens. Our correspondent had better take it to the maker and get him to do the needful.

C. W. BAINSFORD writes: "The other evening I placed some negatives, of snow scenes, on a rack in the scullery to dry, and the following morning I found them covered with ice. They were then taken to a warmer apartment, where they dried. When dry they were covered with marks as if the film had been injured. Is there any remedy?"—We fear the injury is permanent, but we cannot say for certain without seeing the negatives. We have never had any of our own injured in the way indicated.

W. H. W. says: "I was recently recommended to add some alcohol to a solution of gum arabic to be used in spotting prints. On pouring a little in it caused white clots to be produced, which remained floating about in the solution. Should this be the case?"—Gum arabic is insoluble in alcohol, though a considerable quantity of the latter may be added to a solution already made in water if it be done gradually and with constant shaking. With brisk agitation the precipitate at first produced will be redissolved, unless too much spirit has been used.

S. J. writes: "After reading the articles, in one of the back volumes of the JOURNAL, on the Stannotype process, I have been trying to make the reliefs, but have utterly failed, though I have kept strictly to the formula. The only deviation has been that I have dried the tissue in a room instead of the way recommended; it took two days and more to dry. Had this anything to do with the matter? My trouble was that the unaltered gelatine, after printing, would not dissolve."—The difficulty, no doubt, is caused by the slow drying, the tissue having become totally insoluble the while. This could easily be ascertained by placing a piece in warm water before it is printed upon.

L. C. T. R. says: "Can you answer the following questions, if so you will greatly oblige!—1. I use a piece of glass tubing for a stirring rod, but find a great difficulty in keeping the inside of it clean; what can I plug it up with?—2. Can you inform me of a ready means of cutting albumenised paper in a circular and oval shape? I find a great difficulty to get a good even edge.—3. I have lately broken a large porcelain dish in which I silver paper; can it be mended and, if so, how? It is broken in two pieces only.—In reply: 1. Hermetically seal the ends of the tube by means of a blow pipe and spirit lamp.—2. Use a Robinson trimmer and shapes. The former is a small sharp-edged cutting wheel fitted in a suitable handle, and the latter a metal slab out of which has been cut the desired shape. The paper is placed on a sheet of glass and the cut out shape placed upon it, when with one sweep of the cutter the piece is cut out.—3. Mend it by mixing Price's gelatine and litharge until of the consistency of soft putty, moisten the edges with glycerine, then apply cement, and bind together. It will be ready for use in about twenty-four hours.

C. W. inquires the usual size of panel portraits.—We presume you require the size of the mounts. An ordinary panel is $13 \times 7\frac{1}{2}$, and a grand panel may be either $17 \times 10\frac{1}{2}$ or 15×12 ; you will find the former size most convenient.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, March 13, 1889, will be on *Weights and Measures*. Mr. Levy will read a short paper. Mr. England will take a flash-light picture of the members.

We are sorry to learn of the death of Mr. John Williams, F.C.S., which took place on the 3rd instant. Mr. Williams was a chemist, well known in connexion with the care bestowed by his firm (Hopkin & Williams) in the preparation of rare and pure chemicals. He died at the age of sixty-five.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting, Tuesday, March 12, at eight p.m., at the Gallery, 5A, Pall Mall East, when the adjourned discussion upon the paper, *Hydroquinone as a Developing Agent*, read at the annual meeting, February 12, by J. W. Swan, M.A., F.C.S., will be resumed.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—At the next meeting, to be held on the 12th instant, Mr. J. A. Furnival will give a demonstration with his improved oxyhydrogen lantern microscope. The President will exhibit and explain a new patent detective camera, and during the evening there will be a sale by auction of photographic apparatus, the property of members.

HOLBORN CAMERA CLUB.—A Club has been formed at 100, High Holborn, under the name of the Holborn Camera Club. Amateurs or professionals are eligible for membership; the annual subscription being, for gentlemen, 5s., ladies, 2s. 6d. Discussions on technical subjects will be held every Friday from seven to eleven p.m. All interested are invited to attend. W. Rice has been elected President, and Fred. Brocas, Hon. Secretary. Full particulars can be obtained on application.

The Vienna Club of Amateur Photographers asks us to state that it will, in its corporate capacity, with its patroness, H.I. and R.H. the Archduchess Maria Theresa, at its head, take part in the exhibition being got up by the Photographischen Verein in Berlin; and that it hopes to see represented there all those English amateurs and professionals whose pictures formed such an important part of the Vienna Exhibition. All communications to be addressed to Dr. Stolze, Salzstr. 23, Charlottenburg, Berlin.

The first annual exhibition of the North London Photographic Society was held on Tuesday evening, there being a very large attendance of ladies and gentlemen. The exhibition was inaugurated by a *conversazione*, at which were recognised several members of the original North London Society (which became extinct more than twenty years ago), notable among them being Mr. D. W. Hill, its founder and treasurer, and who contributed several charming platintypes. Among other contributors to the large collection displayed on the walls were Messrs. James Martin, E. Dunmore, J. Jackson, F. G. Reader, N. P. Fox, J. Carpenter, A. C. Cossar, J. G. Hilton, and others. After the *conversazione* a lantern display of the members' work took place. This was contributed to by Messrs. J. T. Taylor, W. Bishop, A. Mackie, Oakley, Dunsterville, Clifton, Reader, Rev.—Healey, and others. The President stated that this was the first of what he hoped would be an interesting annual gathering of the members and their friends. As to the success which had attended that evening's entertainment there was but one opinion.

THE PARIS EXHIBITION.—The negotiations which have for some time past been taking place between the English railway companies and the Northern of France Railway Company are now practically completed for facilitating the journey between London and Paris by means of improved express services of trains from the French Coast. Calais will be the chief point of arrival and departure, and the new harbour works are to be completed, so as to provide the additional accommodation required by the mail and passenger steamers. As at present arranged, there will be at least four or five services of passenger steamers *via* Calais and Dover each way daily. All these services will be performed by the London and Chatham Company's fastest boats, which perform the journey on an average of sixty-five minutes. Another new steamer of the same type as the *Empress* will be ready for the service in May next. One of the new services which is to be added early in the season is the Club Special Express, which will be limited to about eighty passengers, and will leave London at four p.m., and arrive at the French capital at eleven. The railway authorities are preparing for an enormous increase in the Channel traffic.

CRYSTAL PALACE EXHIBITION.—This important spring exhibition is now nearing completion, all the space having been applied for. The exhibition of apparatus and other appliances will be exceptionally large, as almost all manufacturers and dealers will be represented. We are glad to perceive that in the Art Division a special award is to be made for the best picture in any class taken by a lady amateur. It opens on the 19th instant.

NOTICE.

We have to apologise for the non-appearance this week of several articles, in type, although we have again given eight extra columns.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1506. VOL. XXXVI.—MARCH 15, 1889.

FULMINATING COMPOUNDS.

It would appear that what we recently wrote concerning the fulminating or explosive properties of two of the numerous chemicals employed in photography has stimulated our readers into desiring to learn something more. As one reader says, "The borderland between safety and the reverse in the employment of chemicals is so very narrow that it were well other substances than silver, iodine, and ammonia be treated in like manner, so that we may know when we stand on solid ground."

Certainly there are many other fulminates than those we spoke of, and all, or mostly all, of them are made from substances in more or less daily use by photographers, although that of silver stands "proudly pre-eminent" as having caused more loss of life than any of the others, perhaps because it is more commonly employed than the others in the manufacture of amusing toys of the cracker *genre*. But we must utter a strong protest against such uses of this potent agent as one of our readers confesses to have played off against a friend, the proprietor of a well-known studio, who, seeing a black-beetle upon the floor, immediately brought down his foot upon the animal, who responded by a sharp detonation; the "beetle" being composed of a bit of wood cut into shape and blackened, and a portion of a grain of the explosive silver attached to its belly. Such *fun* may be carried too far.

Fulminating gold is much less likely to be made than that of silver, on account of the greater expense of the noble metal. This fulminate is formed by digesting chloride of gold in ammonia in excess—this gives a brownish-yellow product; also by digesting peroxide of gold in ammonia for twenty-four hours, and drying the resulting product in the open air at a temperature below 180° Fahr. It explodes with extreme violence, either by the slightest friction or by a sudden increase of temperature.

Differing in some respects from the fulminates of gold and silver, that of mercury is probably entitled to rank next to them in regard to power. Its method of preparation is analogous to that of the silver compound. One part of mercury is dissolved in twelve parts of nitric acid, and the solution is cautiously poured into eleven parts of alcohol, gentle heat being applied. When effervescence ceases, filter, wash in cold water, and dry. All the precautions recommended as being necessary when working with the silver fulminate must also be taken with the mercurial compound.

Beyond saying that copper, bismuth, platinum, zinc, antimony, and some other metals also form fulminates, we do not consider it necessary to speak of them in detail, as their preparation stands a little outside of the routine of photographic work.

In our former article we alluded to iodide of nitrogen and its terrible properties. It is disputed that this is so powerful as the chloride of nitrogen, which, by the way, we did not assert. The fact is, that we feel quite chary at instituting comparative trials of merit between compounds of such a nature, and we are quite willing to yield the point in favour of the chloride to whomsoever chooses to back it against the iodide. We know that M. Dulong (its discoverer) and Sir Humphry Davy (one of the first to investigate its properties) met with severe injuries by its agency. Fortunately it is more difficult of preparation than the iodide. One ounce of chloride of ammonium is dissolved in twelve ounces of hot water, and when the temperature has fallen to 90° Fahr., a glass bottle of chlorine is inverted over it. This is absorbed, and in fifteen to twenty minutes oil-like globules of chloride of nitrogen form on the surface and sink to the bottom, where they should be received in a leaden saucer. A minute globule no larger than a grain of mustard seed is quite large enough to experiment with. Following advice received, we placed such a portion in a platinum spoon and touched it with a tiny morsel of phosphorus, when the explosion that resulted shivered all the immediate surroundings into fragments.

When some one is found enterprising enough to investigate the photogenic properties of these extremely touchy compounds, it is probable that the discovery of a body possessing a hitherto unknown degree of sensitiveness may reward the courageous experimentalist.

BICHROMATE OF POTASH AND ITS PHYSIOLOGICAL EFFECTS.

The employment of the bichromates in photography is more extensive now than at any previous period, owing to the more general adoption of photo-mechanical processes. This, no doubt, fully accounts for the number of anxious inquiries we from time to time receive as to the injurious effect the bichromate of potash is said to have on the health of its users. At a recent meeting of the West London Photographic Society this very question was raised in connexion with carbon printing.

We have, on more than one occasion in years past, treated of the pernicious action which this salt has on some of those by whom it is employed, in cases which we had the opportunity of diagnosing, and which, in some instances, were slight, and in others severe. As the use of the chromic salts in photography is so much increasing, we shall here make some further remarks on the inconveniences that may accrue from its employment, unless due care be taken.

The injurious effect of the bichromate may be experienced

in two forms, each totally different from the other. So far as our observations go—and they are endorsed by no less an authority than Dr. B. W. Richardson, who has since given a great deal of attention to the subject—one is chiefly caused by contact of the flesh with cold concentrated solutions, when the skin is abraded; the other from continually using more dilute ones at a tolerably high temperature, such as in developing the bichromated gelatine image in warm water. With cold solutions, even when they are concentrated, no injury appears to result unless there happens to be an abrasion of the skin, when an immediate smarting sensation is experienced; sometimes this is followed quickly by inflammation, and the part becomes very painful, and eventually ulcerates. When ulceration once commences it is very difficult to arrest; frequently it does not end until it has penetrated to the bone. These sores are very slow in healing, and it is unnecessary to say they are of a very painful character.

Some years ago a solution of bichromate of potash, acidulated with sulphuric acid, was recommended for cleaning old negative glasses, but the injurious action it was found to have on the hands led to its abandonment. A similar solution has been used for batteries, and its employment has, in some instances, been attended by serious inconvenience. Bichromates are employed in one of the processes of oil refining, and here again, we are informed, the workmen often suffer from painful ulcerated sores. Therefore, in employing the salt, say in the preparation of sensitive surfaces for photo-mechanical purposes, or in sensitising carbon tissue, the greatest precaution should be taken.

Sometimes the bichromate is pulverised to facilitate its solution. When this is done the crystals should always be slightly moistened with water. This will prevent the finer particles from being disseminated as dust, which, if inhaled through the nostrils, produce a violent irritation and irresistible sneezing. We are told that powdered bichromate of potash has, before now, been used as an adulterant of snuff to increase its pungency. Dr. Richardson, in a paper he read before the Medical Society a few years back, mentioned that, in the factories where the bichromate of potash is made, some of the workmen have entirely lost the septum of the nose through the constant inhalation of the fine particles as dust.

The ill-effects above alluded to are what may be termed the immediate result of the use of the bichromate, inasmuch as they are, more or less, manifest from the first. Not so, however, with the other form of the evil—that arising from the use of warm dilute solutions—as in this case the injury does not display itself for a long time, generally several months, or may be for a year or two. When it does, however, it is of a very unpleasant nature, and it has been named by Dr. Richardson the "bichromate disease." This disease is a cutaneous one, and takes the form of a thick red rash, accompanied by violent irritation; the skin becomes destroyed, dries up, and then exfoliates in bran-like scales. In general appearance the disease closely resembles one form of pityriasis. In the more acute stages the rash is accompanied with small pustules containing matter, and, when they die away, the skin assumes a parched appearance, like that of dried leather, and then cracks on the joints, causing painful sores. Eventually this hard skin peels off in thick, horn-like scales. The disease, in any form, is an exceedingly painful one, and the irritation is at all times most intense.

Fortunately, so far as we can ascertain, the disease is quite a

local one, being limited entirely to the parts which have been in contact with the solution. It is chiefly confined to the backs of the hands, the backs of the fingers, and the wrists, or where the skin is the thinnest. It does not appear to touch the palms of the hands at all, or when the skin is thick, or to extend to other parts of the body. Unfortunately no really successful treatment is known. If, however, the use of the bichromate be discontinued—the exciting cause removed—the disease quickly disappears, nature curing herself. Experience proves that, if once the disease is contracted, although it may be cured and remain so while the contact with the bichromate is discontinued, it is always liable to make its reappearance, sometimes in a day or two, if the use of the salt be resumed.

The question has frequently been put as to whether there is any danger to the amateur, who may only use the bichromate in a small way, as when experimenting in bichromated gelatine processes, or occasionally doing a little carbon printing? Our reply is that, in our opinion, the amateur runs no risk whatever of the bichromate disease, providing ordinary care is taken, and the hands well washed immediately after work. So far as we have been able to learn, it is only after prolonged and constant working that any inconvenience is experienced.

On a future occasion we shall describe more fully the precautions to be taken, the earliest symptoms of the disease, and the best known methods of treatment.

CONFUSION IN WEIGHTS AND MEASURES *VERSUS* THE DECIMAL SYSTEM.

AN article by Mr. J. B. B. Wellington, on page 179, introduces for the first time among our British Society transactions the thin end of the wedge. It will, we suppose, have to come to it some day, and the good old system of grains, drachms, and ounces of two different degrees will have to succumb in favour of the more rational decimal system of the French—not, however, that this system is confined to the French, for it is now permeating every class of scientific society, both in the country of its nativity, in England, and in America. As we say, we will have to come to it sooner or later, and it is well to be getting prepared for the inevitable period of the popular introduction of this system. To pave the way for the advent, we purpose, at brief intervals, to give short descriptions of the decimal system, and show in what manner it compares with that so long in use in this country.

The subject may be probably divided into three different heads—fluid-measures and weights, longitudinal measurement, and thermometrical degrees.

Our fluid-measures certainly occupy an extremely anomalous position. Some years ago, in Scotland, if one asked for a pint of any liquid, the question in response would be, what kind do you mean—imperial or English? (there being a vast difference between the two); and at the present moment, in the two great countries, America and England, the pints are quite dissimilar. A fluid ounce of ether, as every one knows, represents a totally different quantity from the fluid ounce of sulphuric acid, necessitating the explanation that bulk varies. Then as to the ounce, it, like the pint, is susceptible of more than one interpretation; an ounce of silver is a different quantity from an ounce of nitrate of silver. The same with our pound, which consists sometimes of sixteen, and sometimes of twelve ounces.

In American formula, for example, we frequently meet with the explanation that the weights are troy, or avoirdupois, or in

some cases apothecary's, and when no such distinctive appellation is made, the ordinary aspirant for accuracy is left to his own resources, and guessing enters largely into the computation.

Equally when we, on this side of the Atlantic, compare the pint with that used in America, we seldom realise that it is short of our own admeasurement to the extent of four ounces. Even the hundredweight of the New World is short of that which we employ by twelve pounds. Many other anomalies might be mentioned. Verily, there is much room for reform.

In the French decimal system, Greek prefixes are used to denote the multiples of the units, and Latin prefixes the fractional parts of the units.

The Greek prefix	Deka	means	10 units.
" "	Hecto	"	100 "
" "	Kilo	"	1000 "
" "	Myria	"	10,000 "
The Latin prefix	Deci	"	$\frac{1}{10}$ of a unit.
" "	Centi	"	$\frac{1}{100}$ "
" "	Milli	"	$\frac{1}{1000}$ "

To give an illustration of this in a measure of length (the metre)—

Myriametre	=	10,000 metres.
Kilometre	=	1000 "
Hectometre	=	100 "
Dekametre	=	10 "
Metre	=	1 metre.
Decimetre	=	$\frac{1}{10}$ of a metre.
Centimetre	=	$\frac{1}{100}$ "
Millimetre	=	$\frac{1}{1000}$ "

And so on with other units—such as the gramme, with its various prefixes; and the litre, with those by which it is qualified.

DURING the existence of the mania, as it may be termed, for magnesium flash illumination, it is well to remember that there has always been a practical field of usefulness for artificial light in photographic operations, as witness the several forms of apparatus devised, and sometimes patented, for adapting such lights to portraiture. The advantages of an instantaneous light in the avoidance of drifting smoke and of any movement of the living subject during the exposure are not to be undervalued; but it would be unfortunate for the really useful character of the older kind, of what might be called pyrotechnic illumination, to be lost sight of entirely. With these thoughts in view, we may give experimentalists an opportunity of trying the older forms of artificial light by giving the most recent formula for a brilliant and actinic artificial light. A writer in the *Chemiker Zeitung* has recently given the following formula for a penetrating light, which, it is stated, is visible in clear air for a distance of a hundred kilometers:—Magnesium powder, 20 parts; barium nitrate, 30 parts; flowers of sulphur, 4 parts; beef tallow, 7 parts. The tallow is added in a melted state, and the mixture is sifted. This mass, filled in strong zinc case ten centimeters high and seven in diameter, burns for twenty seconds with a light of 20,000 candle power. Making a rough estimate, this might weigh about a pound, and as it would be one third magnesium, its cost is quickly seen. Of course, such an immensely powerful light would be needlessly great for portraiture.

Our readers will scarcely need reminding of Mr. Muybridge, who, with his marvellous pictures (taken by wet collodion, before gelatinobromide had obtained such a thorough hold upon photographers) excited such absolute enthusiasm among photographers and painters, and in the world of society, a few years ago; and they will be interested to learn that he has already commenced to lecture in this country on his favourite subject, initiating his course by appearing on Tuesday and Wednesday at the Royal Academy before a large and select audience of academicians and their friends. We observed a very great

improvement made upon his first efforts, the figures in which were mostly silhouettes; whereas now they were all fully exposed, showing detail throughout. He had arranged to give a lecture at the Royal Institution after Easter, but owing to the illness of the appointed lecturer for the 22nd instant, he has kindly promised to take his place.

Mr. DAVID P. TODD, writing from Amherst College Observatory to *Nature* last week, states, with regard to the last eclipse of the sun—particulars regarding the photographing of which have been fully given in these pages—"More photographs of the corona were taken than ever before; many of them indifferent and worthless, but an unusually large number of great excellence. The best that I have so far seen were taken with five-inch telescopes by Mr. W. H. Pickering, at Willow, and by Capt. R. S. Floyd, at Lakeport, both in California. The latter's lens was newly made by Clarke, on the Stokes-Pickering plan, convertible from optical to photographic use by reversing the crown lens."

We recently transcribed an account of the discovery of one of the most powerful reducing agents known to science, further experiments with which confirm all that has been said regarding its remarkable reducing properties. It appears that not only is the amidogen hydrate itself distinguished in this manner, but its salts also, at least so far as tried—the carbonate, nitrate, oxalate, and acetate.

We have from time to time described the experiments of M. Fonel in ascertaining the limits of depth to which light penetrated sufficiently to permit of photographic impressions being obtained in Lake Geneva. M. Asper, another Swiss naturalist, also engaged in similar operations, but did not confine his experiments to one lake only. So much interest have naturalists felt in these investigations, that a special commission was appointed by the Society of Physics and Natural History to study the subject, and have issued their report. The first-named workers changed their plates at night time, "thus neglecting the action exercised on the sensitive plate by the light which still exists in the sky, even on a moonless night, at the moment of putting in or taking out." Monckhoven's plates were used in a special contrivance for shutting off all light, other than that which really penetrated at the depth to which each plate was plunged under water. With regard to Lake Geneva, 170 metres was found to be the maximum depth in September, in dull weather, when more light penetrated than in August.

The most interesting results, perhaps, were recorded in the Mediterranean experiments, as none of a satisfactory nature had before been made, the experiments in the *Porcupine* having been given up through the failure of Mr. Siemens's apparatus to work. Plates A, B, C, D, E were exposed at depths of 280, 350, 360, 380 metres for ten minutes each, except B, which had five minutes. A and B were much impressed; C, D, and E the impression diminished very regularly with the increase in depth. On plate E the exposure was notably inferior to that given by an exposure of the same length of time in the air on a clear, moonless night. It was concluded that, in the month of March, at least 400 metres was the maximum depth to which daylight penetrated in the Mediterranean—twenty metres lower than in September.

ON THINGS IN GENERAL.

If the extremely sad explosion accident at Dublin should have no other effect, it will have taught the lesson that explosions are the result, in most cases, of carelessness on the part of some one connected with the consumption, and not the manufacture, of compressed gas, for it is evident that any one may with safety use Brin's compressed gas with the assurance that it left the premises of the latter in a perfect condition and properly described. If the storage of compressed gases were universally carried out in a uniform manner—burning gases in a red, and oxygen in a black cylinder—it would be a most excellent thing, and there could be no difficulty in making it illegal to do otherwise. (It must not be forgotten, however, that oxygen and hydrogen, or coal gas, are by no means the only compressed gases offered for

sale, and we might want all the colours of the rainbow for the purpose.) One point to be gained is the bringing home to the minds of the inexperienced the fact that there is a danger in connexion with the use of gases. Many amateur exhibitors have as much acquaintance with this as the casual oarsman who, with his friends out for a day on the river, stands up and changes places in a crank skiff with perfect nonchalance, ignorant of risk. The same in oxygen manufacture. I know of a worthy clergyman who had been a lantern exhibitor for twenty or thirty years, always made his own oxygen, and was aghast at the mere suggestion that there were possible elements of danger in the latter process. I believe the most terrible and fatal explosion that ever occurred during the latter operation was discovered long after to have been caused by the manganese oxide having been ground in the same mill that had just previously been used for grinding coal into fine powder.

We do not now hear anything of the commercial use of the oxy-hydrogen light for enlarging, though at one time it was in great repute for the purpose. At the meeting of the London and Provincial Photographic Association early last month, enlarging matters had a fair share of attention, but no reference was made to this subject. It is a matter of surprise that neither at this meeting nor at that of the Society of Arts, when discussing Mr. Beck's paper upon lenses and the use of coloured screens, was any prominence given to the practical usefulness of the plan of using a loose stained film of collodion or gelatine. I have seen negatives made with the intervention of such a screen, in which it was next to impossible to discern anything that would distinguish it from another negative taken under precisely similar circumstances, except that the screen was not used. Whatever the value of orthochromatic plates may be in the ordinary everyday work of photography, it is certain that no danger to definition need be apprehended from the use of screens—a plan infinitely to be preferred to that of tampering with the surface of a lens by coating it with coloured collodion, &c., and wherein the experimenter, too, is in effect confined to the use of a single colour if he makes a series of exposures in a reasonable time.

Another difficulty, amusing enough, but extremely real, was that propounded by Mr. A. Cowan at that Society. He wished to know what principle of measurement to adopt to make two pictures to match as companions, when one was a man with a bald head and large beard, and the other a woman with a big chignon. It would be just the same if instead of the chignon she wore a tall cap; the difficulty would be as great, and the more likely to occur at the present time than the other case. Mr. Bridge was quite right in what he said; he used no measurements, but judged of the effect. It is not every one who has conveniences to enable him to adopt Mr. Bridge's practice of throwing the two heads side by side on to a screen and judging of the effect. The plan for those, and they will be the majority without such means, will be to take one negative first to the required size, and then compare it with the image of the second, and adjust the latter till it looks all right. But there is always an unsatisfactory element in this kind of work.

Connected with the topic of enlargements is the framing of pictures, and at the North London meeting on February 19 there was an interesting discussion on the subject. The conversation arose on the question of a discolouration of the tints in a platinotype print, the Chairman—the worthy editor of the "BRITISH"—giving his opinion that the change was brought about simply through the infiltration of dust and smoke. Although, as he pointed out, a similar effect in carbon prints was some years ago shown to be caused by the action of light upon a particular kind of paper—that made from wood pulp—there can be little doubt that he correctly diagnosed the disease; and if all photographers would adopt the proper method of framing a picture when sending it out so protected, there would be a far smaller number of so-called faded pictures than there now are. Mr. Hart fully described the required method. Every one must have noticed, at one place or another, framed pictures upon the mount or the margin of which a yellowish-grey stain was to be seen in patches of circumscribed dimensions, caused by the pasting paper having given way at the spot; it can easily be imagined how the whites of the whole surface of the picture must be degraded when there is no protecting paper whatever. The plan mentioned by Mr. Clifton of sealing up an engraving by stretching it damp across the glass of the

frame, and pasting a thin margin round on to the other side of the glass might do for small pictures, but it is very probable that with a large engraving, if it did not, as would be likely, quite break the glass, by its contraction when drying, it would bring about a curving of the surface. But beyond this, it would afford so little circulation of air that the ultimate growth of mildew would be very probable.

I was sorry to read Mr. Haddon's remarks upon what I had written regarding his views upon lenses, and the action of their periphery. He complains, first, that my remarks are unjust by reason of my having separated a portion of his observation from the context, and, further, that my version was inaccurate. I take the report in this JOURNAL (p. 131) as the basis of what I am now saying. I have no desire to start a polemic with Mr. Haddon, whose practical and theoretical skill I bore willing witness to, but I have to say that his is a most unjust and baseless accusation. I gave a word-for-word quotation, and reference to a page, and if the report be inaccurate it is not my fault, and, as to the absence of context, I dealt only with a particular phase of his observations, and not the whole. I had not the slightest intention to misrepresent him, nor do I think I did in any way. I might equally, taking the last report, say he misquoted me in representing me as saying that "an annular ring on the back lens did no harm," for I wrote of the covering the anterior lens, which it is not usual to term the back lens; and, further, I certainly never used any such absurd expression as an "annular ring." This I put down to misreporting, though after all it does not touch the argument. Possibly Mr. Haddon was misreported in the first instance, in which case I hope he will withdraw any imputations upon my candour. Has Mr. Haddon tried this partial obscuration of the lens-surface upon a positive lens with a sharp margin?

FREE LANCE.

ON THE VALUATION OF HYDROQUINONE.

THE paper by Mr. Adolphe M. Levy on *The Valuation of Commercial Hydroquinone*, read before the Photographic Club and published in last week's issue, is of special interest to me, since I have been for some time experimenting with the substance in question, and have on hand at present an unfinished series of experiments in which I have been comparing its developing value with that of pyro. The communication is also of value to photographers generally, since it is perhaps the first definite examination that has been published of the actual preparations supplied for their use, though its bearing is purely chemical rather than practically photographic.

Looking at the matter from the photographic point of view, and comparing Mr. Levy's analysis and his deductions therefrom with my own experience with the various makes of hydroquinone I have tried, and they are many, I must however confess to a slight feeling of surprise; for whereas science and practice are usually found to walk hand in hand, and the purest products generally prove the best in actual use, I am in the position of having pinned my faith, after repeated and careful trial, to a preparation that receives but a dubious character from the scientific chemist. When I say a dubious character, I do not mean that permanent hydroquinone is definitely stated to be inferior to other samples, nor that it has been found deficient in quality either from want of care in preparation or from the presence of impurities, but that, *ceteris paribus*, if another sample excels it because it contains less water of crystallisation, and is consequently a purer—in the sense of being more concentrated—product.

The difference is no slight one, amounting as it does to more than double the percentage of contained water; but the most surprising circumstance to me is that even the better of the two samples examined should contain so large a proportion. I had never imagined that hydroquinone was anything but anhydrous, have never to my recollection seen mention of any modification of it in which the properly prepared crystals retained any moisture, and have certainly never in the course of my varied experiments with it had reason to suspect such a state of affairs as more than twenty-five per cent. of impurity—or, at least, of useless matter—in a product I have come to consider, if not immaculate, at least as perfect as modern chemistry can secure; while under the most favourable conditions, and with the best sample examined, the percentage is only reduced to one-half of that mentioned.

Before going further there is one point I would like to mention, in

which, for very obvious reasons, I should have liked more information in Mr. Levy's paper, namely, the particular make compared with the "permanent." For one thing, if there is a decidedly better kind than "the yellow hydroquinone," I should like to have a chance of trying it; but independently of that it would be interesting to know whether the difference in composition is due to the process of manufacture, to the method of giving the "permanence," or merely to accident; and in order to judge of these questions it would be desirable to know whether both the specimens examined were by the same maker, and if not whether the white sample was of English or German manufacture. Mr. Levy may reply that he desires to avoid any appearance of advertising any particular make, which would undoubtedly have been a proper motive had he confined himself to calling attention to the wide difference that may exist in commercial samples unspecified; but, unfortunately, by naming the permanent as one of the kinds tested, he has singled out a particular maker, and placed it in the power of his rivals one and all to point to his production and say that it has been found inferior to *all others*: for, in this instance, it is *white* hydroquinone against *yellow*, and the only representative of the latter is the particular sample mentioned by name.

I do not for a moment think that Mr. Levy has done this with the intention of depreciating the yellow sample; on the contrary, the comparison of the new make with the white is not only a natural but also a most desirable one; but by individualising the other make tested it would have placed it beyond the power of *more than one* rival to make use of the supposed superiority of the white crystals.

On the subject of the presence of so large a quantity of water, I can say nothing in the face of Mr. Levy's careful and exhaustive examination, except that it is very surprising. Since reading the article, I have made a rough experiment in order to try and find water of crystallisation, but with negative results. About one gramme of hydroquinone was introduced into a long glass tube, one end of which was connected with a small continuous blast bellows, the other being passed into a glass receiver, unstoppered; a plug of cotton wool being interposed between the bellows and the hydroquinone. The latter was brought to a state of fusion by means of a spirit lamp, and while in that condition a gentle stream of air was passed through the tube, carrying its vapourised contents into the receiver.

I had thought that if so large a proportion of water as even twelve per cent. were present, some distinct traces of aqueous vapour would have resulted from the above experiment, but, so far as I could see, there was not the faintest sign of such. The hydroquinone sublimed in dense white fumes, and settled on the sides of the receiver as a fine deposit with a tinge of purple-grey. On the inside of the tube, as the fused material was slowly driven before the flame, a deep purple condensation took place, which was remelted, vapourised, and driven into the receiver as the flame advanced. Very little discolouration beyond that mentioned occurred, and at no stage of the process could I detect any condensation of aqueous vapour. If, then, water be present, it must be in a more intimate state of combination than as a mere accidental mixture, due to imperfect drying.

Another test for water, which I commenced before this experiment was made, now promises me little better hope of success, but I mean to carry it through. A number of accurately weighed portions of the crystals, from three different samples, have been placed in partial vacuum over strong oil of vitriol. If, at the end of a week, no appreciable difference has occurred in their weight, I shall conclude that the water, if present, is somewhat more than mechanically combined, and that the formula and composition of hydroquinone as usually given require reformation, or that Mr. Levy's deductions from his elementary analysis are incorrect.

W. B. BOLTON.

(To be concluded in our next.)

ECHOES.

I Boston in the discussion on hydroquinone following the reading of Mr. T. Charters White's paper at the Camera Club, Mr. Lionel Clark mentions a peculiarity in the behaviour of paper proofs under treatment with hydroquinone that I have myself experienced and which I had set down to the fault of the paper that I have used having been in my possession a considerable time, and possibly partly decomposed.

Now, however, that an independent worker has noticed the unequal action of the developer upon paper, or rather the irregular progress of the action, I presume that the peculiarity is general with paper, and it would be interesting to attempt to trace it to its source. I observe that Mr. Clark's experience is with bromide paper and caustic potash as the alkali. I have met the same behaviour with chloride as well as bromide paper—both very old—and with both carbonate of potash and carbonate of soda. In all cases of full exposure no trace of unevenness remains in the finished print, but with under exposure some difference always remains, proportionate to the degree of under timing.

The same speaker makes what I consider an accurate observation with regard to the reason of the great popularity hydroquinone has attained in France, namely, that it there "had a much feeblener enemy to contend with," in ferrous oxalate, than in this country it has with pyro. This is quite true as regards negative work, but the matter is altogether altered when we turn to developed positives. In that department I fancy ferrous oxalate will prove a more stubborn antagonist than will pyro in the negative department. I say this in the full knowledge of what has already been done in positive work with hydroquinone, and I speak as one who personally prefers it for the purpose to ferrous oxalate. But the latter has got so strong a hold, and has come to be looked upon as so pre-eminently the paper developer, that it will be difficult to oust.

I must also heartily re-echo Mr. Lionel Clark's opinion that the millennium will be a failure if it is to depend upon an "automatic" developer. Can anything be more ridiculous than some of the "modern" requirements? Automatic developers, automatic swing-backs—another *desideratum* (?) actually mentioned in last week's and previous numbers—and similar contrivances, will some day perhaps entirely eliminate the necessity not only for mechanical exertion but also for brain exercise. Then indeed will be the millennium of one class of amateur photographers.

"Every one his own photographer for sixpence," or very similar words, once formed the external inscription on a package containing a number of the so-called "magic photographs," a mere immersion of which in water sufficed to produce a picture. Perhaps if a packet of similar papers or plates were added to each "guinea set," we should be one step nearer the modern amateurs' millennium.

Truly "there is nothing new under the sun," even in connexion with "sun painting." Mr. F. E. Ives's *New Principle in Heliography* is nearly as old as photography itself—in idea, at least. It was brought to partially practical phase by Ducos du Hauron a dozen or so years ago, but failed of complete success from inherent difficulties. Mr. Ives has at the present time better means at his disposal in orthochromatic plates for the production of the negatives, but he is no better placed for imitating the spectrum colours with artificial pigments, or in the production of pure black or pure white without being able to supply in pigment form equivalents for the "invisible" rays of the spectrum.

JENIUS.

FLASH LIGHT EXPERIENCES.

As most, if not all, of the articles on the flash light which have hitherto appeared in the JOURNAL have been either descriptions of apparatus or demonstrations given before the various societies, it has occurred to me that a detailed account of the process in ordinary practice may not be uninteresting to your readers; for after all, however successful a process may be demonstrated by an expert with every detail carefully prearranged, and every possible cause of failure anticipated and guarded against, the real commercial value of the process can only be ascertained by practical experience in the ordinary routine of business. I think, moreover, that especial interest attaches to the present "experiences," inasmuch as, notwithstanding all that has been said and written in favour of the "blow-through" method, and the use of a screen between the flash and the sitter, actual trial and comparison (in my hands at least) has shown that the best results are to be obtained by the gun cotton method and the naked light; and for the reasons following, amongst others, first, the flash, although sufficiently "instantaneous" to avoid movement, is not so sudden and startling as the "blow-through" method, and, secondly, the yellow flame of the gun cotton mellow and softens the otherwise intensely white magnesium flame, at the same time, by using the naked light, producing that sparkle and crispness which characterises the flash light portraits, and

giving them the sunny appearance to which attention has so frequently been directed.

For the sake of conciseness, and at the risk of being considered unnecessarily minute, I propose to deal with the matter under headings as follows, merely premising that it is the outcome of attendance at four fancy dress balls—two in January, 1888, and two again this year—during which I secured upwards of ninety successful negatives (in addition to others obtained in the studio):—

A large and well-lighted ante room, in close proximity to the ball room, was secured, which answered the purpose of *studio* admirably. The apparatus consisted of studio camera and stand, and Dallmeyer's 3 B lens; for background, exterior and interior on rollers were used, screwed to two eight-foot battens, and simply placed against the wall. The best results were obtained when the backgrounds were darkish in tone.

The dark room for changing the plates was made by placing a small clothes horse upside down on a table, throwing over it a dark cloth, and lighting with ruby lamp.

If ordinary plates were used, the extra rapid series did not answer so well.

The lamp was of tin and of the simplest form, consisting merely of a fourteen-inch circular disc for base, and a semi-circular reflector fourteen inches high with handle. I prefer the hand lamp, as the position, height, and angle of inclination can be more quickly varied to suit the subject.

The charge consisted of twelve grains of guncotton, opened out to about four inches, and sprinkled with twelve grains of magnesium powder, placed upon a sheet of gauze and fired, after the word of caution had been given to the sitter, by a lighted taper through a small hole in the base of lamp. During the exposure the gas was kept full on (there was abundance of it, there being no difficulty in focussing by its aid), it being found that not only was no harm done to the negative, care being taken to keep the jets out of the field of view of the lens, but it was of distinct advantage to the sitters, tempering as it did the exceeding brilliancy of the flash to the eyes, and preventing in a great measure the staring expression which is one of the difficulties of the process.

Respecting the cast shadow, where length of room permits, it is best to place the sitter five or six feet from the background; but where space is limited, as in my case, by the simple arrangement of a curtain on a moveable stand, the shadow was trapped, as it were, by being allowed to fall behind.

For reflector, a sheet thrown over a stand about six feet high, and placed within a few feet of sitter, answered every requirement.

For developer, no finer or more suitable formula has been published than that by the editor on p. 468 of the 1888 ALMANAC, with this variation, that instead of using equal quantities of the two solutions, six parts of the alkalies to two parts of pyro, with equal quantity of water, was found a better proportion; the development was slow, but the loss of time was amply repaid by the range of gradation obtained, and the bringing out of detail in the shadows; and besides, as all the negatives received the same exposure, a great saving of time was effected by developing in batches, as is my practice: the negatives required very little retouching.

In conclusion, I deprecate the statement I have seen repeatedly, that "portraits by the flash light cannot be distinguished from those taken by daylight." They are not as good, nor is it reasonable to expect them to be. At the same time, there can be no question that the introduction of the flash light has placed a new power in the hands of photographers, and that, intelligently used in conjunction with ordinary business enterprise, it is calculated to revolutionise the business experience of the winter months.

GUNCOTTON.

LIGHTING THE SITTER.

PHOTOGRAPHY may be studied both as a science and as an art. Science gives us technical excellence; art introduces beauty, grace, and feeling into our work. The photographer of olden time devoted all his energy to the technique; his ambition was the production of a sharply focussed negative free from pinholes, comets, smears, and fog. The camera artist of to-day leaves much of the science to the manufacturers, who supply him with perfect lenses and unimpeachable plates; and he in his turn studies the posing, lighting, and general arrangement of his subject in order to satisfy an exacting and critical public.

The posing and lighting of the sitter, whether regarded from a scientific or artistic standpoint, is a matter which well repays any attention and thought bestowed thereon, for upon them depend

almost entirely the degree of personal beauty and expression of the features portrayed. Many a photographer has wondered why his customers so frequently complained of the sad and heavy aspect of countenance shown in his pictures; he remembers telling them to look pleased and gay—and they apparently did so. Sometimes the mouth seems all right, for the corners are well turned up in a forced smile, while the brow is heavy with care, and the young sitter has the worn aspect of age.

Retouching does not put matters quite right. It will remove wrinkles, and make the face as smooth and round as an apple, but the truth of the portrait is generally affected, sometimes becoming so marred that the picture appears like another person—a sort of cousin with strong family resemblance.

The bad poser would photograph Mr. Punch with his distorted nose in profile, producing a caricature; the good poser, by taking a front view of his comical highness, would produce a portrait of a genial jolly fellow, with a nose apparently not much larger than the average.

The bad "lighter" would take a person possessing cheeks deficient in plumpness with a good strong top light without reflectors, thereby representing him in his photograph as a broken-down individual who had been imitating the doctor who fasted forty days, and who had thereby drank deeply from the cup of sorrow.

The good lighter would take the same person with light falling nearly horizontally from a position between front and side, with plenty of reflected light from other directions, making the face appear plump, the expression almost merry, and the eyes sparkling with health, and this without retouching.

These examples illustrate the well-known fact that upon the correct adjustment of the curtains, reflectors, and the interior of the studio generally depends the success of a portrait. The professional, working from experience and the recollection of past failures, though he may not inquire into theory much, produces good pictures; the amateur, taking his portraits in different places, and under varying conditions, finds most need of a few hints concerning the principles of lighting.

Outdoor portraiture has some advantages in consequence of the light being unobstructed by the glass panes, window-bars, curtains, and walls necessary in a studio. These advantages consist of a brief or instantaneous exposure, with a corresponding absence of blurring-through movement, fine definition of the details, owing to the small stop available in the lens, and the bright and clear appearance of the print generally, due to the use of landscape lenses having few reflecting surfaces. But outdoor work has its disadvantages. We cannot usually alter the lighting without an entire change of scene. If the top light is too strong the subject can go into a doorway, which gives probably too dark a background. If we move under some trees the lighting may be too equally diffused, and as we cannot control the clouds or direct the sunshine, we have to take the lighting as we find it, and content ourselves with a bright negative full of detail.

In a studio, or in a room possessing a large window, we can alter the lighting, but we are obliged to use a lens of large aperture and rapid plates, with occasionally forced development, for with slow lenses and plates we require a head-rest—an instrument of torture to many, who, when their heads are placed between its metal jaws, and their necks have become stiff or half paralysed by the constraint, are told to look pleasant. If we possess a studio fully furnished with windows, blinds, and reflectors, we can take good portraits therein, provided we understand the principles of lighting.

The most difficult feature to render satisfactorily in a portrait is undoubtedly the eye. The eye-ball, as everybody knows, is globular in shape, approaching whiteness in colour, and it has a bright, polished surface. Light falling upon the eye is partly reflected from its surface, just as it would be from a convex silvered mirror; this reflected light gives the bright speck usually seen in the eyes of portraits. If this point of light is wrongly placed, or if there are two equally distinct specks instead of one, the portrait is a failure, for when this is the case we have the effect of either blindness, squinting, an unpleasant expression, or a dissimilarity between the two eyes. To photograph the eye properly, it is not sufficient to show the outside shape, for then reflections would be of little moment. The interior of the eye is of as much importance as the exterior; we should be able to look through the cornea, to see the iris and its central opening—the pupil. In order to show the pupil as a black spot there must be an absence of reflected light from the centre of the cornea; and to see the iris in whole or in part there should be a total or partial absence of reflections from the rest of the cornea. It is the variation in the colour of the iris which produces the different varieties of eyes—blue, grey, black, brown, &c. Grey and black eyes give little trouble in photography; brown eyes appear too dark, and blue eyes too light,

Brown eyes can be corrected in the negative by careful retouching. Blue eyes cannot be assisted much in this way, but by cutting off reflected light from the cornea we may produce a representation which will require very little touching up in the print.

ALBERT W. SCOTT.

ENLARGING METHODS.

II.

THE general features and principles of the apparatus employed for purposes of enlarging were much about the same in its infancy as those embodied in the instruments made use of at the present time. They were, however, of a less complex order and of ruder construction, as sun and daylight were only then the illuminants at command, magnesium not coming into use till later, and other artificial lights were not of sufficient power to be of use with the slower plates and less sensitive materials then available for the purpose. The most expensive and best-known form for direct enlargements on iodised paper, with gallic acid development, was the arrangement known as Woodward's solar camera, now obsolete, or, at any rate, only to be met with in very old establishments, and there only as a curiosity. It was fitted with a large condenser of the nature of a bull's-eye for concentrating the sun's rays upon the negative, while it was necessary to keep this thin and full of detail to avoid the tendency to harden the powerful light and weak materials favoured. This instrument may be considered as the progenitor or type of the modern and more refined means of employing artificial light for the production of enlarged photographs as now obtained in the lanterns and cameras especially constructed for the purpose. Some of these are very elaborate and perfect, and one might expect to see great advances in the quality of the work over that of earlier periods when instrumental difficulties were greater.

Quantity, however, and speed have it, and seem to be more satisfying to modern needs, and likely to promote free circulation of pictures upon the walls of the purchasers instead of the production of works of art of a durable character. Direct enlargements, apparently, conduce more to the filling of the pockets of the firms who produce them than to the credit of photography.

The arrangements necessary for making enlarged transparencies and negatives by daylight are now, as formerly, of a simple kind, especially when a room, or part of one, with the use of a window to be darkened at will, is at the service of the photographer. A frame or table on which a camera can be placed to slide towards an aperture in the window shutter, and adjusted at such an angle that it points to the sky, with an extension of the frame to carry a second board or easel perpendicular to it, is about all that is required in a small way, and is a fair illustration of the principles involved in the construction of the more elaborate and expensive kinds used by the first-class professional enlargers, upon which anything can be done from the smallest locket to life-size, and upon which adjustments of great accuracy can be accomplished in a short space of time. I have several such cameras, and one in especial upon whose easel I can adjust and focus a midget or a 30×24 with the greatest ease, rapidity, and certainty. Cameras of such a range are necessary to these firms on account of the great variety in the size of originals and what is required from them which constitute the orders they book; the assortment being so great and irregular that tables of enlargement are but little use, a defect of assistance that must be counterbalanced by improved means of adjustment in the cameras, whereby the changes in question may be immediately carried out in accordance with the judgment and experience of the operator, whose constant practice teaches him what to do when the instructions accompanying the negative are made known to him. Where it is simply to go from one common size to another, reference to tables or notes saves trouble. It is well on any camera, even of the most makeshift sort, to lay off on the table or frame supporting it, and upon which it slides, a scale in inches and feet, to enable the positions of the lens and easel in respect of the original negative to be noted for future use. The common requirements—as *carte-de-visite* to cabinet, whole-plate, &c.; cabinet to whole-plate, 10×8 , &c.; and so forth—may appear in the list, with their respective positions in inches marked against them. The table may be either calculated by the usual formula for the lenses in use, or arrived at by fitting plates of the sizes named into the negative carriers and enlarging them to the sizes of which particulars are needed. It is a rough-and-ready way, but is quite effective. Indicators are only necessary when lenses of all descriptions are employed in the camera. They may be of use in clubs or enlarging rooms open to all—that is, if the frequenters of such places understand them—but are not of much account on a professional photographer's premises, who has no space for ornaments, and no time

for fads. A pair of compasses, a foot-rule, and a quick method of shifting the different parts of the camera, in addition to the above table, will consume less time and brain, and be found more satisfactory.

These remarks only apply to the ordinary enlarger's and copist's work in portraits and landscapes where micrometrical accuracy would be simply labour thrown away. When it is a question of great nicety, as in dealing with the enlargement or reduction of drawings, maps, and plans, then too much pains cannot be taken to ensure exact knowledge of the equivalent focus of the lens in use, and its position in respect of original and sensitive plate to enable the variations of scale it is desired to reproduce these subjects in to be faithfully performed. In this class of work no rule-of-thumb or makeshift appliances will do. Something definite is needed, and definite means must be employed to obtain it. It is therefore essential that the enlarging camera be well constructed, and that the principal planes perpendicular to its base carrying original lens and sensitive plate respectively may in sliding keep true parallelism with one another, and have such adjustments to them that any failure in this respect may be detected and remedied; for let the camera be ever so beautifully made and exactly right at the outset, it will not be long before the means of correction prove their value. Photography with apparatus of this description is slightly different to that of snap shot with a hand camera. "Nine-bob-square" is "out of the running," and the tendency to fad does not come, because there is ample exercise for one's thought, skill, and patience without it.

The earliest artificial illuminant for enlarging which was at all common was that of burning magnesium, and the best-known form of lamp in which it was consumed as a ribbon being Solomon's. It held the field for a period of years when direct work on iodised silver paper was the means of supplying the demand for cheap enlargements, but was afterwards superseded by the limelight, when the carbon process requiring enlarged negatives began to take hold and come into great prominence. For this form of light for enlarging there is much to be said. It is of a very high quality, and now the means of producing it have been so much improved, it is simple and safe and not at all costly. Its rivals are, the electric arc, the expense of the installation of which will prevent its becoming common, at any rate, till electricity is "laid on," and paraffin oil, within every one's reach, and quite suitable for the gelatino-bromide and direct silver work, whose age we are now delighting in. The employment of petroleum has caused the enlarging camera to assume the appearance of the optical lantern, now so well known as to need no further mention.

The best lenses for enlarging are those of the rapid rectilinear type, doublets, triplets, and portable symmetricals being equally useful when there is an abundance of light, as they are somewhat slower in action. Whatever be selected, see that they are quite free from spherical aberration and capable of giving an absolutely sharp image on a portion of the plate, say with a $\frac{1}{2}$ stop. Lenses by first-rate makers vary, therefore it is well to learn an instrument thoroughly, that its powers may not be exceeded. I have two of one kind, by a first-class optician, made at periods widely separate. They are not of equal merit, the younger one being a great deal behind its elder, its image not being absolutely sharp under any circumstances where the middle-sized stop is exceeded. The defect is only trifling, and would not be noticed except in the trying conditions of reproducing, where the test is a severe one. When convenient it is a good plan to enlarge or copy the negative by the lens with which it was taken, taking the precaution to keep their relative positions the same; that is, the back combination towards the negative. The lens then, by re-passing the image, corrects any defects it had previously caused. Distortion, as produced by single lenses, may be thus remedied. Portrait lenses may be employed for bust pictures, but are scarcely to be recommended for those covering the sheet. JOHN HARMER.

A PERMANENT TEN PER CENT. HYDROQUINONE FORMULA.

[A Communication to the Photographic Club.]

THE subject of hydroquinone has been so much written and talked about that it is pretty well done to death by this time; but as the season is just upon us when we shall all be ready to rush out into the country to secure some fresh scenes which perhaps may have escaped our notice before, this, then, will be the time when hydroquinone will have to fight its brother on the battle-field of developers. I am not going to say at present that I prefer this chemical to pyro until I have had greater experience in its use; but when I use pyro and ammonia, or soda, I am inclined very often to cry out, "Good old pyro!" and I am sure many besides myself here will agree with me that it

requires a good deal of beating. However, in many hands hydroquinone is capable of producing quite as good results as any other developer, and, moreover, it has the quality which I am sure many will hail with delight, that it does not stain the fingers, and the negatives produced by it are of a brilliant and clear character, which makes them extremely useful during the dull winter months for quick printing.

If the chemistry of hydroquinone I do not intend to touch this evening, as it is quite outside my sphere. I must leave this side of the question to my friend, Mr. Levy, who has already given us valuable and interesting information respecting its nature, and who has, I know, a great deal more to say respecting it.

Hitherto, all the formulæ that have been published have been rather too bulky; that is to say, that it was impossible to get a very large proportion of hydroquinone into solution owing to its being sparingly soluble in water. This, of course, is a serious drawback, not so much to a portrait photographer as it is to the tourist, who, of course, requires that everything should be in as concentrated a form as possible.

In some of the early formulæ, alcohol has been recommended as a solvent for hydroquinone, it being extremely soluble in the liquid, namely, to the extent of about thirty per cent., but it has this drawback, that the solution soon becomes a very dark brown colour, almost worse than pyro in the same oxidised condition. In the formula I have just perfected, alcohol is still the liquid in which the hydroquinone is dissolved, and in order to preserve it from oxidation I employ sulphurous acid, which appears to keep it good without any change at all, but I can only speak from three months' experience at present.

As it was the wish of the majority of members of the Photographic Club that some reform should take place in the weights and measures of formulæ, I have taken this opportunity of giving the proportions of this new ten per cent. hydroquinone in the French measures—viz., grammes and cubic centimetres—pending their decision as to something better; although extremely convenient and easy in use, I am afraid it will be a long time before the method becomes general, because as long as things continue to be sold by the ounce, so will formulæ be given in the same.

The formula stands thus:—*

Hydroquinone	30 grammes.
Spirit (meth.)	100 c.c.
Sulphurous acid	100 "
Water, sufficient to make	300 "
Sodium hydrate	30 grammes.
" sulphite	30 "
Water, to make	300 c.c.

Take three c.c. of each solution, and fifty c.c. of water.

You will notice that I have endeavoured to keep the proportions as round numbers as possible. There is nothing I abominate more than a complicated formula; the simpler it is the better, not only in chemicals, but also in the proportions.

The strength I have given will develop a plate in about five minutes with normal exposure. The addition of bromide is not necessary. (I may say here that I have experimented with Thomas's plates only, so cannot say if the developer is suitable for other plates.) Potassium hydrate may be used instead of the sodium, but then a larger proportion must be used. By so doing you naturally get more sulphite of soda as well; this tends to keep the developer clearer for a much longer space of time. I may just say that the sulphite may be left out entirely; although the solution discolours a good deal, the appearance of the negative is just the same as though sulphite had been used.

I feel I have sufficiently exhausted the subject, at least from my point of view, as writing a paper to me is not such a work of love as carrying out experiments. However, one is always well repaid by the attentive manner in which a paper is received by members of the Photographic Club.

J. B. B. WELLINGTON.

* For the convenience of some of our readers we have converted the formula into English equivalents:—

A.	
Hydroquinone	462 grains.
Spirit (meth.)	34 ounces.
Sulphurous acid	34 "
Water, to make	10½ "

B.	
Sodium hydrate	462 grains.
" sulphite	462 "
Water, to make	10½ ounces.

One part each of A and B to seventeen parts of water.—ED.

SKIES.

Why is it that the average photographer pays so little attention to "skies?" There is nothing that gives such a charm to a picture as a suitable and picturesque sky, and yet we see so many landscape and architectural subjects with the plain white skies once so popular—when a "clean" sky was looked upon as proof of technical excellence. A photograph with such a sky is like a song without accompaniment—it may be good technically and in an artistic sense, but it lacks the charm of music, for a well-graduated and properly lighted sky is "music" to a picture!

There are many difficulties in the way of obtaining a good sky on the same negative as a picture; but there is absolutely no difficulty in obtaining suitable skies on separate plates, and utilising them by combination printing; this is even now considered as illegitimate by a few photographers, but there is no sound reason for their objections.

Even when we find photographers who carefully print in skies they are oftentimes of such a "woolly" nature as to damage rather than improve the picture, and it very often happens that the same sky negative is made to do duty for a whole series of views—this is "too much of a good thing!"

Who can look upon the beauties of even an English inland sunrise or sunset without feeling a sense of the beautiful and a keen appreciation of the variations of light and shade? even a stormy sky has its delights, with its white, fleecy lights and heavy masses of black shadow.

Many negatives which are only passable may be made to yield charming prints by the addition of a beautiful bit of "cloudland," just as the commonplace words of a song may charm the hearts of its hearers by the sweet melody of appropriate music. Many well-known pictures owe their popularity in a great degree to the "music" of their skies, just as many popular songs owe their success to their music; therefore it behoves us to look to our "music," if photography is to take its proper place among the older arts.

OXONIAN.

PSYCHIC PHOTOGRAPHY.

We are slightly at a loss as to formulating the position one might reasonably hold concerning Psychic or Spiritualistic Photography. But we believe it may be done in this way: Some believe that death does not end all, as regards human beings at any rate, but that after passing through that experience known as death, men and women still live, and may make themselves manifest under certain conditions. This, we take it, is Spiritualism, especially as distinct from Materialism, which recognises no existence after death.

The spirit-body is supposed to be existent, and capable, under certain conditions, of making itself visible, if not to the visual organs of the observer, at any rate to the photographic plate. We very well know that there are invisible as well as visible rays of light, and Spirit Photography is assumed to be founded upon the emanation of rays invisible to the spectator, but nevertheless existing—in short, the rays which are ultra blue, and which all scientists recognise as possessing chemical power without being able to impress themselves upon the sight nerves of a normally constituted human being.

Photography has long been said to afford the means of determining the existence of such invisible entities—that is, if these be present when the photographic operation is going on; and just so far as photography is supposed to conduce to this end, and not one step further, do we permit the discussion of "Psychic Photography" in our columns. We don't want hypothesis or opinions, but well-attested records or results of experiments.

A correspondent of the *Birmingham Daily Gazette* has interviewed Miss Power, and having evidently made himself intimately acquainted with all that appeared in our pages ere the correspondence relative to Psychic Photography became so heavy and voluminous that we had to close it, has written a very long account of the subject generally, and this interview in particular, from which we make a few extracts.

"The Society of Psychic Research has taken up the matter, and appointed two of its members—Dr. Myers and another—to interview and examine Miss Power. Visitors come from all parts of the country in the hope that Miss Power may be able to secure a photograph of their dear departed relatives or friends. Letters arrive from all parts of the world making anxious inquiry touching experiences in the life to come. Miss Power courts inquiry, and rarely refuses to give an audience even to the most sceptical. The psychic photographs—some of which have been developed by Mr. Whitlock, of New-street—are taken in a small upstairs room, which one can cover in a couple of strides. The camera is placed in position, and focussed on or rather slightly above the chair on which Miss Power is to sit. The window is heavily draped, the fireplace screened, and the room

made perfectly dark. Then Miss Power and visitors take their seats and maintain absolute silence and stillness, in order that the air in the room may become quiescent. When all is deathly still and silent, the Ilford quarter-plate, which has been previously placed in the slide and uncovered, is said to receive the image of the spirit or spirits floating in the room. Then a magnesium light is burned in order that visitors may see that there are no strangers or trick-forms present, and the plate is immediately developed. As the burning of the light was considered by some visitors sufficient to cause a cloudy appearance on the negative, a few had been taken in absolute darkness—with the same result. The spirits mostly have a nebulous shape, and seem draped in a variety of night-dresses. One spirit looks like a well-to-do gentleman with a handsome beard; another resembles a woman of sixty; a third is a girl of sixteen, of delicate figure. Believers and unbelievers can buy them at a shilling each. Miss Power invites mediums who possess a camera to buy a box of plates and try to photograph their intimates in the other world. She says there is no reason why any one should not obtain good negatives."

After describing some "manifestations" said to take place, the interviewer continues:—

"But to return to matters in which the public are more closely interested. Miss Power is interrogated as to why the challenge of the editor of THE BRITISH JOURNAL OF PHOTOGRAPHY has not been accepted. Her reply is rather startling. 'Dr. Norris, you know, is the president of the Birmingham Photographic Society.' 'Yes, and after the intimation in the JOURNAL he probably communicated with you?' 'No, he did not. You see, he is a spiritualist, though he doesn't publicly avow the fact. He effects his cures by the aid of the spirits; he has earned his position by spiritualistic means.' Which delightful revelation will probably startle Dr. Norris almost as much as it did the interviewer."

On this "delightful revelation" we have merely to remark that if the spirits, either directly or indirectly, had a hand in enabling Dr. Norris to make his great discovery of photographic dry plates forty years ago, then for once, at any rate, they have done a good thing, and one which entitles them to the lasting gratitude of photographers.

A CHAT ON DEVELOPMENT.

THE value of the varied manipulations in the production of negatives has been immensely enhanced since dry plates have come into general use. Speaking broadly, comparatively little latitude is allowed in the three main operations, viz., lighting, exposure, and developing, which very largely accounts for this. Two or three seconds more or less in the exposure did not, as a general thing, materially affect the negative in the old wet plate days. The lighting, again, did not require the same nicety in modelling, and developing was far easier in many ways: one great reason being that intensification was so simple a matter, which it certainly is not with dry plates.

Then, again, dry plates are very tricky. Without wishing to say anything unkind about the manufacturers of them, it is an undoubted fact that to get two batches of the same maker's plates exactly alike is almost an impossibility. They do vary, and that very considerably sometimes; and what has to be done is to so regulate things and apply methods that uniformly good results may be got.

Sometimes, for instance, they dry up very dense, at others losing rather in density; now the film is more di-actinic and looks really "thinner" than "printably" (to coin a word) it is. And reasons might be multiplied to prove that they are what I termed them. Well, it follows that a long and careful experience is a *sine qua non* to successfully work them—I mean "commercially" successful, where nearly every "shot" tells: not after the manner of many who do not pose as amateurs, who think they have done big things if they get a decent negative out of every three or four exposures, and that by a wretched "fuke."

Without doubt a good "developer" (using the word as a personal appellation) deserves well of his profession; and where he holds the post as a distinctive office, it is hardly fair to relegate him to a position inferior to the other operators. He is a man of skill; skill acquired by an unstinted use of the faculty of observation and unremitting care, which by mitigating studio difficulties makes the work go "merrily on." His work seems to be done by a sort of intuition; he knows when to send the developer over the plate with rapid "swirls"—by so doing brightening up the lights and avoiding flatness—or by a gentle undulatory movement coaxes out the details; or, again, sends over the developer with a scarcely perceptible movement in order to prevent "hardness"; now "tilting" and manoeuvring so that a defectively coated plate may be circumvented and uniformity of density obtained.

So much in fact can be done in developing, either for good or for evil, that too much care and attention cannot be devoted to it. It is not the simple operation of "only just pouring on the acid" that one

hears from time to time from the lips of the knowing "amateur," and the spirit of which too many professed photographers exhibit, if one may be permitted to judge by their manipulating and the results thereof. No, there is a good deal more than that wanted, even supposing all things are favourable. The light and subject have always to be considered, as well in the developing room as in the studio. In consequence of this fact it has always seemed to me that those who develop at the time of sitting are in a position to attain—well, if not better, certainly more uniform results than those who do not, and who defer development until the end of the day's work, for it is hardly possible to remember the conditions under which all the exposures were made; but being a necessity with very many, carefulness and quickness of resource are imperative.

With many operators there is far too much hurry and flurry. It may be a fresh batch of plates are commenced; if the picture flashes out quickly they (in nine cases out of ten) jump to the conclusion that overexposure is the cause; resort to restrainers or condemn; exposure again, cutting down exposure, and are astonished and disgusted at a meagre, miserable-looking negative. One occasionally does get a batch that develop in this way, but they will yield good negatives granted the image does flash out more quickly than is liked; still if correctly exposed detail will not be lost: they will gradually increase in density, further detail does not come out, and as a consequence the image will not flatten nor the shadows fog. With a plate of this kind one thing must be very carefully guarded against, and that is overdeveloping. "Piling" up rather slowly they are apt to look much thinner than they really are, and as a rule the film is extremely di-actinic.

Some samples, again, develop in a way exactly the reverse of the foregoing: they come up very, very slowly, and continue to give detail the whole time of developing. They would be voted a nuisance by any one in a hurry, but the results are good. With these, again, an impatient man might conclude that they were "slow" (in exposure), and that more time was wanted. Arriving at that point he might decide to condemn or consider it necessary to "dose" with ammonia to "hurry" it up. Such treatment is decidedly to be condemned, as it is detrimental to good work. Naturally enough the stronger lights are seized upon with avidity, and before the picture is fully developed the finer gradation and half tones are ruined. Plates have got their peculiar ways—well, try and find them out, and let them have them so long as satisfactory results are at the end of them.

Plates that develop rather slowly all round—that is, detail comes slowly and density also—are deservedly the favourites with the great majority; for the negatives, as a rule, are better than those on the very quick or extremely slow. They are well under control (a great desideratum), and density can be judged to a nicety.

The great want and the most difficult thing to get with dry plates is really good modelling. This can only be done in lighting, although an equal care is necessary in developing: under and over development is so easy. *Apropos*, there is an immense advantage in sticking to one good make of plates (or two or three at the outside), as all their peculiarities and variations become known and (what is more to the point) the modes of treatment rendered necessary in consequence. There are restless spirits who are always trying something new, either in plates, developers, or fad of some sort: they are never content, their work is variable (what wonder?), clients are dissatisfied, and re-sits multiply alarmingly. Now while it is quite right the *last* new make should be tried so that the *best* may be found, or at least justice done to all competitors. But where much egregious folly is displayed in clearing or running out of the old reliables, instead of continuing their use until experiment has found a better. These experiments, again, are frequently conducted very unfairly and in a slipshod way. Old developers and methods are used, and the endeavour made to fit them to the new plates; as a result many good plates are condemned, and the spirit of unrest lives on.

With regard to developers themselves, it will generally be found that the maker's formula is the best; modifications have, of course, to be made now and then. To cite a case in point. A few years ago I was under the necessity of returning a couple of grosses; the negatives were simply execrable—flatness, halation, everything that was bad; variations of the old standard developer—and in the exposing were equally useless. I had a few left, and during the slack season I made up a developer "out of my head." It was very simple, being as follows:—

Liq. Amm.	1½ drachm.
Br. Amm.	1 " "
Water	12 ounces.

With this I used equal quantity of water, adding a few grains (to

ounce) of dry pyro. The results were charming, and I sadly regretted I had not the sundry returned dozens in stock. This developer, however, proved quite unsuitable for the ordinary quality of the same plates. At another time I used half ordinary and half sodic sulphite with good results.

It is necessary to know something of the properties of the chemicals used, and with that knowledge a little common sense will overcome many worries and difficulties and lead to greater success. I do not know what the opinion of others may be, but I do incline to the bromide of ammonium rather than to the bromide of potassium as a restrainer. It seems to admit of greater delicacy of half tones—gives more half tone in fact—the image does not seem to “fill up” or “block” to the same extent, even when development has to be prolonged. There are advocates in abundance for the sulphite of soda developer, but invidious comparisons are unnecessary, good results are to be got with almost any formula, but like many other things much depends upon the using.

More directly to the subject. If the negative, despite its want of vigour, gives plenty of half tone and clear shadows, then an increase of both pyro and ammonia should put matters right; in obstinate cases dry pyro might be better than usual “stock.” If, however, the negative, in addition to thinness, lacks half tone, and the shadows are hazy and dirty-looking, pyro must be increased, but using normal quantity of ammonia; or, that failing, the bromide might be increased. The latter method, however, is rather hazardous as “sootiness” is not an infrequent result. “Another way” (pardon cookery-book parlance) is to flood with pyro first for a minute or two before adding ammonia; or should they be plates developed with ordinary pyro and ammonia, it is not improbable that if the sulphite developer be used better results will be got. If, however, there is an inclination to hardness, half and half of developers. Sometimes there are plates which will give intolerably strong contrast—they are rare it is true, and well that they are, for they require a lot of very delicate attention before decent results can be got. Exposure should be lengthened as much as possible, even until the deepest shadows are *slightly* hazy; developer also must be reduced. First try usual quantity of ammonia and less of pyro; if, however, negative lacks modelling use less than normal quantities of both. Immersing in water for a minute before developing will sometimes improve them, or even flooding with ammonia first; this latter wants great care.

Most plate makers recommend immersing in the alum bath before fixing, simply as a precaution against frilling. I do not wish by any means to pose as a “quidnunc,” but I certainly do think the alum bath plays another and not a less important part than preventing frilling. Sometimes the result is beneficial and sometimes it is not. With some it acts as a kind of “fixer,” rendering the unfixed image more permanent, and imparting good qualities to the film. On others, again, it has an effect quite the reverse and impairs the quality. One thing, however, is important—the alum bath should be weak and *not* of the same strength as that used after fixing; for if the strong is used it has a deleterious effect (at least in those cases I have noticed), robbing the film of good printing quality. I do advise operators to try the effect of immersion and of non-immersion, and so prove for themselves which method is the better for their own particular plates. I use a deservedly popular plate and *always* immerse prior to fixing, as I find without it the negatives are not anything like so brilliant. On the other hand, I have others (not same maker's) which puzzled me terribly. They worked well and quickly, and everything looked perfectly satisfactory until they were in the fixing, when, horrors! they were all streaks and patches, took an unheard-of time to fix, and when they were fixed there was a regular network of transparent markings rendering the negative valueless. I could not understand it a bit, as I am always careful to wash the plate well after removing from the alum. One day, however, I cut an exposed plate in two, and after developing put one half as usual into the alum and the other direct into the fixing; the latter was perfect, the other came out exactly the same as the others had done. I offer no reason for this: I simply relate it. The moral, however, was very obvious.

It is always advisable to bring up the negatives a *little* more than full printing density, but of course *not* to the “blocking” point. Plenty of “body” is admittedly a *sine qua non*, but that need not be at the sacrifice of either detail or half tone. A trial or two will decide upon the amount of extra density; then to reduce with the alum, citric acid, and sulphate of iron “reducer” to correct printing density. It will give a beautiful blending of shadow and high light, capital printing quality, and, in addition, will obviate and consequently save a good deal of retouching. The “reducer” with sulphate of iron is preferable in the majority of cases—the lights seem to be kept purer and brighter. It may be used the full strength for

obstinate negatives, or reduced for those that require little more than the staining, a simple flooding being sufficient. There are plates that are better without having to resort either to reducing or staining, such as those which give delicate yellowish films; robbed of their “natural” colour they seem to lack life and vigour, and the prints are “leadeny” looking.

A little hint *re* really obstinately thin negatives and also for copying. Sufficient density cannot be got by the ordinary methods: use dry pyro with usual ammonia for developing, and *before* putting either into the alum or fixing bath (the former bath may be omitted) let them stand for about ten minutes or so; the result will be an intensely yellow film, one which will give bright prints. Exposure to daylight for a minute or two sometimes improves a negative inclined to dirtiness in the high lights, especially those developed with the sulphite developer. I stumbled across the “wrinkle” some years ago. I had a great number of sitters and could not possibly spare time to develop, so had to develop all together. I had to keep one or two plates waiting before I could put them either in the alum or fixing. The result was deplorable, such a density I could not get rid of with the strongest reducer. All the other negatives were perfect, so that I read the cause at once, and have profited by the experience many a time.

Very much more might be written on so vital and engrossing a subject, but I trust the perusal of the few notes I have submitted will tend to create a more intelligent interest amongst some of us in the little details of manipulation which dry plate photography demands, and also prove helpful (to some at least) to the attaining of every operator's ambition—a *good negative*.

WILLIAM SCHMIDT.

ART IN RELATION TO PHOTOGRAPHY.*

THE recognised leaders in art incur serious responsibilities, seeing that they have, as it were, the moulding of the feelings and ideas of those who trust themselves to their guidance; and how easy it is by dogmatic assertions of their own views to warp the judgment, to blight and chill the fervid aspirations of their pupils. It has often struck me that there is a very marked difference observable between those who devote themselves exclusively to artistic pursuits, and those who identify themselves with matters of a more scientific character. In the former there is a kind of Bohemianism and a manifestation of insipient lawlessness, call it devil-may-care if you like, which is quite refreshing to be brought into contact with, whilst the latter seem to partake more of a cold, arbitrary character of their own mathematical calculations.

All that glitters is not gold, and it is equally true that all which is pictorial is not art. Still, setting aside for the moment the question of art, it is by no means surprising that the practice of photography has endeared itself and become so popular with such a large section of the community as it has. This, of course, is partly accounted for by the fact that during the last few years the mechanical and manipulatory difficulties have been reduced to almost *nil*, so that now any one who possesses the smallest amount of manipulative skill is enabled to prepare for himself results which form at least pleasing reminiscences of places he may have visited, or reproductions of objects which he values. Indeed, it is becoming a common practice for the proprietors of large concerns to make it a special adjunct of their business plant, so as to utilise it for advertising and various other purposes. The professional photographer probably regards this movement as a kind of innovation upon his vested rights, and feels that his nose is being put out of joint; but if he finds he is getting too much spare time on his hands, let him, by a greater exercise of his artistic skill and training, bring it to bear more forcibly upon his professional work, and he will not find his occupation gone, but probably increased by his having raised himself upon a higher platform of art—for, depend upon it, there is still plenty of room upwards—and by so doing he will find that he will still be able to afford himself the luxury of a little bit of cheese to his bread.

I cannot allow this golden opportunity to pass by without breathing fervid anathemas at what I consider the most withering influence which has ever been brought to bear upon photography. You will have anticipated me when I say retouching, that insidious, treacherous photographic art, the older I get (and people tell me I am getting on) the more do I hold it in contempt. The introduction of albumenised paper, although hailed with delight by many, was, to say the least of it, a retrogressive step, but the so-called art of retouching, fraudulent and libellous as it is, has done more to degrade the art side of photography than all other abuses combined. The full power and capabilities of photography pure and simple, especially in portraiture, will never be developed until the almost despotic rule of this dangerous usurper is suppressed. Let us then have more genuine photography into which the art instincts of the photographer himself have been instilled—and the means at his disposal for assisting him in his endeavours are infinitely greater now than in days of yore—and we shall then find that there will no longer be the

* Concluded from page 165.

necessity for resorting to such mechanical and meretricious aids, and photography will rise with increased vitality into more elevated regions of art.

I would not have it supposed for one moment that I am indifferent to the advantages of art culture; indeed, I regard such gatherings as this as highly conducive to our best interests in that respect, the bringing together and contrasting one with the other the various examples of our work, as on this occasion, is not only pleasant and agreeable, but highly instructive and educational; and most sincerely do I appreciate, in common, I am sure, with all the other members of this Club, the warmth and geniality of feeling which prevails, as well as the willingness—indeed, I might almost say anxiety—to impart information one to the other upon matters connected with photography. The only regret I have is that, with hearts so expansive, our accommodation is not more extensive; but I still hope that in the not very distant future, to use a commercial phrase, this long-felt want will be duly met. Wm. Cobb.

LORD RAYLEIGH ON EXPERIMENTAL OPTICS.

III.

LAST Saturday the Right Hon. Lord Rayleigh delivered his third lecture upon the above subject at the Royal Institution, and said that in optics wave length is dealt with rather than periodicity of vibrations, because the latter cannot be directly measured as they can in the case of sound. The periodicity of waves of sound is readily measured by the aid of the siren and of other instruments. In experiments on sound the beat can be compared with the known rate of velocity of sound. With light, difference of wave length gives difference of colour, and the refrangibility of light depends upon wave length; the longer the waves, the less they are refracted.

In relation to the elementary phenomena of light, there is not much to choose in explanation thereof between the emission and the undulatory theories. No doubt the projection of shadows is more easily explained by the corpuscular theory, and that made Newton incline to it in the later years of his life. Sound waves are usually supposed to pass readily behind obstacles, but this is rather a mistake, because sound shadows can be thrown and made experimentally evident. The phenomena of the reflexion of light present no difficulty by either theory; the projectile theory does just as well as the other, and by it it is also necessary that the angle of incidence should equal the angle of reflexion. Refraction is not so easy to explain by the corpuscular theory, but Newton overcame the difficulty fairly well; it is necessary, however, to assume that light moves more rapidly in glass or water than in air. As this point had not then been experimentally decided, there was nothing to choose between the corpuscular and the wave theories, consequently so long as nobody wished to hold both theories at once, everybody was happy. Subsequently Fresnel and Foucault proved that in this matter the corpuscular theory is contrary to fact, so that no two theories are now possible on the subject. When light strikes glass a part of it is reflected and the other part refracted; in other words, it is divided. The wave theory lends itself much better than the projectile theory to the explanation of this phenomenon.

When we pass on to other phenomena there is no comparison between the two theories, and in relation to the colours of thin plates the corpuscular theory makes a very poor show. What happens when two trains of waves of the same length are superimposed one upon the other? When the crests of one train of waves tend to fall into the same positions as the crests of another train of waves the light is intensified, but when the depressions of one train of waves tend to coincide with the crests of the other train of waves the two influences neutralise each other, so that darkness is then the effect of mixing two lights of the same colour. There are intermediate positions in which the waves may meet, and the various relative positions are called "phases" of the wave, a term adopted previously in relation to the phases of the moon. The length of a wave fixes the colour, the height or amplitude of the wave fixes the quantity of the light. When two waves meet, and their phases agree, twice the amplitude is the result; when the phases are opposed we get nothing.

The colours of thin plates were known in ancient times, and were tolerably well described by Hooke, the predecessor of Newton. Then they were described by Newton himself, and subsequently by Young, in whose hands they became the determining point of the wave theory of light. When light strikes a sheet of glass, part of it is reflected from the front surface and part from the back surface. If the plate of glass be reduced to such thinness that one wave is retarded and thrown behind the other, colour is the result when white light is used. When homogeneous light is used alternations of light and darkness occur. The speaker here performed Newton's experiment, in which a slightly convex lens was pressed upon a flat piece of glass, so that a circular wedge of air was formed between the two pieces of glass, and so thin as to present rings of colour when white light fell upon it. When red light was made to illuminate this arrangement, and the image of the concentric rings was projected on the screen, the rings appeared red and black; with green light they were green and black, and of a different diameter, for which latter reason colour is produced when white light is used in the

performance of this experiment. The space in the centre of the rings was dark at the place where the lens and plate were in closest contact, and where the plate of air was almost of no thickness at all. At that place we might expect to find the light brightest. This, in Young's days, was a great difficulty; he explained it, but was not understood by his contemporaries. In the phenomenon there is a kind of reversal in the circumstances; in the one case reflexion is from the denser to the rarer medium, and in the other from the rarer to the denser.

Soap films, as in the soap bubble, best exhibit the colours of thin plates. The speaker here made some thin circular soap films supported upon small metal rings. He illuminated each film by electric light, and projected an image of it upon the screen, so that as its thickness became less by evaporation, and colours appeared, they could be seen by every one in the theatre. He said that some experimenters mixed glycerine with their soap solution to make the films more permanent, but glycerine tends to absorb water from the atmosphere and to make the films thick. It was best not to use glycerine when experimenting with soap films on the colours of thin plates. He then thinned down some of these films by Brewster's method of causing to play upon them a steady jet of air from a nozzle and tube connected with a weighted bellows. The air increased evaporation from the surfaces of the films, with the result that gorgeous displays of colours were seen upon the screen. Some of the colours were so remarkably strong that it is scarcely surprising, he said, that Brewster, towards the end of his life, broached an extraordinary theory that the soap bubble in some way secreted colours.

Lord Rayleigh said that, for the sake of convenience, the term "ray of light" is frequently employed, but it is doubtful whether it is legitimate to use the word "ray" at all. He frequently in the lecture employed the phrase "train of waves."

TRIALS AND TRIBULATIONS OF THE PHOTOGRAPHER.

[A Communication to the Society of Amateur Photographers of New York.]

NOW, ladies and gentlemen, I have been asked to talk on the *Trials and Tribulations of the Photographer*. Well, I stood it for forty-one years, and I should be very sorry to undertake to tell you all of them. It might take me another forty-one years to get through with it. But, fortunately—or unfortunately—I generally try to make the best of everything, and what might have been a trial to many I endeavoured to laugh off. I was told that the business was very unhealthy, but I tried to laugh and grow fat. I commenced at a hundred and twenty-five pounds and finished at two hundred, so that it was not very unhealthy in my case.

In speaking of the Daguerreotype (and we have just listened to a very interesting and a very excellent address), I want to say that I was a practical Daguerreotypist from fifteen to seventeen years, and in looking over some old books of account I believe that I made and sold to the public 200,000 pictures, so that I am something like the boy eating pie—I have had an enormous experience.

I well remember the 15th day of October, 1846. I placed at my door a little frame. I think it had four pictures in it, and at that date the people were very much interested in the Daguerreotype. It was the "wonderful silver picture," and you would hardly have time to hang your frame out in the morning before there would be large crowds around it, all anxious to get a sight at the wonderful picture; and at that date a man who made a good Daguerreotype was looked on as a scientific man. He was not a mere "machine worker," as photographers have got to be called to-day.

I believe that, not only in talking of photography, but in writing of it, there is too much latitude nowadays and too much fancy writing. It is not practical enough. It is quite amusing to me to read six, or eight, or ten columns in one of our photographic journals written by some young man who has never stood under a skylight, and yet he gives us directions as to how it should be done, and how to do it. Place that same man under the skylight and let him wait all day upon eighty people—all kinds of people, men, women, and children—and let him do that for each day, and there would not be enough left of some of these writers to make a respectable funeral when night came. I am glad I had a subject. I will try and stick to it, but I am afraid I will not.

I should be sorry to speak about any new developers. I think there are 2163 or 3102—somewhere along there—and each one susceptible of two or three changes. I have some compassion on the brain of amateurs, as I understand the lunatic asylums, like the learned professions, are crowded. And then, again, I have been a fool if I would not recommend before this audience somebody's plates; I am too much of a coward for that. There are too many good plates in the market, and I would not dare to recommend one man's plates for fear I would never see any peace and comfort the remainder of my days from the rest of the makers. In short, I would rather not do it. As I say, I am too much of a coward for that.

I saw a pretty good Irish bull the other day. It seems that Pat came very near being killed, but by some dexterous movement he saved his life and got away. Some one said to him, "Pat, you are a coward." "Well," said Pat, "I had rather be a coward for ten minutes than be a dead man all the rest of my life." And so it is in regard to the recommendation of any specific plates, for if I did I would never see a minute's peace.

But there is one thing I would say, and with all the nonsense I want to mix a little sense: Get a good reliable plate and get a good developer and go to

work and master them. Then, after you have mastered them, if you can find some changes that are going to be better, all right; but if you are going to follow each and every one's make and each and every one's suggestions, you will never make a worker. In the old days of the Daguerreotype we had one developer, and I think sometimes to-day it would be a good thing if we never had but one. There would not be half the changes and mistakes and half the plates spoiled that you see to-day.

I remember once a very singular thing. We used to have to go out and take sick people. We had a little developing box that I could carry under my arm—the camera and the whole thing, and the mercury for developing the picture, and a lamp to heat it; and the mercury after use we poured out from the corner here into a little bottle. I went one day and took some pictures of a sick lady, and when I came to pick up my things to go home I found I had not put my mercury in the bath at all, but my pictures came out just as well. That was a very singular circumstance to me, but I accounted for it very soon: there was enough mercury in the iron developing box to develop a picture, but I never made that mistake afterwards.

In the olden time the public had a very hazy conception of the process of making a picture. The people at that time knew no more about how the impression was made, and not so much as the most ignorant do to-day; and they think if the machine is good a good picture is the result, and that is all they know about it. And in those times they talked in this way: One man would show his superior wisdom (he was telling the men who were around him), "You look in the machine and the picture comes, if you look long enough." Another one says, "It is not so much the looking, but the sun burns it in when you look." Another one settles the whole thing by saying, "It is not so much the looking, but the plate itself is a looking-glass, and if you sit in front of it long enough your shadow sticks on the plate." I have heard those very remarks made myself.

We had a great many pupils in those days, and everybody who could not succeed in something else started to learn Daguerreotypy, and the first question the pupil would ask was, "How long does it take?" I was forty-one years at it, and I never learned it all in that time; and they had an idea you only had to get your machine, try it a few times, and you had learned it all. I used to tell them I could not tell how long it would take any man to learn it, as one would learn more in two days than another would in two weeks.

Mr. Weston, who was on the corner of Broadway and John-street, told me a very amusing story. A man, he said, came from a neighbouring city to learn to make Daguerreotypes, and after he came in the room and was told what the price would be and the cost of the camera and all that sort of thing, he said, very well, he wanted to take instructions. He was going to stay in New York two weeks. Mr. Weston coated a plate, which was about the plan Professor Landy has shown us here to-night, and he said, "Is that all?" and Mr. Weston said, "Yes, that is all; that is what you do every time." And the man said, "I am not going to pay board here in New York for two weeks for that!—why, I can do that myself!" And so he straightway took his camera and other necessary appliances, and in about four days after that he came back, with fire in his eye, and walked in, holding the camera by the nozzle, and said, "There it is!—it is not worth a damn!" And Mr. Weston said, "What is the matter?" and he said, "It won't take a picture." And Weston coated a plate and put it in the camera, and brought out a picture at once. The man says, "I could not get it." "Of course you could not do it; you only saw me go through the motions two or three times, and you thought you knew it all." He said, "I set it in front of the window where I worked, and about half a mile off there was a hill. Do you suppose that was the matter? Do you suppose that hill made the trouble?" I mention this incident simply to show you what perfect ignorance there was in regard to it.

And then the name of the "Daguerreotype"—as to spelling it, that was almost an impossibility. Some called them "doggytypes," some "daggytypes," some "degytypes," and the vulgar "dogtypes."

And the "dark room" was a place about which a great many people had a very curious and amusing idea. Some would ask, "What do you do in there?" One thought you went in there and did some hocus-pocus and some sleight-of-hand work to develop the picture; and another would say, "You need not be so particular to shut that door; I don't want to steal your trade." We were not so much afraid of the trade as we were of the tools, and in those days you did not see people bring a crowd of persons together to explain to them some new method of development, or a thing of that kind, as you do to-day. Every man that got a hold of an idea kept it to himself, and he would never let another photographer or Daguerreotypist go into his dark room. Every man was the personification of all wisdom.

And then the improvements came so fast! What we learned one day, in two or three days was of no use, for something had been brought out in the meantime that was entirely new, and superseded what we learned a day or two before. The advance has been very rapid in photography.

During my earlier days, in 1816, on a dark day I have often kept people sitting four minutes for a picture. Now, if some of you ladies and gentlemen will take out your watch and time four minutes and tell a man not to wink, you would see what a very difficult thing it was at that time; but the usual sittings were from thirty to forty seconds, and, finally, they were reduced down from ten to twelve; but I have been compelled to take four minutes many a time on a dark day.

Now, as to the Daguerreotype, I want to mention one fact which is not com-

monly known. The Daguerreotype will not fade, and I know what I am talking about when I make that assertion. While it will not fade, it will become tarnished on the surface, but that can be easily cleaned. I have cleaned a great many of them and made them just as perfect as they were the day they were taken, provided some person has not taken a handkerchief and rubbed it out. I remember a case: Only a few years ago a lady came to me with a half-sized picture, and you could not see anything at all upon it. She wanted to know if I could clean it, and I took it and cleaned it, and in about five minutes I brought it to her and showed it to her and she fainted dead away in a moment. It was her husband who had been dead twenty years, and she had not seen the picture in fifteen years. It was so completely covered with a film that there was nothing to be seen, and I brought it up as good as it was originally. As I say, the lady fainted immediately. It was just as if her husband had been brought back from the grave for her to see.

ABRAHAM BOGARDUS.

(To be concluded.)

DAGUERRETYPE.*

THE failure of two such eminent men as Wedgwood and Davy in their attempts to produce light-drawn pictures appears to have discouraged any further experiments of this kind at that time in England. In 1814 M. Niepce, of Chalons-on-the-Saône, turned his attention to the chemical agency of light, his object being to fix the images of the camera obscura, and he appears to have discovered the peculiar property of light, in altering the solubility of many resinous substances. In 1824 M. Daguerre began a series of experiments with the same object in view. The first substances used by him were, according to M. Arago, paper impregnated with a solution of the nitrate or chloride of silver, but his ill-success induced him to abandon them. It is not, however, clear whether any other substances or materials were used by M. Daguerre previously to 1826, when, through a Parisian optician, he became acquainted with M. Niepce. Letters addressed to Niepce received, however, but no responses, and it was not till 1827, when Niepce passed through Paris on his way to England, that he entered into cordial relations with Daguerre. In December of 1827 M. Niepce was in England, and he communicated an account of his experiments to the Royal Society of London, together with several pictures on metal plates in the state of advanced etching; the etching effected by acid subsequent to that part of the process in which light assisted in laying bare portions of the resin-covered plate. These early productions prove that the experimentalist of Chalons was acquainted with the method of making the shadows and lights of his pictures correspond with those of nature, and of rendering his copies impervious to the crasing effects of the solar rays. In a paper, dated December 5, 1829, M. Niepce communicated to M. Daguerre the particulars of the process employed by him, and they entered into an agreement to pursue, for their mutual benefit, the researches which they had respectively begun. A correspondence between M. Niepce and M. Daguerre has been published which sufficiently proves that to the latter the sole merit of the discovery of the process which bears his name is due. In 1831-2 M. Niepce, indeed, regrets that, at the recommendation of M. Daguerre, he had lost so much time in experiments on iodine. "I repeat it, sir," he says; "I do not see that we can hope to derive any advantage from this process more than from any other method which depends upon the use of metallic oxides," &c. In another letter he speaks of a decoction of thapsi (shepherd's purse) fumes of phosphorus, and particularly of sulphur, as acting on silver in the same way as iodine, and that caloric produced the same effect by oxidising the metal; "for from this cause proceeded in all these instances this extreme sensibility to light." We may perceive from these remarks that although M. Niepce may not have been fortunate enough to discover the exquisitely sensitive method of M. Daguerre, he must have submitted to experiment a great variety of substances in different states of combination. The philosopher of Chalons died in July 1833, and a new agreement was entered into between his son, M. Isidore Niepce, and Daguerre.

Five years after the death of Niepce, Daguerre was able to announce that he had overcome all difficulties, and that henceforth nature would depict her own likeness with a pencil of light. In January, 1839, the discovery of M. Daguerre was reported, and specimens shown to the scientific world of Paris. The extreme fidelity, the beautiful gradations of light and shadow, the minuteness and the extraordinary character of these pictured tablets, took all the world by surprise, and Europe and the New World were astonished at the fact that light could be made to delineate on solid bodies delicately beautiful pictures, geometrically true, of those objects which it illuminated.

In the July following, after a bill was passed securing to M. Daguerre a pension for life of six thousand francs, and to M. Isidore Niepce of four thousand francs, with one-half in reversion to their widows, the process by which these pictures were produced was published.

It is to be regretted that—after the French Government had thus liberally purchased the secret of the process of the Daguerreotype, for "the glory of endowing the world of science and art with one of the most surprising discoveries that honour their native land," on the argument that the invention did not admit of being secured by patent, for, as soon as published, all might avail themselves of its advantages—in the face of this, on or about the 15th of July, 1839, a certain foreigner residing in France instructed Mr. Miles Berry, patent agent in London, to petition Her Majesty to grant Her Royal Letters Patent for the exclusive use of the same within these kingdoms. This certainly needs no comment. It was unworthy the liberal spirit which should actuate the follower of science and art. The process was accordingly patented in England in 1839, and in the specification is called "A new and improved method of obtaining the spontaneous reproductions of all the images received in the focus of the camera obscura." Nevertheless, the Daguerreotype process was at the time of its publication very imperfect; and it was destined to undergo important modifications and improvements during the next three or four years.

The news of Daguerre's wonderful discovery soon spread to other countries, and the inventor obtained a rich reward by the sale of apparatus, and by the instruction of hundreds who flocked to Paris to learn the details of the new art. The materials employed by Daguerre in his early experiments, between 1824 and 1829, appear to have been the same as those used by Wedgwood and Davy—the chloride and nitrate of silver spread upon paper; and he did not advance upon, if indeed he equalled, the

* Continued from page 150.

results obtained by the two English chemists. After entering into partnership with Niepce and learning the details of his bitumen process, Daguerre followed for a time in the same track, but further study enabled him to work out improvements and modifications which led him ultimately to a greater success. We know that Niepce sometimes used metal plates coated with silver; moreover, he employed iodine to darken these plates after the picture had been developed. Using these two materials—plates of silver and vapour of iodine—Daguerre found that the iodide of silver formed by exposing silver to the vapour of iodine was sensitive to light. When such "iodized silver plates" were exposed within the camera faint images of bright objects were impressed upon them in the course of two or three hours.

At this stage a happy "accident" occurred which revealed to Daguerre a method by which not only was the time of exposure necessary to secure a good picture greatly reduced, but the distinctness and beauty of the image was much enhanced. It appears that one day Daguerre removed from his camera a plate which, either from the shortness of the exposure or the dullness of the light, showed no sign of an image. He placed this blank plate in a store cupboard, intending to clean the surface and use it again. But what must have been our photographer's surprise when, on taking out this plate the next morning, he found upon its surface a distinct and perfect picture. Another prepared plate was quickly exposed for an equally short time within the camera, and again a sojourn of twenty-four hours within the magic cupboard sufficed to bring out a picture. The next step was to ascertain to which of the numerous chemicals kept within the cupboard this marvellous effect was due. By a process of elimination, it was at last traced to a dish full of mercury. Delighted by this fortunate discovery, Daguerre at once proceeded to place his exposed plates over a dish of warm mercury, when the vapour proceeding from the liquid metal was found to settle upon the iodized silver in exact proportion to the intensity of the light by which each part of the plate had been affected. This was, in fact, a process of development, an invisible or "latent" image being strengthened and thereby made visible. Some such method of "developing" the originally feeble impressions produced upon sensitive plates by a short exposure to light has been found necessary in every photographic process.

Another advance made by the French artist was the discovery of a fixing agent. This was neither more nor less than a strong solution of common salt, in which the plates were soaked after development, and which dissolved and washed away the iodide of silver that had not been acted on by light. But when, almost immediately after the publication of the Daguerreotype process, in 1839, Sir John Herschel drew attention to the superior qualities of hyposulphite of soda as a solvent of the silver salt, Daguerre immediately adopted it for clearing and fixing his exposed plates. This substance, so valuable to every photographer, was discovered by Chancener in 1799 and its power of dissolving the haloid salts of silver had been described by Herschel as early as 1819.

The first Daguerreotypes were so delicate that the merest touch of the finger was sufficient to mar their beauty, and when exposed to the air they rapidly tarnished and deteriorated. This defect was remedied by M. Fizeau, who gilded the image by means of a mixture of chloride of gold and hyposulphite of soda. This solution was poured over the silver plate, which was then heated until the liquid evaporated, leaving a thin coating of gold upon the picture, which was thereby more distinct as well as more permanent.

Another great improvement was introduced by Mr. Goddard, a London science lecturer, in 1840. He exposed the iodized silver plate to the action of bromine vapour, thereby forming a bromide of silver upon the plate in addition to iodide of silver. In 1841 M. Claudet used chlorine vapour in a like manner. Plates prepared by either of these methods were found to be far more sensitive to light than those which had been simply iodized. In fact, the time required to produce a picture in the camera was thereby reduced to from one to five minutes, or, with a very good light, to less than one minute. As the three elements referred to were only discovered—chlorine in 1774, iodine in 1811, and bromine in 1826, we see that photography was hardly possible before the present century.

After the improvements of Goddard and Claudet, which were quickly adopted by Daguerre, the production of portraits by the Daguerreotype process became comparatively easy. In the first attempts at portraiture, which appear to have been made in America by Draper and Morse in 1839, the sitter's face was covered with white powder, the eyes were closed, and the exposure, lasting for perhaps half an hour, was made in bright sunshine. To lessen the glare of light, which painfully affected the sitter, Draper caused the sunlight to pass through a large glass tank containing a clear blue liquid—ammonia and sulphate of copper—before falling upon the sitter, thus filtering out most of the heat rays, which could well be spared, as they possess little or no actinic value.

In 1840 Beard and Claudet opened photographic studios in London. Davidson followed suit in Edinburgh, and George Shaw in New-street, Birmingham, and soon Daguerreotype became a trade. For landscapes, &c., the Daguerreotype process was, however, but seldom employed, though we read of a fine instantaneous picture of New York Harbour being secured by its aid.

The expense of the plates, which were usually of copper, plated with silver, was a serious objection to the Daguerreotype process. As late as 1854 we find the price of Daguerreotypes in England was two and a half guineas each for the quarter-plate size (4½ x 3½), and four guineas each for half-plate size. The cleaning and polishing of the silver surfaces on which the picture was to be produced was a most troublesome task, necessitating great care and a vast amount of labour in the production of the "black polish" which was necessary. It must also be remembered that there was practically no power of multiplying a Daguerreotype, a fact due to the opacity of the silver plate. It is true that Grove (now Sir W. R. Grove, one of Her Majesty's justices) devised a method of etching Daguerreotypes with acid so that they could be used in a printing press, but, practically, this method was a failure.

The Daguerreotype held sway for about ten years only—from 1839 to 1851. It was more popular in America than in England; indeed, in England specimens of the art are now quite rare. With all its faults, it was an immense advance on anything previously known, and entitled Daguerre to rank with the leading inventors of the nineteenth century. Daguerre died in 1851, aged sixty-three. In 1853, a bust of this ardent worker was unveiled at Cornhill, funds being contributed by photographers of all civilized nations.

Viewing his whole career, Daguerre must be considered as a fortunate man. Not only did he reap much honour and material benefit from his discovery, but he lived to see photography rise to an important place amongst the arts and sciences.

I will now give you Daguerre's original process of making his pictures.

The pictures of the Daguerreotypes are executed upon thin sheets of silver, plated on

copper. Although the copper serves principally to support the silver foil, the combination of the two metals appears to tend to the perfection of the effect. It is essential that the silver be very pure. The thickness of the copper should be sufficient to maintain perfect flatness and a smooth surface, so that the images may not be distorted by any warping or unevenness. The process is divided into five operations. The first consists in cleaning and polishing the plate to fit it for receiving the sensitive coating on which light forms the picture. The second is the formation of the sensitive ioduret of silver over the face of the tablet. The third is the adjusting of the plate in the camera obscura for the purpose of receiving the impression. The fourth is the bringing out of the photographic picture, which is invisible when the plate is taken from the camera. The fifth and last operation is to remove the sensitive coating, and thus prevent that susceptibility of change under luminous influence which would otherwise exist and quickly destroy the picture.

(To be continued.)

W. THOMAS HORTON.

THE PHOTOGRAPHIC EXHIBITION, CALCUTTA.

THE following are the list of prizes awarded by Colonel Waterhouse and Mr. W. H. Jobbins, the Judges nominated by the Photographic Society to decide on the merits of the different exhibits:—

Class A. (open to all exhibitors).—No. 1, gold medal, to Messrs. Johnston & Hoffman, for portrait of Mrs. Ian Hamilton. No. 2, special medal, to Lalla Deen Doyal, for a series of six photographs of places—such as the Ridge Simla, the Benares Giants, the Ellora Caves, &c. No. 3, extra silver medal, to P. Klier, of Rangoon, for *Patience*, and *Papa is Coming*.

Class B. (open to all amateur exhibitors).—No. 1, silver medal, to Mr. E. M. Showers, for *Match between "Honor Bright" and "Landshark,"* with a hand camera. No. 2, silver medal, to Mr. A. Norman, for at Shanklin, Isle of Wight, the Thames at Wargrave, Pangbourne, and Henley. No. 3, silver medal, to Mr. J. J. Meade, for his series of photomicrographs. No. 4, bronze medal, to Mr. T. Miller, for the four roadside views near Calcutta.

Class C.—This silver medal has not been awarded.

Class D. (open to members of the Photographic Society only).—No. 1, silver medal, to Lieutenant Dick, for enlargements and a series of views in Cashmere. No. 2, silver medal, to H. H. the Bara Thakur of Tipperah, for the excellence of his series of photographs as artistic pictures and as platinum prints. No. 3, bronze medal, to Captain Wedderburn, a series of views in the Eden and Zoological Gardens, Belvedere, also shipping elephants for the Chittagong Expedition.

The Judges also desire to honourably mention the photographs by Messrs. J. S. Gladstone, A. Fleming, Geo. Ewing, and A. E. Caddy; also Mr. J. C. White's portrait of the Maharani of Sikkim.

Our Editorial Table.

WOOD'S WASHER FOR PRINTS AND PLATES.

WE have received from Mr. James Wood, of Liverpool, one of the print and plate washers bearing his name. It is claimed that the hypo can be removed from a print in thirty minutes, and from a plate in fifteen minutes.

The washer is so constructed that there are no corners into which the prints can get jammed and creased, but they are kept always on the move.

For the convenience of holding the plates there is an adjustable rack



which is set into the water. The rack is adjustable for several different sizes.

The whole apparatus is substantially made, and on account of its utility will doubtless become widely known. Its form is shown in the above cut.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3790.—"Improvements in and relating to Photographic Casuerrs." H. J. GRAY.—Dated March 4, 1889.

No. 3810.—"An Improved Photo-chromographic Process." B. C. LE MOUSSU.—*Dated March 5, 1889.*

No. 3818.—"Improvements in the Stage which is used as a Part of his Lantern Microscope, known as 'Leach's Oxy-hydrogen Lantern Microscope.'" W. LEACH.—*Dated March 5, 1889.*

No. 3840.—"Improvements in Magic Lantern Slides." Complet specification. W. C. HUGHES.—*Dated March 5, 1889.*

No. 3889.—"Apparatus for Opening or Closing the Shutter of a Photographic Camera by means of Electricity." F. G. HOWARD and A. J. OBERMAYER, the Younger.—*Dated March 6, 1889.*

No. 3966.—"Improvements in Telescopes." A. T. CLARKSON.—*Dated March 6, 1889.*

No. 4047.—"Improvements in and relating to Apparatus for use with Photographic Cameras to Facilitate the Changing of the Films or Plates." E. FRANKHO.—*Dated March 7, 1889.*

No. 4082.—"An Improved Head for Photographic Camera Stands." F. SHUKW.—*Dated March 8, 1889.*

No. 4103.—"Improved Apparatus for Washing Photographic Negatives and Prints." Complete specification. F. BISHOP and D. ALLAN.—*Dated March 8, 1889.*

No. 4143.—"Improvements in Photographic Changing Boxes." G. W. SHAILER and G. W. FOWLES.—*Dated March 9, 1889.*

No. 4188.—"Improvements in Racking Trays applicable for Photographic Developments and for other Purposes." C. WIGZELL.—*Dated March 9, 1889.*

No. 4189.—"Improvements in and connected with Tables used for Photographic Developments and for similar Purposes." E. J. B. SCRATTON.—*Dated March 9, 1889.*

PATENT COMPLETED.

INSTANTANEOUS SHUTTER FOR PHOTOGRAPHIC APPARATUS.

No. 12,707. CHARLES BOUCKAERT, Brussels, Belgium.—*March 3, 1888.*

THE apparatus known as instantaneous shutters, employed in photography up to the present, have the serious inconvenience of being too large or not sufficiently compact to enable it to be placed in the interior of the camera.

The object of my invention is to remedy this fault, as my apparatus may be placed inside any camera without interfering with the action. All the movements, either for setting or for relaxing the spring so as to increase or decrease the rate of motion of the instantaneous shutter, are effected from the outside of the apparatus.

One of the advantages of my instantaneous shutter is that it can be placed either inside or outside the camera as desired.

Another essential advantage is that the shutter is put into action without uncovering the object glass or lens.

The apparatus having been once fixed to the camera does not require to be opened unless it is necessary to change the diaphragm.

The apparatus is composed of a plate fixed to the camera by means of holes, and on which all the mechanism is mounted. A lever working on an axis is actuated by a spiral or other spring attached eccentrically on a movable rod by which it can be rendered stronger or weaker by turning the rod to the right or to the left.

This lever carries at one end a blade spring terminated by a tappet, which takes under a pivot on the shutter to act upon it when moved.

Another lever has a spring and two detents for throwing the first lever into and out of gear. A third lever is provided with a fork, in which works the pivot, and which serves to move the instantaneous shutter. A small pin or tappet fixed to the first lever, strikes against the third lever to cause the return of the shutter.

The movement of the first lever may be retarded by arranging a small rack actuating a pinion mounted on the same axis with a small flyer.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 19	North London	Myddelton Hall, Upper-st., Islington
" 19	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
" 19	Bolton Club	The Studio, Chancery-lane, Bolton.
" 20	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 20	Bury	
" 20	Burley and District	Mechanics' Institution.
" 20	Hyde	
" 20	Manchester Camera Club	Victoria Hotel.
" 20	Edinburgh Photo. Club	5, St. Andrew-square.
" 20	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 21	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MARCH 12.—Mr. James Glaisher, F.R.S., President, occupied the chair.

THE PRESIDENT announced that Captain A. M. Mantell, R.E., had been appointed honorary secretary to the Society, and that Mr. Brownrigg had been appointed a member of the Council.

Mr. F. W. Hindley and Miss Mildred were elected members of the Society.

THE PRESIDENT read a letter from the Society of the Photographic Amateurs of New York offering its congratulations to the Photographic Society of Great Britain on the occasion of the close of the first and beginning of the second half century of photography. He remarked that it was a pleasing communication from New York.

MR. FRIESE GREENE opened the discussion on Mr. Swan's paper on quinol, by saying that if the quinol developer were mixed a quarter of an hour before use it worked better than if employed at once, and gave better pictures; the operator could go on developing plates for four or five hours in the same solution. He found the negatives to be superior to those produced by other developers. If the plates were soaked in sulphite of soda for half an hour before applying the quinol developer the time of exposure could be reduced by one half.

MR. S. G. B. WOLLASTON had developed a large number of stripping film negatives with quinol and compared them with his best pyro developed negatives; he then found that quinol had distinctly given the best results.

MR. NOWLAN exhibited negatives which he had developed six years ago with quinol and washing soda, with nothing else.

MR. W. COBB asked if Mr. Wollaston had formed his conclusion from the negatives or prints taken from them.

MR. GEORGE DAVISON asked in what respect Mr. Wollaston's quinol developed negatives were better than the others.

MR. WOLLASTON never judged the character of a negative until he had taken a print from it in platinum as well as in silver, the former being the more trying test of the two. He found that with quinol the exposure of the plate could be lessened, and that the films would strip with water at half the usual temperature employed.

MR. T. SERASTIAN DAVIS said that quinol did not stain the surfaces of the negatives, and that it was especially useful for transparencies. He exhibited some quinol developed lantern slides in which portions of the print were as clear as the margins which had not been exposed to light; he also exhibited some pyro developed slides not so clear in this respect. He wished to know how Mr. Swan proceeded with quinol when he was not sure of the amount of exposure of the plate. He (Mr. Davis) then exhibited three pictures, one of which had had five seconds' exposure, another seven and a half seconds, and the third ten seconds. He had obtained good results with all these by applying the alkaline solution first and adding to it quinol and sodium sulphite solution little by little as it seemed to be required; the margins of all three plates were absolutely transparent.

MR. DAVISON thought that most of the published formulæ recommended too small a proportion of quinol, and that a larger quantity thereof increased rapidly; he had also found that quinol did not do so well as pyro for under-exposed plates, at least that was his experience after trying it on and off for two years. He doubted if the printing quality of the quinol developed negatives equalled their visual appearance, and he had heard a rumour that Mr. Swan's operator, Mr. Green, liked pyro best. Quinol was good for lantern slides and for paper development. As to staining effect Mr. Davis's experiments had been tried with a larger proportion of pyro than of quinol, which was not fair to the pyro; in comparative experiments he thought that six grains of quinol should be tried against four grains of pyro.

MR. LEON WARNERKE had seen results in which lowering the proportion of sulphite had increased the intensity of the negatives. In trying his process of developing silver prints like carbon tissue, he had found that quinol made the film quite insoluble in hot water, so his experience did not agree with that of Mr. Wollaston. He was favourably impressed with the quinol developer and had used it for many years, especially upon chloride films.

MR. GEORGE SCANNELL had tried quinol five or six years ago, and then given it up. Recently he had tried it again, making comparative experiments in relation to latitude of exposure, and would hand round his results in the shape of negatives and the proofs taken from them; his conclusion was that the old pyro and meta-bisulphite of potash developer gave the best results, so he had gone back to it.

MR. A. MACKIE said that Mr. Swan had stated that a largish proportion of meta-bisulphite of potash was bad for the quinol developer; had he tried an extra amount of alkali with it to overcome the effect of the excess of sulphurous acid? With collodio-bromide plates quinol answered admirably, and gave a good colour.

MR. W. E. DEBENHAM agreed with Mr. Mackie, and thought that Mr. Montefiore's excellent negatives had proved the point.

MR. W. ENGLAND'S experience with quinol was small, but the results had been promising; it would bring out under-exposed plates which pyro would fog in the forcing; much depended upon the plates used. The time of development with quinol was seven or ten times longer.

MR. DAVIS said that in his experiments he had used chloro-bromide gelatine plates, and developed with Hopkin & Williams' quinol, which he understood was prepared from the bark and not from the benzine compounds.

MR. J. HUBERT had found that with Wratten's plates the time of development was the same as with pyro and ammonia, when the quinol developer was prepared by Swan's formula; he had also found that the range of half tone was not quite so good as with pyro. His negatives were developed in from two to three minutes.

MR. CONNELL had helped Mr. Hubert in his experiments, and thought quinol to have been a little slower than pyro therein; in the earlier experiments the quinol developer was slightly the warmer of the two, and then the times of development were about equal.

MR. HUBERT added that in the later experiments the developers were applied at the same temperature.

MR. A. COWAN thought that it had been proved that quinol was nearly as good as pyro. Sometimes it gave a yellow stain which was deeper the larger the proportion of sulphite; perhaps that result might have been due to peculiarities in his sample of quinol.

MR. J. W. SWAN said that in the absence of sulphite of soda, or of some equivalent therefore, considerable stain resulted; he had recommended the minimum proportion of sulphite to prevent stain. In the formula he had given, the proportions were such as to make the quinol developer work as

rapidly as a pyro developer, which would bring out the image in two and a quarter minutes. Quinol is not slow when caustic potash is used as the alkali. He doubted if much could be claimed for quinol in relation to under exposed plates, although pyro would give a little more fog. As to the tanning action, he thought that the difference in the results of Mr. Warnerke and Mr. Wollaston, might be due to difference of plates; his own experience agreed with that of Mr. Wollaston. He thought that Mr. Scamell's results should be carefully considered; they proved that as yet we are all inexperienced in the use of the quinol developer. He had not said that meta-bisulphite of potash could not be used with the quinol developer, but that an excess of it was dangerous, and would almost destroy the activity of the solution. As regards prints from negatives to prove their quality, Mr. Wollaston had done it, but probably experienced photographers were not generally deceived as to the printing qualities of their negatives before they had tried them, unless the colours were such as to be misleading; quinol negatives much resembled the old wet plate collodion negatives. The fact that the action of a good quinol developer is limited to the parts on which light has acted, is exceedingly useful for transparencies, and above all for negatives intended for use in photo-mechanical processes. There is much yet to be done in experimenting with quinol, to ascertain how far and in what method it can be made to compensate for under and over exposure. Sulphite of soda with quinol tends to make the image weaker.

Mr. DEBENHAM asked if adding more alkali would not overcome the retarding influence of excess of meta-bisulphite of potash.

Mr. SWAN had not tried it. He had been much pleased with the interest his paper had excited among the members of the Society.

Mr. LEBLIS MONTEFIORE had found no advantage in adding a bromide to the quinol developer; he thought it but complicated matters as an unnecessary introduction.

Mr. ARNOLD SPILLER had experimented with the quinol developer years ago, and found that it slightly shrank the film wherever the image was formed, but in his experience the tanning effect was not strong enough for practical purposes; pyro acted more strongly in this respect.

Mr. SWAN had tried an experiment on the point that day, and contrary to the experience of Mr. Spiller, the image was raised where the light had fallen; in hot water the image came off the plate, and the rest of the film dissolved.

Mr. SPICER had used no sulphite in the developer in his experiments.

The PRESIDENT read a letter from the Rev. Mr. Sutton, British chaplain at Luxor, in Upper Egypt, saying that he had been photographing the interiors of tombs, using Abney's and Monckhoven's plates, and found the latter the better of the two; he had also found that the quinol developer gave the best results in that climate. The speaker then announced that from March 18 to March 26, there will be an exhibition of Alpine and Caucasian photographic views taken by the late Mr. W. F. Donkin; the exhibition will be open from ten a.m. to six p.m. at the Gainsborough Gallery, 25, Old Bond-street, London. Some members of the Council, he added, wished to gather the opinion of the members upon the question of "medals or no medals" at the next exhibition of the Society, and this subject would be considered at the next meeting.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 7.—Mr. A. Mackie presided.

A question in the box asked the best preservative of pyro in solution.

Mr. J. B. B. WELLINGTON stated that sulphites were good, and any acid would do; it was entirely a matter of taste.

Mr. A. HADDON said that there was a serious objection to nitric acid or any of the class of acids which would yield oxygen to the pyro; sulphite of soda was objectionable when alkaline, and if made acid with citric acid would contain some of the strong restrainer, citrate of soda. Sulphurous acid, being an absorbent of oxygen, was one of the best to preserve pyro.

Mr. WELLINGTON remarked that when a plate was predisposed to green fog sulphite of soda had a tendency to increase it.

Question: "Does a preservative act as a restrainer?"

Mr. HADDON replied that it all depended upon the preservative used.

Question: "Should you focus again after stopping down?"

Mr. HADDON replied that when any lens gave spherical aberration focusing should be repeated after stopping down.

Mr. EDGAR CLIFTON said that old periscopic lenses depended entirely upon stopping down for achromaticity.

Question: "What is the best way of transferring engravings in printing ink from paper to glass plates for lantern slides?"

Mr. CLIFTON replied that a compound for doing it was on sale in the market; he believed that it contained alkali and soap. Old books recommend sticking the print to the glass with copal varnish, then rubbing away the paper, and afterwards varnishing again; but this plan results in a kind of ground-glass effect. A piece of sheet gelatine may be laid on the picture, the lines then traced on the gelatine with the point of a needle so as to scratch its upper surface, and red chalk or Venetian red rubbed into the cracks with the fingers; the lines will then show black on the screen.

The HON. SECRETARY said that the simplest way was to photograph the print.

Mr. HADDON suggested tracing the engraving on ground glass with a pencil and then varnishing the glass. At the Edinburgh Photographic Society a member had exhibited a Wray's lens shutter and stated that it would give exposures of from two seconds to one-fourth-hundredth of a second. Had any one present had experience with a shutter which would do that? He should like to know by what method the speed had been measured.

Mr. A. COWAN suggested that Mr. Wray had better be invited to kindly attend a meeting of the Association and to explain.

Mr. CLIFTON thought a committee should be appointed to test the speed of shutters and to fix standards.

Mr. WALTERS asked the best way to copy old oil paintings so as to get pucky negatives.

Mr. W. H. PRESTWICH suggested the use of orthochromatic plates.

Mr. COWAN suggested putting the painting in direct sunlight, so that the

light falls on it at an angle of forty-five degrees, and no glare is reflected into the lens, the optical axis of which should be perpendicular to the plane of the face of the painting.

The HON. SECRETARY said that such copying was often not easy work, and that some paintings could not be copied well with orthochromatic plates.

Mr. CLIFTON suggested rubbing the face of the painting over with half a potato, to give it an even sort of gloss.

Question: "Is pyro better than quinol?"

Mr. WELLINGTON preferred pyro because he saw no advantage in quinol.

Mr. CLIFTON thought that it would supersede ferrous oxalate, especially as it needed no subsequent acid bath in paper work.

Mr. J. J. BRIGNSHAW asked what latitude quinol gave.

Mr. HADDON replied that Mr. Montefiore had said that in one dish of it under-exposed and over-exposed negatives could be developed.

Mr. CLIFTON, when trying quinol one day, thought it would not bring out the picture; he left the plate for three quarters of an hour, and when he returned was surprised to find an excellent negative developed upon it. The quinol developer, when properly made, seems never to fog or stain.

The CHAIRMAN read some extracts from Mr. J. W. Swan's recent memoir on the subject.

Question: "Is hypo a reducer of gelatine negatives?"

Mr. C. H. COOKE had found that by three or four days' immersion the plate was reduced nearly to clear glass.

Mr. CLIFTON said that during the first twelve hours hypo did not attack the image much, but afterwards it made headway. Hypo in conjunction with atmospheric influence was a powerful reducer, as he had accidentally found after laying aside an unwashed plate; where part of the surface had been protected from the atmosphere by contact with another piece of glass the image had not been reduced.

Mr. WELLINGTON had known a bromide print left in hypo for four or five days to change from red to slaty blue.

Mr. F. A. BRIDGE had had the opposite experience; the colour changed to a very nice brown. He used the same hypo for negatives, paper prints, and all purposes without finding any disadvantage.

Mr. PRESTWICH used alum in a hypo bath neutralised with carbonate of soda.

Mr. HADDON observed that if he had added some sulphate and sulphite of soda to the fixing bath he would have obtained the same solution and been saved the trouble of filtering.

Mr. COOKE had tried alum as stated, and in his hands it gave abominable stains.

Mr. WELLINGTON gave a formula for solutions to be used in quinol development, which will be found on page 179.

CAMERA CLUB.

MARCH 7.—Mr. W. Asbury Greave in the chair.

Mr. W. ADCOCK read a paper entitled *Alum*.

Previous to the lecture the HON. SECRETARY drew attention to a fine set of old photographs, presented by Mr. H. P. Robinson, which it was to be hoped would form the nucleus of a historical collection of prints to be organized parallel with the growing Club library.

The lecturer, in his address, emphasised the need for invention in photographic work. Pot-boilers should be left, and new and original ideas worked out. Let one really fine picture satisfy as a year's work. Size he thought essential, and urged the production of large direct heads. Members of societies might combine to obtain large expensive apparatus, and suitable studio convenience for important work.

In the discussion Messrs. H. P. Robinson, Graham Balfour, E. Ferrero, G. Davison, S. B. Webber, and J. Gale made remarks.

On Thursday, March 21, a paper on *Exposure* will be read by Mr. H. C. Bond, M.A. Meeting at eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

MARCH 8.—Mr. W. England (President) in the chair.

Mr. G. F. BLACKMORE, in describing a new method of toning lantern slides, said:—

It was well known that the silver image of a transparency or negative might be modified in colour by certain toning processes, and also by varying the exposure and the development. He believed, however, that the process he was about to introduce to their notice possessed novel features and appeared to open a wide field of investigation. Working by his system it was possible to make a transparency agree in colour with the nature of the subject, and a greater variety of colour could be obtained with greater certainty than was possible with any system of development. His early experiments were of a haphazard character. Observing the changes of colour which prints toned by the sulphocyanide bath underwent, the idea occurred to him that it might be possible to obtain similar effects with lantern slides. His first experiment consisted in bleaching an ordinary bromide transparency with mercury and afterwards placing it with some aristotype prints in the sulphocyanide toning bath; these slides, after protracted immersion (some six hours), ultimately toned to a purple colour. On the toning bath being raised to about a tepid temperature the time was reduced to about an hour and a half—still too long for practical purposes. The proportion of gold was then increased, with the result that the toning proceeded more rapidly. He found from three to four grains of gold to the ten ounces of solution to be about the limit; a larger proportion of gold caused a tendency to precipitation. With this strength toning took place in from ten to fifteen minutes, the colours obtained ranging from greenish-blue to deep purple. Of all the methods tried the most promising seemed to be to soak the plate, after bleaching with mercury, in a weak solution of gold (one grain to the ounce of water) previous to placing it in the sulphocyanide bath. A great range of colour was obtainable by varying the time of immersion in the gold solution. The bleached image could be toned in the gold solution alone, but, in order to secure permanency, the tone in this case should be very complete. Toning in the aqueous solution of gold yielded greenish-blue tones, which were very suitable for moonlight effects. The colour could be modified to a steely blue by a slight sub-

sequent immersion in the sulphocyanide bath, but to obtain this effect the preliminary gold toning must be thorough, otherwise the resulting colour would be a deep purple. Other bleaching agents were experimented with. Slides bleached with cupric chloride resisted all attempts at toning, others bleached with iodide of mercury proved equally intractable. The borax bath was also used, but, after several hours' treatment, was found to have no effect upon the image. Other well-known toning baths were not tried, thus a large field of experiment was open to those who might feel interested in the matter. In summing up, Mr. Blackmore said that to obtain an extensive range of colours by toning it was essential, first, that the image should be bleached with bichloride of mercury prior to toning. Second, that with the sulphocyanide bath containing one to two grains of gold to the ounce of solution, and used cold, a range of tones varying from steel blue to a delicate pink might be obtained; further, that by keeping the bath above a tepid temperature the result would be achieved in a shorter time. Third, increasing the proportion of gold would cause the toning to be more uniform and warmer in colour. Fourth, tones varying from greenish-blue to pink and magenta could readily be obtained by giving the plate a preliminary soaking in a plain gold solution followed by immersion in the sulphocyanide bath, the plate being washed between each operation. Fifth, care should be taken to select slides with thin images, as considerable intensification as well as toning occurred. Many points remained to be cleared up, such as the results to be obtained from the bath being in an acid, alkaline, or neutral condition; the effect of dispensing with or adding a larger proportion of hypo to the sulphocyanide bath; also of increasing or diminishing the amount of ammonium salt—all these suggestions opened up a wide field for investigation.

The PRESIDENT said Mr. Blackmore's paper had disclosed a very promising method of toning slides, and he hoped members would take the matter up with a view, if possible, of further developing the process.

Mr. HODGES believed Mr. Blackmore's process to be a new departure in toning bromide transparencies, although toning collodion slides with gold and platinum was well known, but in bleaching the image preparatory to toning with gold Mr. Blackmore appeared to have struck out a new line. The process, however, would require careful working in order to avoid too great a deposit and consequent blocking of the lights.

Mr. WHITING had found that by varying the exposure and modifying the development he could get almost any desired colour on commercial plates, therefore he did not see the necessity of resorting to any toning process.

Mr. J. S. DESIRÉ ENGLAND said warm tones could be produced easily on chloride plates with a suitable exposure and development.

Mr. HARBREAVES had found it impossible to bleach Thomas's lantern plates with bichloride of mercury without first thoroughly soaking in water.

Mr. BLACKMORE, in reply, said he believed that the silver image could be bleached, no matter what condition the film was in, although at times both bleaching and toning operations were somewhat erratic. It was desirable to soak the plates in a solution of chrome alum before toning, as the prolonged treatment tended to make the film rotten. If the cold tones were desired the toning should be proceeded with immediately after development, and before allowing the film to dry, but if the warm tones were sought the result would be more readily obtained by first allowing the plate to dry.

Two hundred slides were exhibited by means of the lantern.

Mr. HODGES handed round a negative and a transparency on Beechly plates prepared some twelve years ago. They were produced by a friend of his, Mr. Paul, who, in turning over some old apparatus, had come across a dark slide with the unexposed plates in it. After the milkew with which they were covered had been removed, they were exposed, and, as the result proved, were found to be still sensitive to the action of light.

HOLBORN CAMERA CLUB.

At the special general meeting, held on the 8th instant, an address was delivered by the PRESIDENT (Mr. W. Rice), detailing the progress of the Club, and inviting all interested in the proceedings to attend any of the future meetings, which will be held at the headquarters of the Club, 100, High Holborn, every Friday from seven to eleven p.m.

The following gentlemen were elected members:—Messrs. Louis Smeed, A. J. Raymont, H. Beckford, G. F. Asterooth, C. Irving (Platinotype Company), N. Dukas, Albert Bell, H. C. Gay, F. W. Gay, and Samuel Withlers.

Special class for learners the third Friday in each month; no fees; open to all.

Annual general meeting, April 5.

SHAFTESBURY PHOTOGRAPHIC SOCIETY.

MARCH 8.—Mr. Tollett in the chair.

Mr. BAKER read a paper entitled *Trips round London with my Camera*. Mr. Baker showed views of Windsor, Kingsbury, Boxhill, Dorking, and a group of pictures of Volunteers at Aldershot.

Messrs. Wills, Noel, Tollett, and Samora took part in the ensuing discussion. In consequence of an inquiry having been made at the previous meeting as to the most desirable camera for a lady to use, Mr. Wills exhibited the Aurora hand camera, concealing within a space of 10×4 twelve quarter-plates for exposure in a quarter-plate bellows camera, and weighing in all from four to five pounds. This was considered to be one of the most compact cameras ever brought before the notice of those present.

Two new members were elected.

Next Friday, the 15th instant, at a quarter-past eight, Mr. J. B. Rintonl will give a lecture, *In and Round London*, illustrated by about one hundred photographs shown as dissolving views. Visitors cordially invited.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

PHOTOGRAPHIC SECTION.

MARCH 1.—Mr. A. H. Allen in the chair.

Mr. WILLIAM BROOKS gave a demonstration of the collodio-bromide process for transparencies, lantern slides, &c. The lecturer described the operations involved, and protested against the prejudice which exists concerning the pro-

cess owing to its supposed difficulties. He cleaned and coated a plate in the full light, and when the gas was turned down developed a splendid lantern slide from one previously exposed. The subsequent operations of fixing, toning, reducing, and intensifying were shown in full gaslight.

The CHAIRMAN complimented Mr. Brooks on behalf of the members on the success of his experiments.

LEWES PHOTOGRAPHIC SOCIETY.

MARCH 5.—The President in the chair.

Messrs. E. J. Baker and J. J. Holloway were elected members of the Society. It was decided to hold an exhibition of members' work in the autumn, the details to be arranged by the Committee.

Mr. G. FOXALL read a paper on *Carbon Printing*, and went through the process by demonstration, and passed round for the inspection of the members the prints which he had developed and which had been exposed previous to the evening.

Mr. C. A. WELLS showed three carbon prints, and explained that they had been produced by himself some years ago, when the process was not so simple in manipulation as at the present time.

Some fine prints and enlargements, sent on loan by the Autotype Company, were exhibited.

A home-made detective camera was shown by Mr. G. E. Constable, with specimens of negatives taken with it; also other negatives and prints.

At the next meeting, to be held on April 2, Mr. J. Tunks will read a paper on *Hints to Beginners*.

BOLTON PHOTOGRAPHIC SOCIETY.

MARCH 7.—Mr. Walter Knowles in the chair.

Dr. Johnson exhibited the monthly *Album of the Argosy Postal Club*.

Mr. RICHARD LEIGH exhibited negatives taken on celluloid supports instead of glass; they were manufactured by Messrs. Allen & Rowley, of Boston, U.S.A. The negatives were greatly admired for their lightness, and Mr. Leigh stated that they were quite as easy to work as glass.

Mr. WALTER STATION exhibited an album of views taken whilst on tour in North Wales, the prints all being on Obernetter paper. He remarked that there was a print in the album from every negative he exposed on that tour.

Mr. Thomas Parkinson showed a variety of apparatus manufactured by C. Vevers, of Leeds, and Mr. A. Harper a number of prints.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

MONTHLY meeting, March 6.—A large number of members and their friends were present to witness the lantern exhibition promoted by the Lantern Committee of the Society.

About two hundred and fifty slides, the work of members, were shown by the oxyhydrogen light, the lantern being efficiently worked by Mr. F. W. Dew. Mr. Ambrose contributed some views and very successful copies of engravings; Messrs. Owen and Orton, some local and other views; Mr. Sturmev, about one hundred slides of cycling subjects, views, and hand-camera pictures; and Mr. Dew, instantaneous studies of animals and children, views in the neighbourhood and North Wales. With a good light, plenty of slides, and an appreciative audience, the exhibition was in every way a success, and was thoroughly enjoyed by all present.

A meeting for the transaction of business was held at the close, and it was settled that at the next meeting there should be an exhibition of members' apparatus, and, time permitting, some flash light portraiture.

GLOUCESTERSHIRE PHOTOGRAPHIC SOCIETY.

MARCH 11.—The President (G. Embrey, F.C.S.) in the chair.

Eight new members were elected:—Rev. Mowbray Trotter, Messrs. Clinch, Gillar, Hancock, Hughes, Johnson, Friday, and Round.

Mr. W. B. WOOD read a paper on *Picturesqueness in Photography*, illustrated by a number of lantern slides.

The HON. SECRETARY announced that the Society's new rooms were being furnished and would soon be ready for occupation.

DARLINGTON PHOTOGRAPHIC SOCIETY.

MARCH 11.—Mr. G. Newby Watson in the chair.

Messrs. E. V. Clark, W. Otley, W. R. L. Forrest, and Drs. Smith and Anderson were elected members.

Demonstrations of James's magnesium flash light were given by Mr. R. A. LUCK.

The PRESIDENT followed, substituting guncotton in the place of magnesium powder, but the former light was found to be the more actinic of the two.

Several of the members availed themselves of the opportunity to expose some plates.

At the next meeting, to be held on April 8, Mr. W. F. K. Stock will read a paper on *Hydroquinone as a Developer for Dry Plates*.

DEVON AND CORNWALL CAMERA CLUB.

MARCH 5.—Mr. Robert Murray in the chair.

The HON. SECRETARY requested those who exposed plates at the last meeting, when a series of tableaux were photographed by magnesium flash lights, to produce either the negatives or prints. The results, as a whole, were considered satisfactory and very encouraging.

Mr. GAGE TWEEDY then gave a demonstration on *Development without Washing*. He pointed out that occasionally a photographer was so situated that it was difficult, or even impossible, to obtain a sufficient supply of fresh water for the use of the ordinary methods of development; notably on board

ship; he, therefore, wished to bring before them a remedy for this inconvenience. He produced two half-plates—Edwards's isochromatic—which had been exposed that afternoon on a figure-subject in a fairly lighted room, the one four seconds the other six seconds, with a rapid rectilinear lens working at $f/8$. These he developed in a solution of pyro, two-thirds of a grain to the ounce, preserved by meta-bisulphite of potash and carbonate of potash twenty grains, a proportion which he strongly recommended at this time of the year. When the high lights showed clearly at the back of the negative he immersed it, without washing, in the following solution, which had been previously prepared:—Two ounces of alum was dissolved in twenty ounces of water, making what might be termed a half-saturated solution, to this was added four ounces of hyposulphite of soda. This should be allowed to stand about two days, during which time a white precipitate would be thrown down; the remaining clear liquid being that to be used as shown. The solution would keep good a couple of months, and probably longer. As soon as fixed the plate was removed from the dish, carefully wiped with a cloth, and put away, to be washed at a convenient time. One curious result of the process was the extreme hardness of the film; it was difficult to scratch it with a finger nail. This hardness was of course a great advantage, as it was not so liable to damage.

A discussion followed. Mr. Tweedy's demonstration was considered very valuable, especially with certain kinds of plates given to frilling.

The next meeting will be on the 29th instant, when Dr. Aldridge will read a paper entitled *Picture Making, not merely Taking Photographs*.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 6.—Mr. T. Mansel Franken in the chair.

After the ordinary business had been transacted, Mr. A. W. ALLEN delivered a lecture on *Photography as an Art*. The extensive practice of amateur photography as an art to many pursuits pertaining to art receives the full consideration of the lecturer, and, with the aid of the pencil he graphically described how to make an artistic picture photographically.

An illustration was also given by the power of the new magnesium flash light in producing instantaneous portraits at night, two excellent negatives of the President being secured and developed.

The lecture given by Mr. Storrie recently to the members privately on his discoveries at Llantwit-Major will be repeated shortly for the benefit of the general public and under the auspices of the Society.

On March 20, Mr. W. Windsor will demonstrate on *The Lantern and How to Work It*.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

MARCH 6.—Dr. Anderson, Vice-President, in the chair.

It was arranged to have a field half day on a Wednesday or Saturday towards the end of April.

Mr. A. Brown was elected a member of the Council in room of Mr. D. Holgeton, who has left for South Africa.

Thereafter Mr. J. C. MIDDLETON read a paper, *Suggestions on Picture Making*. The Secretary exhibited some slides on Mason plates developed with the pyro developer recommended for these, showing how various shades of brown could be obtained.

Some questions which had been put in the hat and drawn for at a previous meeting then received attention.

At a meeting of the Council the Rev. T. L. Ritchie was elected an honorary member of the Association.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

ONE of the most enjoyable exhibitions, representing the work of a single member, was given at the rooms of the Society, 122 West Thirty-sixth street, on Wednesday evening, February 29, 1889. The subject was *A Trip with a Detective Camera through Norway and France*, the negatives and slides on dry plates being the work of Mr. Richard H. Lawrence. The exhibition comprised one hundred and twenty slides of interesting subjects. The pictures, with the exception of a few interiors and some others, were made instantaneously. Most of the slides were made on dry plates and were developed with pyro, hydroquinone, or iron.

Correspondence

Our Correspondents should never write on both sides of the paper.

MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—LETTERS RECEIVED FROM FOREIGN SOCIETIES ON THE OCCASION OF THE FIFTIETH ANNIVERSARY OF THE DISCOVERY OF PHOTOGRAPHY.—A PRINT IN NATURAL COLOURS.—MEDALS AWARDED.—LATENT IMAGE DEVELOPED AFTER TWO AND A HALF YEARS.—A NOVELTY IN PHOTOGRAPHY.—AN APPARATUS FOR EXPERIMENTING ON LENSES.—EXHIBITION OF PLATINUM PROOFS.—A HAND CAMERA.—A NEW APPARATUS.—A NOTE FROM M. GAUTHIER VILLARS.—MY TOUR TO THE SOUTH OF FRANCE.—CONDÉSCENSION OF THE PRINCE OF WALES.

THE Photographic Society of France held its monthly meeting on Friday evening, the 1st instant, M. DAVANNE in the chair.

On the occasion of the fiftieth anniversary of the discovery of photography, the Photographic Society of France received several complimentary letters from foreign societies (Christiania, Copenhagen, Vienna, Boston, &c.), at the same time expressing their desire to have some relic of Niepce or Daguerre.

M. Chardon presented the Society with a print obtained in natural

colours, with paper prepared by him and exposed by contact behind a polychromed screen composed of a coloured-glass window. This proof was obtained twenty-eight months ago, and the colours have not yet faded.

The Society awarded a vermeil medal to M. Vieuille; a silver one to MM. Pector and Londe; and a bronze one to each of the following gentlemen, MM. Dronet, Jacquin, and Buquet. Three medals were granted for the best positive prints sent in for exhibition.

M. Grassin exhibited a negative exposed the 15th of August, 1886, at five o'clock in the afternoon, and developed the 20th of January, 1889, that is to say, two years and a half after exposure. The negative was very good; it represented a public procession. The exposure was instantaneous, a proof among many others that the latent image is not destroyed by over keeping.

M. Louis Ducos du Hauron presented a novelty in photography; whether it will be of service or not is an open question. I believe the idea is quite new. He calls the process "Transformisme." This gentleman can obtain by his process all the different effects such as are seen when a person stands in front of those concave and convex mirrors. This is the definition he gave of his process: "When rays of light are allowed to penetrate into a camera obscura, not by a single hole made through a shutter, but by the intersection of two slits made so as to throw the light in different directions, these slits being more or less apart from each other, when the rays of light are received on a screen so as to coincide with each other, the relative proportions of the image represented are completely changed." At present this appears to me to be useful only to make photo-caricatures. The idea is original, and the deformations obtained are certainly eccentric and amusing. All sorts of comical figures of a sitter can be obtained. The form of the two slits can be modified, and can take the shape of a curve, a crescent, a cross, or a hook, and so obtain, says the author, an incalculable number of transformations, either serious, scientific, pleasing, or caricatural, and that of the same sitter or model.

M. le Commandant Moessard presented an apparatus for the study of photographic lenses. By the aid of this instrument he can immediately find the exact focal length of a lens, and not only this, but what is more advantageous, the maximum or minimum of light can be measured, absorption calculated, as well as any distortion perceived, and any fault in the manufacture detected.

M. Poulene exhibited some platinum proofs, printed out without development; they were found to be inferior to proofs already exhibited which were obtained by development.

M. Schaeffer presented a hand camera of Dr. Krugener. It has the form of a book, and like all others of its kind has many advantages, such as cheapness, portability, lightness, &c.

M. Gravier exhibited a new system of fixing the moveable part of the camera which carries the ground glass. As the ground glass remains always at right angles with the bed of the camera, other systems I think are preferable. M. Gravier then informed the Society that all red glass to be employed to light up the dark room should be examined through the spectroscope. This is indeed new!

M. Tondent intended to exhibit a negative which was developed during the exposure, and explain how this was done. The President requested him to forbear until the next meeting, seeing the hour so far advanced (11.30). This is to be regretted as the communication appears to be of value. In all societies some young and badly informed member takes up the time, and often prevents some interesting subject being made public.

MM. Mario Carquero and Guillaumot, jun., presented an apparatus intended for the Paris Exhibition. They call it the photographic carriage. At one end of this carriage or rolling tram is an armchair, in which the person who desires to be photographed takes a seat. The armchair can be placed at any angle required. At the other end of the tram is a dummy, carrying the camera and a large mirror, which hides the camera from the sitter. In the centre of the mirror is a hole through which the lens of the camera protrudes. The sitter can see himself or herself in the mirror, and when a pleasing expression or a good position is obtained the sitter can set the lens or the shutter at work by pressing the india-rubber air ball fixed to the arm of the chair.

This ended the March meeting.

M. Gauthier Villars writes me that as M. Arthur Batut (who wrote an article on the means of taking photographic views and plans by means of a camera attached to a kite) desires that it should be publicly known that he was the first to propose a kite as a means to obtain photographic views from above, and as the author attaches great importance to his idea not being pirated, M. Gauthier Villars says that he should be obliged if the photographic journals would mention the fact. This is done, but I am afraid that M. Batut will not find himself alone; others I think will claim to share the glory with him. We shall see.

I am now getting quite close to the borders of Italy, and have obtained two hundred excellent negatives of the Riviera since my departure from Marseilles. On February 23 I was taking photographic pictures in the delightful gardens of Monte Carlo when the Prince of Wales arrived. I went to him, and said, "Will your Royal Highness permit one of your loyal subjects to shoot at you—(after a pause)—not with a deadly weapon, but with this harmless photographic lens?" The Prince and the Duchess of Manchester laughed heartily. The Prince answered, "Willingly; I will remain here quite still." I thanked the Prince, and told him that

at that distance the portrait would be very small, and if his Royal Highness would condescend to walk along the terrace towards my instrument I would seize the favourable moment. The Prince, in company with the Duchess, walked backwards and forwards, and I got three or four excellent negatives of him and his *suite*, as well as of his favourite dog. The Prince was thanked for his condescension.

Menton, March 4, 1889.

PROF. E. STERRING.

OXYGEN CYLINDERS.

To the Editor.

SIR,—In order to reassure your correspondent "G." and others interested, I have again seen the managing director of Brin's Oxygen Company, and he informs me that, although previously to the explosion in Dublin it was not always done, it is now the *invariable* rule to open the valve of every cylinder that goes into the works, so as to let the gas escape. As regards my arrangements with customers to credit the returned gas, I have been enabled to do so on account of having special understanding with Brin's Oxygen Company. All bottles tested by the Company have the letter B inside, and O stamped on the collar or mount of the cylinder, and, if not tested to one and a half tons pressure, the number of atmospheres are marked on, such as 70 A. Regarding the way in which a cylinder would behave in case of bursting from concussion or compression, it is considered it would do the same as one previously did that I believe was purposely broken, viz., rip up and let out the gas.

In the case of an explosion we have fortunately not more than one instance, viz., the Dublin, and there need never be another if users of gas will take the simple precaution of testing the gas before use by Professor Fleming's explosive gas tester.

The more that is known about the gas the better, and when users of gas understand the precautions taken, they will realise that they can work the limelight quite as safely as with gas bags and far more conveniently.—I am, yours, &c.,

J. H. STEWARD.

406, Strand, London, March 12, 1889.

COMPRESSED GASES FOR LANTERNS.

To the Editor.

SIR,—The numerous articles and letters recently published in England concerning the use of compressed gases for lanterns seem very strange over here, for with us the use of gas bags is scarcely known. Compressed gases have been used in this country for the past twenty years to my knowledge, and no one ever thinks of using the bags unless he has to work where the transportation of cylinders would be expensive. I have had them sent twenty miles by rail, and they are so very much better and more convenient to use, that they are worth the additional cost.

The idea seems to be prevalent in England that there is danger in the use of cylinders. We never think of danger here, and, so far as I know, there has not been an accident arising from their use. Moreover, safety jets and safety regulators are quite unnecessary. I do not say the latter are not advantageous, but I do say they are not required, and I doubt if they are useful except in regulating the steady flow of gas. Occasionally there will be a slight pop at the nozzle, or a mixture of gases may explode in the rubber tube below the attachment to the lantern, but I have only known the latter to happen once, and then when one cylinder was full and the other nearly empty.

When I was in England a few years since, I could not understand why so many people, in a country where the lantern is so much used, were working with gas bags. We have gas bags at lectures sometimes, but they are usually well in front of the lantern on the platform, and they do not always give as much light as one would like. I did not dream that there could be any objection to cylinders on the score of danger, and supposed the only reason they were not in use was that the compressed gases were not to be had. Now that they are available you should get better light than hitherto, and if the cylinders are always of two colours—red for oxygen and black for hydrogen—there is absolutely no danger in their use.

The zirconia light is now very favourably spoken of in Germany. Dr. Eder, of Vienna, uses it for photo-micrography, and recommends it highly. The zirconia is embedded in a platinum disc about five-eighths of an inch in diameter. These discs cost ten marks, and are said to improve by use. If flakes of zirconia come out they are ground fine in a mortar and pressed in again. Messrs. Schmidt and Haensch, of Berlin, make a special lantern for this light with condensers about thirty centimetres in diameter. They also make an improved form of jet, which is said to be far more efficient than those ordinarily used.—I am, yours, &c.,

National Museum, Washington, D.C.

ROMYN HITCHCOCK.

HYDROQUINONE.

To the Editor.

SIR,—In a letter printed in your issue of the 1st instant, our name occurs very frequently, and we did not expect to be charged with jealousy of our neighbour's new secret to "commercial success" with a lemon-coloured compound of hydroquinone. We consider this very unjust to us, as we are actually distributing pure and real hydroquinone of

Schering's manufacture, leaving to the whole world the chances of commercial success by the industry of making hydroquinone compounds.

A useful matter to know, it seems to us, when dealing with unaltered real or pure hydroquinone, is, "What is meant by pure hydroquinone suitable for photography?" To define this we must explain that, as with many other chemical products, there is pure hydroquinone—meaning that it is, technically speaking, nothing but hydroquinone, and the proper product for the photographer—and there is also hydroquinone of higher chemical purity called "purissimum," which is slightly more expensive, but which in photography works no better than the ordinary chemically or technically pure. Consequently we recommend Schering's pure hydroquinone to the photographer, and, as a particular secret to the commercial success of our buyers, do not encourage them to go to the greater expense for a luxury. Nevertheless, should operators fancy that the purissimum form will better secure their commercial success, we shall be happy to supply it.—We are, yours, &c.,

A. & M. ZIMMERMANN.

6 & 7, Cross-lane, St. Mary-at-Hill, London, March 11, 1889.

To the Editor.

SIR,—I have lately been in the habit of using hydroquinone developer, but find that the enamel of the developing dish has assumed a rough, uneven surface. It seems to me that this has been caused by the action of the hydroquinone, but am not sure. If any of your readers have noticed an occurrence of a similar nature, perhaps they will relate their experiences.—I am, yours, &c.,

DEVELOPER.

Swansea, March 11, 1889.

ACTION OF SOLUBLE BROMIDES.

To the Editor.

SIR,—Having noticed a very able and instructive article in this year's volume of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, by Dr. Hill Norris, on *Action of Soluble Bromides on the Latent Image*, and as its teaching appears to corroborate a statement which I was allowed to make (though under editorial protest) in the pages of this JOURNAL of October 19 last, I ask permission to invite attention to it, and particularly to that portion of the article which seems so conclusively to show that bromide of potassium is not a *destroyer* of the latent photographic image; for, if this be taken as proved, it is a fact which gives much probability to the accuracy of my previous allegation, to the effect that, in cases of *much over exposure* bromide of ammonium had, in my experience, been found *not* to act as a restrainer at all when a carbonate of either of the fixed alkalies was used as the auxiliary of the pyro instead of ammonia; but the writer of the article referred to goes further, and proves by the evidence of experiment that bromide of potassium, under one condition at least, actually does the work of an accelerator. His words are:—"In experiments of this class we obtain evidence that, so far from the bromide of potassium having destroyed any part of the latent image, it has actually rendered it possible for the developer to bring out more of the feeble effects of light."

The practical lesson taught by these facts is that bromide may be freely used to restrain developmental action, provided the constitution of the developer be duly taken into account, for I still hold that it is far from being a matter of indifference whether we add bromide of potassium or bromide of ammonium to a developer made up of *carbonate of potassium* and pyro, for this reason, that the latter haloid would immediately start chemical changes, which would end in the liberation of ammonia, or its carbonate, and so upset the balance of the developer. This fact has been made more evident to me by the following experimental trial of *hydroquinone* which I made a short time since. Acting on the knowledge of the foregoing facts, I mixed two developers containing the new agent as follows:—No. 1. Eight grains hydroquinone; thirty-two grains sulphite of soda (crystallised); and thirty-two grains bromide of potassium, and water one ounce. No. 2 was the same in all respects, save that bromide of ammonium took the place of the potassium haloid. To a given measure of each of these I added, in turn, an equal quantity of an eight-grain solution of caustic soda, and proceeded to test their respective powers of development on two plates equally exposed, upon the same subject. No. 2 began to smell of ammonium as soon as the caustic sodium solution was added to it, as I expected it would, and for this reason I also expected that it would prove by far the more powerful developer of the two, but to my great astonishment it proved no such thing; for while in five minutes No. 1 (caustic sodium) had finished its work, No. 2 (ammonium) had not begun! When the plates left the fixing bath, No. 1 reminded me more of a good wet plate negative for clearness, vigour, and delicate gradation of details, than anything I had before made on a dry plate. No. 2, which, by the way, was quite thirty minutes in developing, was a good positive picture by reflected light, but only a stain when looked through. So it would seem that, though ammonium is perhaps a more active agent than the carbonates of the fixed alkalies, it is far less powerful than the caustic alkalies are (unless bromide of sodium happens to be a much more powerful restrainer than the potassium haloid). This, if true, is a very important and suggestive fact, which I have not seen any notice of before.

From the theoretical point of view, so large a proportion of bromide as four to one of a developing agent, which is thought by many to work

better without a restrainer, appears almost rash, but the end in this instance is a justification of the means.—I am, yours, &c.,
Leeds, March 7, 1889.

W. HANSON.

THE CONSTITUENTS OF "AZALINE."

To the Editor.

SIR,—Will you kindly find room in your JOURNAL for the results of another scientific analysis of the above compound sold by me as licensee of Dr. Vogel? It is from Dr. O. W. de Witt of Berlin, and is in complete agreement with that published by you last week by C. H. Bothamley.

TRANSLATION.

"SIR,—According to your wish I have examined the packet of "azaline" sent me, and tested it for eosine and find that there is not a trace of any colouring matter belonging to that group in it.

"The analysis was carried out in the following manner:—The contents were reduced by evaporation and the residue dissolved in water, and then acidified with sulphuric acid and shaken up with ether. This left the ether colourless, as also did the addition of ammonia.

"If ever so little eosine had been present, the solution must have shown it by its colouring. This was proved by a controlling experiment in which a small trace of eosine was purposely introduced.—I remain, Sir, yours respectfully,
DR. O. W. DE WITT.

"To Dr. H. W. Vogel, Berlin."

It is certainly to be regretted that Mr. Spiller's analysis should lead him to results entirely at variance with the finding of other men of undoubted authority and independence, specially when being confronted with his finding that eoside of silver was actually formed in the orthochromatic emulsion process as described in Attout Talfer's specification, an opinion which is at total variance with that of Dr. Eder and several other almost equally good chemical authorities.

I have only to add that the above translation is my own, made from the original letter of Dr. O. W. de Witt, which may be seen at my office.—I am, yours, &c.,
J. R. GORTZ.

19, Buckingham-Street, Strand, London, March 11, 1889.

DETECTIVE CAMERAS.

To the Editor.

SIR,—In the present and past numbers of the JOURNAL, the articles on the above have doubtless been of great interest to many of your subscribers. There are now of this class of so-called "Detective" cameras scores of different patterns, more or less complicated. During the past few months I have had frequent opportunity of inspecting a hand camera purchased by an amateur in this city. Not having seen a description of this one published or brought before your subscribers, I will endeavour to give a short description.

The camera itself is contained in a wooden case, painted dead black and the brasswork also blackened, so that there is nothing conspicuous in its external appearance, and is fitted with black leather shoulder-strap, also leather handle so as to admit of its being carried as an ordinary parcel. The plates, $4\frac{1}{2} \times 3\frac{1}{2}$, are fitted into metal sheaths, and placed into a grooved box contained within the camera, and holding twelve plates, which can rapidly be brought into position one after the other. After exposure, by moving a small handle the plate slides into a grooved box in the bottom of the camera and the next plate racked into position, an ivory indicator on the side of the camera showing at a glance what plates have been exposed. The camera has two view finders, for upright and oblong pictures. The lens being of the eury-scope class, works with an effective aperture of $f/6$, about three-quarters of an inch (covering the plate sharp with full opening). The shutter works behind the lens, and is adjustable to various speeds, one-hundredth to one-half second or thereby. For hand exposures it is fitted with a set of Waterhouse diaphragms, and can be used by screwing a hood and cap on the lens. Being entirely self-contained, and obviating as it does the annoyance of having to manipulate half a dozen slides, it should prove a boon, especially with an eury-scope lens, to admit of what is generally sadly deficient in detective cameras—light.

The maker is Mr. T. Haddow, 2, Maitland-street, Edinburgh.—I am, yours, &c.,
GASKIN WOOD.

6, St. Bernard's-row, Edinburgh, March 9, 1889.

PHOTOGRAPHING MOUNT EVEREST.

To the Editor.

SIR,—Noticing in your issue of January 4 a description of photographing Mount Everest, some particulars by others may be of interest. In 1885 I sent home some attempts of the snowy range done from Hetchal on Paget plates. Dr. Donkin, commenting on these at a meeting of the Photographic Society of Great Britain, recommended the use of isochromatic plates (vide report in your JOURNAL). In these, Mount Everest was plainly distinguished, although eighty miles off. Since then I have not had an opportunity of again trying a shot at the big mountain, as whenever I have had my camera with me it has been shrouded in mist, but have done numerous ones of Kinchinjunga, which is 28,000 feet high, from distances varying from twenty miles on the hills to over a hundred down in the plains; my best have been from one and a half to two hours after sunrise—a 12×10 Ross orthochromatic lens, stop $f/64$, drop shutter

exposure, Ilford ordinary plates or Eastman's films, and careful development; with potash. Of course a second plate has to be exposed for the foreground; but I think the best results are to be obtained in the evening, just before sunset, when in the early part of the rains the snows are occasionally illuminated in masses of pink and gold. A very good picture can be obtained on a clear moonlight night, perhaps better even than in the day; also a very interesting picture is to be got on a clear starlight night without moon. An exposure, not sufficiently long to blur the stars, will give a view of the snows if done soon after sunset, the snow retaining sufficient light to impress itself on the plate.—I am, yours, &c.,
Punkaburrie, N. Bengal, February 10, 1889.

C. R. NEWTON.

PHOTOGRAPHING IN ITALY.

To the Editor.

SIR,—Being about touring through Italy during April next, and purposing using Eastman's films, I shall be glad to know what precautions are necessary to avoid interference from police or others, beside carrying passports as recommended in the ALMANAC.

2. Also, whether Eastman's rapid or ordinary films would be best to take.

3. Would not Burton's exposure table require to be diminished by one-half?

4. Please give me a formula for a hydroquinone developer suitable for developing an occasional test cut sheet.

My banishment in Brittany must be my excuse for troubling you.—I am, yours, &c.,
N. Y. Z.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Good whole-plate portrait lens in exchange for accessories or backgrounds.—Address, T. LLOYD, 35, Earl-street, Coventry.

Wanted to exchange, several good lenses and cameras for studio chair, accessories, &c. Address, RAWSON, J. Photographer, Sudbury, Suffolk.

Rastic accessory wanted in exchange for books by Professor Tyndall.—Address, REICHT, 4, Carlton-terrace, Harrow-road, London.

Will exchange handsome quarter-chime clock for tourist camera and lens for large-sized plates.—Address, WATERMAN, Photographer, High-street, Shanklin, Isle of Wight.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, from July 15, 1887, up to the present time, for cabinet turnisher or half-plate camera.—Address, J. GRIFFITHS, 12, Allen-street, Hartshill, Stoke-on-Trent.

Will exchange rapid eury-scope lens, ten and a half inch focus, $f/6$, covering 9×7 , with full opening, for rapid symmetrical twelve-inch Steinheil apianat, $8\frac{1}{2} \times 6\frac{1}{2}$, or Suter's apianat & No. 3.—Address, J. GASKIN WOOD, 6, St. Bernard's-row, Edinburgh.

For exchange, heavy cabinet rolling press (nickel plate), half-plate portrait lens by Barr, whole-plate portrait lens by Leroy, card embossing press, four dies; wanted, outdoor apparatus, cameras, and lenses.—Address, MERRAT, 4, Malgrave-road, Sutton, Surrey.

A set of tanks, 16×22 , with trowsers, &c., for carbon printing, a 7×5 optimum rapid eury-scope lens, Wilson's Quarter Century in Photography, all equal to new; wanted, portable symmetrical lenses, Dallmeyer's landscape lenses, Shew's eclipse hand apparatus.—Address, H. C. J., 7, Tadema-road, Chelsea, S.W.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

WILLIAM DENISON.—At Marion & Co's, Soho-square, London.

O. R.—A gelatine so acid as your sample is not well adapted for making emulsion.

H. B. MILSOME.—If you adhere to the instructions of the makers of the films—the Eastman Company—no difficulty will be experienced.

DENIS.—Yes. A lens of the rapid class of about seven or eight inches focus will take a whole-plate group in the short space at your disposal.

S. SIDEX.—As far as we know there are no detective cameras in the market similar to yours, which, from your description, ought to be a good one.

BACKGROUND.—If with using a white background you are unable to develop a background to print white, better stop it out in the negative with an opaque varnish.

C. M. MAJOR AND OTHERS.—Referring to the formula on page 576 of our last ALMANAC, Mr. Wellington has promised to elaborate on it in the course of a short time.

R. EATON.—The form of studio will do very well, but why slope the roof backwards from the first pane of glazing to the back of the backgrounds? Better make it square.

ETHEL CONSTANCE MAY.—1. The cockling is due to the negative not being thoroughly dry.—2. No, the developer has nothing to do with it.—3. The developer does not give fog when used intelligently, according to the instructions sent by the firm mentioned.

S. BARNES.—The causes of spots on collodion negatives are so very numerous that we could not explain those in the present case unless we were present during the manipulations.

S. N. SIMMONS.—If you stick a cork upon the prong of each leg of the camera stand and connect the legs with a piece of string it will neither slip nor scratch the polished marble floor.

WORLD.—1. Daguerre was born on November 18, 1787; his process was patented on August 14, 1839; and he died on July 10, 1851.—2. Daguerre and Niepce formed a partnership in 1837.

F. R. FISHER wishes to know how best to apply a cut-out mount to a print in optical contact with glass so that when mounted with an outside glass no shadows will be cast.—This cannot be done.

C. B.—Carbonate of soda (washing soda), two and a half drachms; sulphite of soda, five drachms; dissolve in one and three-quarter ounces of water and add forty-six grains of pyro. For use, dilute with five times its bulk of water.

C. H. MUNROE (Jamestown, N.Y.).—Enamelled paper suitable for receiving a coating of collodio-chloride may be had from Oefflein & Co., 54, Berners-street, Oxford-street; Buchillott & Co., 37, Southampton-row, London; and, doubtless, many others.

STEAMER writes: "Will you kindly tell me what is the nature of the deposit or for in kettles? and can you suggest anything to put in to eliminate what is already formed? I have tried diluted hydrochloric acid, but to no purpose."—Reply: Sulphuric or nitric acid will remove the deposit, which is a carbonate of lime.

GRONIA.—1. The yellow veil can be removed by placing in a solution of alum with citric, tartaric, or oxalic acid.—2. For enlarging by artificial light, condensers are necessary to direct the light in a straight line from the negative to the objective.—If you have access to our ALMANAC of 1888 you will find a chapter, on page 273, on the use of a condenser.

R. A. L. asks the size of the smallest camera made for practical use and the dimensions and information of same.—The smallest that we know of is one made by Lancaster, the body of which consists of a series of telescopic draw-tubes which close up in a case the size of and similar to a watch, but we are not acquainted with the arrangements for holding dark slides, &c.

H. J. EASTON writes: "I shall feel obliged if you will let me know how Major Barrington Baker fixes the concave glass on to the plain sheet of glass that he mentions in his paper on *Substitutes for Condensers*, on page 426 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1889. I have tried cement, plaster of Paris, whitelead, and indiarubber, but find the glycerine eats its way out."—By opticians' cement Major Baker doubtless means Canada balsam, such as is used by opticians in connexion with achromatic lenses.

FLORENCE writes: 1. "You say in your paper of October 19, 1888, that the Barnard Comet will be seen on January 28, 1889, and that 'there will be a chance for camera work.' Has this comet appeared, as I have seen no notice of it in any other paper?—2. Can I fasten a telescope on to a camera so as to use it in the place of my lens? If so, shall I have to take any glasses out before I can use it as a photographic lens?—1. The comet has not yet made its appearance.—2. Better use the bare object glass and make an allowance for over correction.

FILM writes: "Kindly give me some advice in stripping films. I have followed the instructions, but cannot get the skin to adhere to the film in every case, but to the cloth instead. I use an ordinary squeegee and a rubber cloth."—Your difficulty no doubt arises from not using the right side of the cloth on all occasions. If you use the rubber side next the squeegee the skin will adhere to the film, but if the rubber side be used next to the skin it will adhere to the rubber instead of to the film. Try again and let us know if you manage it satisfactorily.

ARTIST writes: "Will you kindly tell me, through your columns, of an effective method of photographing on boxwood for engraving—a process workable at night-time if possible? I have found much difficulty in preparing the white ground so that it keeps on, but I am ignorant of any process complete, so that I should be very grateful for any assistance you can give me."—Reply: Whiten the surface of the wood with a paste composed of whitelead and water, then give a coating of very thin varnish in order to "bind" the surface. We do not know of any process applicable for nightwork unless you use the carbon process, exposing during the day and transferring and finishing at night.

CONSTANT READER says: "I take the liberty of addressing a few lines to you asking for a little information respecting the working of the carbon process. I have been a carbon printer about eight years, and for the last three years have had very bad health; I have been to several medical men—they don't do me any good; they say it must be something to do with my work that affects my health. I have told them I used bichromate of potash, and they said that would not affect me. I saw in your JOURNAL a discussion on carbon printing at the West London Society, and Mr. Foxlee mentions there is danger to health in the process of developing if proper precautions are not taken. Could you inform me what precautions are necessary, and what effect the developing has on the health? For any information I shall be very grateful."—The first of some articles on the bichromate disease will be found on page 174.

CANTLE wishes the following questions answered: "1. An easy but efficient method of testing for hypo in silver prints supposed to have been thoroughly washed.—2. Will washing them in a tin or zinc vessel injure them in any way?—3. The cause of spots on a silver print. On holding the print to the light I find the gloss on all the high lights entirely gone and the surface of such parts rough and blotchy. What can be the cause?"—Replies: 1. Hang it up to dry and collect the droppings in a glass; now, in (say) a watch glass, place ten drops of thin boiled starch (cold), to this add two drops of an aqueous solution of iodine, by which a violet-blue colour will be developed; mix a little of this with ten or fifteen drops of the washing from the print, and if there be any hypo present the blue colour will be discharged, but if free from this salt the colour will remain unchanged.—2. It is desirable to give it a coating of Brunswick black before using.—3. Impossible to say definitely without seeing a print.

W. A.—Send a postal card stating hour when it will be convenient to call—Monday, Tuesday, or Wednesday—as we should like to converse with you relative to the negatives.

L. J. says: "I read with interest and profit your article on *The Reactions of Mercurial Salts on Intensifying Solutions* in the JOURNAL of January 18. I think its interest would have received addition had you been able to give a method of removing the 'sickly yellow veil over the whole negative' without causing injury to the image. I have a negative in the state described, looking almost as though it had not been fixed; probably caused, as you suggest, by 'varying from ammonia to one or other of the substances last named.'—Reply: We should not have failed to mention the remedy had a satisfactory one existed for the yellow and brown stains left after mercury intensification. If the stain be of the brown kind, caused by imperfect washing after the application of the mercury, the only chance is that it may be mercurious sulphide, which is slightly soluble in potassium sulphide; but the prospect of doing much good with that re-agent is not encouraging. But if the 'sickly yellow veil over the whole negative' is due, as is most probable, to imperfect washing after fixing, and before applying the mercurial solution, it may consist of silver sulphide, which is slightly soluble as hot concentrated nitric acid. This we did not consider worth mentioning as a remedy.

FLORENCE writes: "1. If I dip my finger in a solution of ammonia, citrate of iron, and ferriyanide of potassium, and then in H_2SO_4 , my finger will be stained blue; if I dip the stained finger in ammonia (liq. 880) the colour is taken away, but can be restored again by putting on H_2SO_4 . Will you be kind enough to tell me what chemical change takes place?—2. What quantity of K_2CrO_4 must I put to an ounce of gelatine to make it insoluble after exposure to light? also, how much H_2O must I use?—1. The ammonia most probably converts the ferrous ferriyanide which forms the stain into ammonium ferriyanide and a basic hydrate of iron. Upon the application of sulphuric acid the ammonia is again withdrawn and the original salt re-formed. In all likelihood if a thorough washing followed the ammonia treatment, so as to remove the soluble ferriyanide, the stain would not reappear.—2. Dissolve the gelatine in the proportion of about sixty grains to the ounce of water. The proportion of bichromate is immaterial so far as the ultimate result is concerned, provided a sufficient exposure be given; but bear in mind that the smaller the quantity the longer the exposure necessary, while as the proportion increases so also will the discolouration of the gelatine film by light. As it is of greater importance to obtain a colourless film than to work with great speed, you will do well to employ a minimum of bichromate, say about one grain to each ounce of solution.

PHOTOGRAPHIC CLUB.—March 20, 1889.—Smoking concert.

MR. WILLIAM ENGLAND has favoured us with two cabinet prints from flash light photographs taken respectively of the London and Provincial Photographic Association and of the technical meeting of that of Great Britain.

SCANDINAVIAN EXHIBITION.—A meeting of the photographers of Scandinavia will be held at Christiania, Norway, from June 11 to 14 of the present year, to celebrate the fiftieth anniversary of the discovery of photography, and a photographic exhibition will be held in connexion with it. The Photographic Society of Christiania, the organizers of the meeting, invite inventors of instantaneous shutters of all nations to exhibit them, and each shutter must be accompanied by a collection of ten instantaneous pictures taken with it. The exhibitor must also give his name and address, as well as a description of the lens, diaphragm plate, developer, paper, &c., employed in the production of the pictures, together with the price. His Majesty the King has placed at the Society's disposition a number of Royal silver medals, which will be awarded as prizes. The articles must be sent carriage paid to H. Ahel, Christiania, before May 15.

PHOTOGRAPHY BY GASLIGHT.—Another advance has been made in photography as the result of experiments made with a new patent of Messrs. Sugg & Co., an improved Cromartie light. At a demonstration given at the studio of Messrs. Brown, Barnes & Bell, eight lamps of the improved pattern were in use, giving a light of about forty candle-power each, and some excellent negatives were secured. The light is a modification of the ordinary "Cromartie," the process rendering it particularly actinic, and thus specially adapted to photographic work. Negatives were taken both of groups and Rembrandt heads, the results showing no perceptible difference from photographs taken by daylight. The advance illustrated by this new development in the art of photography may be imagined, for it practically renders the various firms who adopt the patent independent of the weather. The exposures varied from ten to twenty seconds. Photography by gaslight has been attempted by various firms in different parts of the country, but thorough success has not been attained until now. The experiments were made under the superintendence of Mr. R. Brown, jun., and Mr. Semmance, local manager for Messrs. Sugg & Co. Visitors to the studio or to Messrs. Sugg's can see specimens of the photographs, and they will admit they are equal to pictures produced by daylight.—*Liverpool Echo*.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1507. Vol. XXXVI.—MARCH 22, 1889.

THE CRYSTAL PALACE JUBILEE EXHIBITION.

THIS Annual Exhibition has, we vain hope, come to be a permanent resident amongst us. The experience of the last year, when it was initiated, has served to remove certain elements by which a *souffron* of friction was then encountered.

Very wisely, as we think, the medal system has been suspended as regards lenses and other apparatus. The display of pictures is very large, and each exhibitor has sent his best.

Among the exhibitors in the art department are to be found the names of the Polytechnic School of Photography, Lavender, Morgan & Kidd, Frith (Reigate), Hallier, Eastman Company, Wollaston, Webster Bros., Benrose & Sons, Bedford Lemere & Co., Keene, Winter, Byrne, Gridley, Maull & Fox, F. W. Edwards, London Stereoscopic Company, Marsh, Parry, and others.

It is in the apparatus department, however, where the greatest attraction to the photographer will be found, and, as we did last year, we shall bestow considerable space to a description of the novelties to be found under this heading.

The promoters have worked assiduously and well, both in this and the pictorial division; and with the anticipation of more favourable weather than was experienced last year, it will, we hope, achieve that great appreciation from the public which its merit demands.

The manufacturers of lenses and others who make a speciality of them come out in great force. Among these we recognise Ross & Co., Dallmeyer, Taylor & Hobson, Wray, and Beck; but, indeed, lenses of one or another form are to be found in the majority of stalls of the exhibitors.

Marion & Co. have a very large display, so have, also, Eastman, Lancaster, the Stereoscopic Company, Rouch, Lawley, Sands & Hunter, Fallowfield, and Negretti & Zambra. The exhibits of Mawson & Swan, Houghton, and Stanley are also characterised by fullness and variety.

Messrs. Watson are also here in great force; Shew, Gotz, and the Photographic Apparatus Company being also well represented.

The list of exhibitors also includes the names of Mayfield, Couch, the Paget Company, Fry & Co., Thomas, Abraham, Zimmermann, The Photographic Artists' Stores, Mothershill, Skinner, and Wormwald.

Amongst specialists in lanterns are Steward, Walter Tyler, W. C. Hughes, and Noakes.

Spicer, Theobald, and the Platinotype Company are also included in the list, to which we may add that of W. Tylar, of Birmingham.

As we write this notice the catalogue has not yet issued from the press, although hourly expected.

Next week we shall speak of the various exhibits in full detail, and, as on a previous occasion, describe as amply as possible the novel features of the apparatus exhibited, which we may state is of an exceedingly high class throughout, and shows that a great advance has been made during the past twelve months.

This exhibition partakes somewhat of a jubilee or semi-centennial character as regards photography, fifty years having now elapsed since the Daguerrotype was introduced to a wondering world.

As we have already said, great credit devolves upon the organizers and managers of this exhibition.

EFFECT OF DIMINISHING THE DIAMETER OF A LENS.

SOME of our friends have of late, and in these pages, been disagreeing respecting the illumination of a plate when the light is transmitted under circumstances by which a portion is unequally cut off. Probably the few remarks we are about to make may tend to elucidate the matter, and we shall assume the lens on which the trials are being made to be a rapid doublet, working at its full aperture.

The circle of illumination or area of delineation given by such a lens will be lessened by reducing the effective diameter of either the front or the back component, whether by an annulus or otherwise. Indeed, many of the hoods of objectives of this class are of such a narrow and projecting nature as to materially circumscribe this area of illumination, from which fact may be deduced a hint by those who desire to obtain the largest possible photograph by a given lens.

While the illuminated circle is decreased by "stopping" the margins of either component, the intensity of the illumination on the plate is less affected by an annulus around the back lens than if the front one were so treated, because, taking axial rays as an instance, a bundle of these falling upon the front element will suffer convergence immediately upon their transmission, and will all pass through a back lens of slightly less diameter than the front. In this case, the diameter of the front is the measure of the intensity; but such intensity would be materially diminished were the annulus placed at the front, as when in that position the angular aperture of the combination would be reduced.

When an opaque slip is inserted equi-distant between the lenses, no light is of course transmitted, but it is surprising to what a short distance it has to be raised in order to allow the

light to be distributed over the plate, a fact which would indicate this as a favourable position for a shutter.

PRACTICAL CONSIDERATIONS IN STUDIO BUILDING.

II.

WE have assumed as an axiom that all studios should give the artist power to direct the illumination to either side of his sitter's face, that is to say if full justice is to be done to every subject. As to the plan of gaining this power by having opposite sides of the studio glazed, there is the advantage of studying the sitter's feelings and convenience, with the corresponding disadvantage of rendering the direct sun more difficult to deal with. With a studio that is built east and west (the sitter usually facing the east) this is a most objectionable mode, for one side would be in full sunlight for the greater part of the working day, and to illuminate the sitter from that side is always very troublesome, whether paper, woven fabrics, or coatings of paint be used to modify the glare. Still greater are the difficulties in this form of screening off the light entirely when the north light is in use. Beyond this great drawback lies the fact that, though the sun's direct rays may be sufficiently softened to admit of artistic effects, its heat is not destroyed, and except by an almost unworkably complicated system of *louvre* boards, the heating of the studio would be almost unsupportable. When it runs north and south, the sitter facing east or west, it is more particularly in the afternoon only when the sun gives trouble, and this mode of lighting has many advantages. We shall shortly have to more fully discuss the trouble with the sun; but will first point out some considerations regarding a double-ended studio. In the first place, unless it be of very unusual length, no approach to that favourite method of some workers, the tunnel system, is permissible, as the tunnel would have to open out at each end. There is, however, no need for any one to be troubled at this, for a tunnel very greatly restricts the opportunities of the artist—it is not a desirable form. It is further obvious that in studios of ordinary length almost the whole of one side, as regards length, will have to be glazed, for the skylight for a distance in front of the sitter of about twelve feet is considered ample; when he was placed at the opposite end of the room this light would be too far in advance to get either effective illumination or a sufficiency of it. Naturally these objections would not hold when busts and half-lengths, and with a comparatively short-focus lens, were taken. So also, when a great length of room was obtainable, the twelve feet of glass could be placed in the middle of its length and space be still left to work from either end in a good light. A double-ended studio would also require either duplicate backgrounds or moveable ones, all which considerations involve elements of expense.

In assisting at arriving at a conclusion on these points, another aspect of the subject must be looked at. Taking a studio again, built north and south, great difficulty will occur with the sun's rays in and about the summer months. But with a single-ended room it may be possible either to build against a high wall or lofty building, or, failing that, to erect a wall or other structure for the purpose of keeping the sun out. This cannot with advantage be done with the double-ended form, as, when the sitter was placed at the north end, this screen would often prevent desirable effects of illumination being obtained. It is true that excess of front light is very undesirable, but there are many cases where an obstruction

of the light in front of the sitter would be particularly unfortunate.

We would here interpolate the remark that we purposely avoid alluding to particular forms of roof, such as "lean-to," "ridge," or "sloping-front" form; we do not wish any remark to have a partisan aspect—we are aware of the strong views some photographers hold—and when the context does not exclude a particular form, what we say would be applicable to all shapes.

We have said so much of the difficulties the sun's rays place in the way of the photographer, that it may be well to describe them for the benefit of those who hitherto have not been so troubled. They are not of much account in the winter months, and are confined mainly to the discomfort of heating the room to excess, and to the real injury to work by either shining into the lens or the more subtle evil of illuminating the atmosphere between sitter and lens. We need scarcely say that the very finest sunbeam whose path lay in such a course would destroy all brilliancy of shadows, while if a broad beam of light passed, the work would be worthless till the rays were screened off, or, at any rate, softened by the interposition of some diaphanous substance. We well remember being asked for advice by a fairly practised hand in regard to certain parallel streaks that made their appearance at times upon his negatives, and which we diagnosed as effects of light. We may conclude our remarks for the present occasion by explaining their cause and how they were prevented. The studio was a sloping front facing due north (the sitter having his back to the sun), and it was built against a high building, the sash-bars running from overhead forwards. This was the very position to minimise or destroy the sun's injurious action; but the building was not quite high enough, for during a month or two in the middle of summer, for a few minutes, comparatively speaking, in the middle of the day, the sun's rays just passed over the building and shone into the studio. The streaks on the negatives were simply the breaks in the sunbeams caused by the bars of the skylight. It was thus quite possible for the effect to remain some time unnoticed, through the combined effect of cloudy days or photographic work not going on at the particular time of day when only the effect could be produced.

The cure was as follows: Immediately overhead a wooden awning projecting about four feet was built against the lofty building spoken of, and at the highest point attainable; and in addition to this a screen was built inside the studio to receive the residuum of beams and prevent them illuminating the atmosphere in front of the lens, some judgment being required to place it so as to answer the purpose without interfering with the field of view. This incident is fairly instructive as showing the defects incident to a particular aspect and how it was found possible to master them.

MANY professional photographers evidently do not attach much importance to the permanence of their work, that is if one may form an opinion from the evanescent character of the pictures shown as specimens at, and issued from, some establishments. We are not now alluding to the prints produced by those houses who do the work at low prices, as here it may be somewhat excusable, if an excuse be admissible for sending out pictures which are certain to prove fugitive, when the bestowal of a little more time and care would ensure those of a more permanent character. The houses to which we here specially refer are some of those which charge the highest prices, and yet care but little for the permanence of their pictures. "A thing of beauty is a joy for ever," so says the proverb, but this clearly does not apply to photographs, or at least the majority of

them. The chief aim amongst professionals at the present day, it would seem, is to produce a thing of beauty. But for how long it shall be a lasting "joy" is a question which a large proportion of photographers completely ignore.

PASSING through one of the fashionable thoroughfares at the West End a few days back, we noticed at a leading photographers an enlarged portrait—life-size or thereabouts—highly finished in oil colours. We cannot state the price that would be charged for a similar picture, though we think we may safely say it would not be less than twenty guineas at this establishment. The picture was on a photographic basis, but of what kind we are unable to say. However, the picture had cracked badly, and the cracks were confined to those portions where the photograph would be the strongest—the shadows, hair, dress, and the darker parts of the background. The lighter portions of the flesh, although they were thickly painted with body colour, were intact. This would rather indicate that the fault rested with the photographic basis. There are many works by the old masters in existence, which have been painted nearly as many centuries as, probably, this picture has been years, which show less signs of deterioration. But this is the point. Here is an expensive picture, badly deteriorated, which is publicly exhibited as a specimen by an establishment of reputation. This naturally leads one to imagine that here, at least, durability in the work is but of secondary consideration.

STRICTLY as the Copyright Act is, it is manifest that it is being infringed, and in a somewhat barefaced manner, too. Some months back we alluded to this matter, and mentioned that photographic reproductions of some of the most popular engravings of the present day were being publicly sold. Only last week we saw an itinerant vendor in the street offering photographic copies of most of the leading modern engravings, including such works as *Christ leaving the Priesterium*, *Too Late*, *The Peace Maker*, *The Ruling Passion*, *A Disgrace to his Family*, *For the Safety of the Public*, &c. &c. The copies were of good size—from twelve to fifteen inches—and mounted on large sheets of cardboard. The price asked for them was but two shillings and threepence each, followed by the query, "Well, what will you give?" This sum seems ridiculously small considering the penalties incurred under the Copyright Act. Some of the prints were slightly stained or otherwise damaged, although they appeared to have been made from good negatives. It may, therefore, well be imagined that these were rejected prints, and that perfect ones are to be had elsewhere at a higher and more remunerative price.

THE present is an excellent time for securing cloud negatives. During the latter part of March and the beginning of April, as well as in September, good cloud effects, as a rule, can be more readily obtained than at any other period of the year. Perhaps, however, for grand studies of clouds the autumn would take the palm, but for clouds for printing into other pictures those obtained in the spring are usually better in accord with a sunny landscape, such as those for which most artists require them. At the present time there is not much to be done out of doors, and the time may be profitably spent in securing a goodly number of cloud negatives for future use, and these may now be obtained without difficulty. A good variety of cloud negatives is an acquisition to every photographer. Nothing looks much worse than to see, as one frequently does, the same clouds introduced into several different pictures. This, however, is often met with, and even in different peoples' work, when commercial cloud negatives are employed.

IN taking sky negatives, judgment must be used in the development that they are not made too dense, or with too great contrasts. In developing, the amateur often makes them too strong. Hence in the printing, in order to obtain all the detail, they become too pronounced. Clouds, it should be borne in mind, are introduced as an adjunct to the picture, but if they are made obtrusive it goes without saying that they will completely spoil the effect. In taking studies of clouds, if they are to be printed and used as such, the negatives should be

made of a different density from those which are to be used for printing into landscape pictures. In seascapes, representing storms or gales, stronger cloud negatives than would be desirable with ordinary landscapes are not only permissible, but advantageous. But usually, with this class of subject, the natural sky may be obtained in the seascape negative.

AMATEURS should now be prospecting for the coming season, both as regards the apparatus they will adopt, and the class of subjects they intend to make a speciality. We strongly advise every one, whatever be the form of apparatus decided upon, to have with it the means of taking stereoscopic pictures. There is no question but that the stereoscope now promises, within a brief time, to again become a popular thing. Every camera of the half-plate size and larger should therefore be arranged for taking binocular pictures, particularly as the slight modification, practically, neither increases the bulk or weight of the apparatus.

THE resuscitation of the stereoscope is being largely brought about by the popularity of the optical lantern. The experience gained by amateurs, in making transparencies for this instrument has, of course, availed them in the production of similar pictures for the stereoscope. We shall be surprised if the majority of the slides which in the future will be made for this instrument are not transparencies. There is a certain charm about a transparency when viewed in the stereoscope which it is impossible to obtain in a print on paper. With the different commercial lantern plates now in the market, almost any colour or tone may be obtained.

IN the Daguerreotype days an extensive business was done in stereoscopic portraits. We doubt if at the present time one portrait photographer in a score could take a stereoscopic picture if called upon to do so by a customer. If the stereoscope regains its former status, we imagine that stereoscopic portraits will again be in considerable demand. Possibly professionals will do well to be prepared.

IT is imagined by many that the wheel or Robinson trimmer, which is so largely employed for cutting paper masks, can only be used for round or oval shapes. But this simple piece of apparatus will answer quite as well for square or oblong, provided a narrow slot—the eighth of an inch or so, according to the diameter of the wheel—be cut in each of the angles of the metal "shape." Even when cutting rectangles with a knife—when the cutting is done from the inside of the templet—it is convenient to have a slight slot in the angles, as then the corners may be more clearly cut than is usually done by amateurs.

A RECENT issue of the *English Mechanic* gives an illustration of a patent gas utiliser, which, if all said of it be true, should be particularly useful in the dark room. Whatever of improvements may have taken place in many studios, there yet remains a large number where the developing chamber is not much more than a box, with an atmosphere in its normal state not very healthful, but with even its one solitary gas jet burning is positively unhealthful. This Spong's Patent Gas Utiliser should reduce the consumption and, of course, consequent fouling of the air to two-thirds; for the journal in question quotes Mr. H. Leicester Greville, chemist to the Commercial Gas Union, as stating that, with gas at ten-tenths pressure, the mean increase of light is 52.9 per cent., and also of its own experiments states that the illuminating power of any fish-tail burner is increased by its use.

IN addition to the display of art subjects and apparatus at the Crystal Palace, the daily lantern entertainments, which last year proved so great an attraction, will be repeated, competitive and other photographic slides being enlarged on the screen to thirty feet in diameter by special limelight apparatus, presided over by Mr. W. Brooks. A grand *soirée* will also be held on Thursday evening, the

29th instant, when many objects of great historical interest will be exhibited. Addresses, with lantern demonstrations, will also be given on the history and progress of photography. Visitors to the Palace will be admitted without extra charge.

ON THE VALUATION OF HYDROQUINONE.

II.

Now with regard to the presence of sulphur or sulphur compounds. We have recently been told that in Germany a considerable percentage of sulphurous acid has been found in the yellow hydroquinone. Immediately on the appearance of that statement I made a search, and found sulphur certainly, in the form of SO_2 , as I took it, which I estimated to be present in the proportion of about .26 per cent. Now Mr. Levy says he found sulphur, but no sulphurous acid, "so that the sulphur must be due to sulphuric acid." From this result, and the latter conclusion especially, I must dissent on several grounds.

I think there can be no question of the fact that the yellow colouration is caused by contact, at some period of its existence, of the white hydroquinone with sulphurous acid or an acid sulphite; whether the colour necessarily disappears with the last trace of the free sulphurous acid, or on its conversion into sulphuric acid, I am not able to say, but if the yellow tint be permanent then Mr. Levy may be correct, inasmuch as the sulphurous acid originally present may, in his sample, have been oxidised to sulphuric acid. But that sulphuric acid is not the original "impurity" or preservative agent is open to very easy demonstration. I made a solution of sixteen grains of white hydroquinone in one ounce of a mixture of sulphuric acid, s.g. 1.84 and water in the proportions of 1 : 7, that is to say, one drachm of strong sulphuric acid to the above quantity. The solution remained for several hours perfectly colourless, but on the addition of a minute crystal of sodium sulphite the characteristic tinge of yellow was given to the solution by the liberation of a trace of sulphurous acid. This I think dismisses the supposition that sulphuric acid, and not sulphurous, can be the original preservative.

I repeat that on this point there can be little doubt. In the process of preparing hydroquinone by the action of sulphurous acid upon quinone the original yellow colour of the latter is gradually removed, and when the conversion is complete a colourless solution of white hydroquinone remains. If, however, the treatment with sulphurous acid be continued, the solution again becomes yellow, and when saturated with SO_2 yields by evaporation yellow crystals, which are found to contain definite proportions of hydroquinone and sulphurous acid, and which has been called sulphite of hydroquinone. The proportions are three of hydroquinone to one of SO_2 , or between sixteen and seventeen per cent. of the latter. Upon heating, the SO_2 is given off and white hydroquinone remains.

I may remark, *en passant*, that when a definite compound exists containing as much as sixteen per cent. of sulphurous acid, the use, for beneficial purposes, of so small a quantity as one quarter per cent. as a preservative in "permanent" hydroquinone scarcely justifies its condemnation on the score of impurity.

My own view is, that not only is sulphurous acid in some form the preservative employed—either free or in the form of an acid sulphite, possibly of ammonia—but that it is present, and not sulphuric acid in the crystals themselves. I say this for various reasons. I have tried to show that SO_2 is necessary to the production of the yellow colour, and, considering the ease with which that colour is removed, either by heating or by recrystallisation, either of which will remove the SO_2 , it seems undoubted that the colour is dependent on the actual presence of the acid.

But besides that, by fusing a few of the crystals on platinum foil, or in a hard glass tube, the presence of sulphurous acid is patent to the smell. We cannot reasonably suppose that sulphur itself is present to account for it, nor can I conceive that it is due to the decomposition of sulphuric acid, since the fusion of hydroquinone occurs at a temperature nearly 300°Fahr. below the boiling point of sulphuric acid, and we know the latter can be distilled unchanged, so that a far higher temperature would be necessary for its decomposition. It is

true that by heating platinum foil in the presence of vapour of sulphuric acid the latter is split up into oxygen and sulphurous acid, but a red heat is necessary; it is true also that strong sulphuric acid boiled with certain metals—silver, copper, mercury, for instance, or even with carbon in the form of charcoal—yields SO_2 , and the action of the sulphuric acid upon a portion of the hydroquinone accidentally carbonised in fusion *might* produce the smell of SO_2 , but I do not think any of the conditions are sufficiently favourable to account for its formation in that way.

But, leaving the fusion test as allowing a loophole for doubt, I will give other reasons for rejecting the sulphuric acid theory. Let a strong, hot, aqueous solution of the yellow crystals be made, and I think, to nerves of ordinary sensitiveness, the presence of free sulphurous acid—either wholly free, or partly combined, as in the case of an acid sulphite—will be clear enough. Or, if any doubt remain, let a small quantity of citric acid be added, when the smell will become more intense and undeniable. The last experiment may be made with a cold alcoholic solution, and points rather to the presence of an acid sulphite, since it is difficult to see how the addition of citric acid can give greater prominence to a quantity of SO_2 , already free, though in the case of a sulphite it brings the whole of the combined acid in evidence. Mr. Levy and I agree in the entire absence of sulphites of the fixed alkali, but it is not improbable that the acid ammonium salt may be present, and minute traces would be difficult to value, except as sulphurous acid. Or it is possible that the so-called sulphite of hydroquinone itself may be added in small quantity as the preservative.

However, there can be no ground for supposing that, if sulphuric acid were present, it would be reduced to sulphurous by mere solution, or by the addition of citric acid. In fact, so far as I can see, there is not only no reason for saying that the sulphur *must* be due to sulphuric acid, but there is, on the contrary, every evidence that it is not, and cannot be.

There is one other sulphur compound which would form a theoretically good preservative for hydroquinone, but which, though actually employed, would not be likely to be found in the crystallised product in its original state. I allude to the acid known variously as thio-sulphurous or hydrosulphurous, and which is formed by the deoxidising action of metallic zinc upon aqueous sulphurous acid or a sulphite. This is one of the most powerful reducing and bleaching agents known, far exceeding sulphurous acid in this power, but it is exceedingly unstable, absorbing oxygen, and reverting to the state of sulphurous acid within a few minutes of preparation. It was with this preparation that, years ago, I first noticed the peculiar yellowing action, in conjunction with pyro solution, which occurs in precisely the same manner as with hydroquinone, though with pyro I have been unable to get the yellow crystals. If hydrosulphurous acid, or one of its salts, were the agent originally used, it would only exist in the crystals as sulphurous acid or as a sulphite.

I do not intend in this article to say a word about the value or otherwise of this preservative agent; the series of experiments I have on hand have for their object, *inter alia*, this very point, and this brings me to the final remark I have to make on Mr. Levy's paper. It is extremely valuable as a chemical examination, and useful to the photographer as showing to what extent the products he is supplied with agree with their theoretical composition. But it says nothing about the practical side of the question, or whether the white or the yellow, the English, French, or German make of hydroquinone constitutes the best developer.

The finest "malt" vinegar would take but a poor place either for purity or strength as "acetic acid," but I fancy most professed cooks would look very much askance if asked to use the pure acid, "solid at 50° ," for their purposes; and so with the photographer and hydroquinone. What gives him the best result is the best product, call it what you may.

I do not know that any great advantage will accrue from them, but the idea of my experiments seemed to me an interesting and possibly useful one, viz., the testing not only of different samples and makes of hydroquinone, but also different alkalies and proportions in order to find the absolute reducing power of each sample and each mixture upon silver bromide. In addition, I am comparing the results with pyro tested in the same manner, taking note of the variations

and peculiarities of the character of the reduction so as, if possible, to solve some of the anomalies of development with hydroquinone.

It is needless to say that such trials need care and take time, so that I cannot very well "rush" the results. But so soon as I have fairly placed myself in the position of being able to do so I will report my results.

W. B. BOLTON.

ECHOES.

"CHEMICAL Vignetter" seems rather a misnomer for Mr. Robert Morrison's substitute for the ordinary vignette glass or card screen, though the contrivance is undoubtedly a good one, and capable of producing results far superior, as far as softness is concerned, to the mechanically graduated glasses.

But I would suggest a far simpler method of construction than that given, and one that I have frequently myself used when requiring vignettes of special or extraordinary form. This consists in utilising the printing frame instead of the camera for the purpose of making the negative or reverse vignette, and if only a single one be required it may with the least possible trouble be made direct, and in every case the gradation is quite as perfect and fully as much under control as when the camera is used.

Proceed as follows:—In a piece of opaque cardboard or sheet zinc cut an aperture a little smaller than the vignette required, and of suitable shape, bearing in mind that the more gradual the shading is to be the smaller must be the opening, and *vice versa*. Also that the opening should be proportionately a little longer in shape than the finished vignette is required, as the graduation "spreads" relatively more in the direction of the breadth than the length. On no account serrate the edges, as this has merely the effect of enlarging the aperture without in the least affecting the gradation. Fix this mask on an ordinary printing frame in just the same manner as if for an ordinary vignette print; in fact, the processes are so far quite identical. Run a tack or small wire nail into each of the corners of the printing frame and attach four pieces of thin twine or stout worsted, tying them in a knot at about three feet from the frame so that the latter may be suspended in a horizontal position, face upwards. Having so hung the frame, arrange so that the light from a gas flame, lamp, or candle falls upon the surface of the vignetting card at a more or less acute angle, according to the degree of softness required, remembering that the softness increases in proportion to the distance of the screen from the sensitive film, and to the smallness of the angle at which the light falls.

In the dark room itself the whole process can be most conveniently worked. Place a sensitive plate or piece of sensitive paper—positive answers quite well—in the printing frame, suspend it as described, with the aperture covered with a piece of ground glass, cause the whole to revolve slowly but uniformly, which it will easily do for some time owing to its mode of suspension, and turn up the gas or other light for the required number of seconds. On development a tint of the most exquisite gradation will result when after one or two experiments the proper adjustments of the screen and light have been obtained. The *cliché* thus produced will be opaque in the centre, shading off to clear glass, and can be used as a negative from which to reproduce any number of clear-centred, vignette glasses. If only a single one be required for a particular purpose, instead of the opaque mask with centre aperture, attach a piece of opaque paper of suitable shape to the centre of a sheet of ground glass, or, better still, of thin Rives's paper, using this as the vignetting screen, when a clear-centred vignette will result. In this case the opaque centre must of course be larger than the vignette required and broader in proportion.

I have found this plan often very useful, and the whole preparations may be made in five minutes, when a "vignetter" of particular shape is suddenly required. By making an opaque, centred *cliché*, and reproducing it by simple contact printing on ordinary albumenised paper, which is finally rendered translucent by means of oil vaseline, any number of vignettes may be had at a merely nominal cost; indeed, every negative may have its own permanently attached.

The genial Mr. William Cobb commenced modestly his dissertation on *Art in Relation to Photography* by fearing that he would find

himself "rowing in the same boat" with others who had previously "made a shipwreck" of the subject. Fortunately in such cases of "shipwreck" the "fatalities" are comparatively few, the waters are always shallow, and if only the rocks—breaches of the "strict canons of art"—be avoided, the unfortunate "mariner" may generally flounder into his depth again.

I remember, many years ago, an old and well-known photographer (still living) expressing himself to the effect that "photographers who talk art" generally make fools of themselves. If this sweeping assertion be partially true it is because of the difficulty pointed out by Mr. Cobb of defining what art is. If the rules of pure art be difficult to discover, how much more so must it be to fix them when complicated and mixed up with the tools, appliances, materials, and, above all, the hopes, aspirations, and difficulties of the photographer?

Photographic art productions have always been regarded from two entirely distinct standpoints—that of the photographer and that of the artist; and the former, when he aspires to the latter designation, has been generally too prone to make too much allowance for his difficulties, while the artist, on the other hand, totally ignores them. The artist is perhaps, after all, correct, for art is art no matter what its source.

The triumphs of the art photographer in past days have, no doubt, been meritorious in the highest degree from the photographic point of view, but as comparable with the real masterpieces of art as a child's slate pencil sketch with a finished water colour, or a portrait by a Chinese artist with a Millais or Holl. They belong, in fact, to a distinct category.

But at the present time far greater facilities exist for the production of really "artistic effects" by means of the camera than were available in the days of Hejlander. But let us—those of us at least who aspire to be artists as well as photographers—drop the plea that we are hampered by our tools and should therefore be handicapped in the competition with painters. I reckon that, fifty years after the "discovery" of painting, brushes, colours, and canvas were not as perfect, nor were the "canons of art" so well understood as even they are at the present day, so there is plenty of time before the photographer need begin to feel ashamed that he cannot beat the artist on his own ground. Such, at least, is how it appears to me; and if in saying so I have added to the number of shipwrecked ones, or those who have made fools of themselves, I cannot help it. Such occurrences are almost invariably rather unlooked-for than wilful.

But Mr. Cobb is scarcely happy in one or two of his references. For instance, to that of the "historical apron of fig leaves." That, I take it, was scarcely in any form a work of art, but most emphatically and common-placedly (pardon the word) utilitarian. It may have been a useful and durable garment, and, considering the absence of manufacturing facilities at the period, worthy of a medal, or at least honourable mention, in an industrial exhibition. It might even possess the "priceless value" Mr. Cobb sets on it as a "relic," but not as a work of art, for I judge it could scarcely be much more ornamental than the gentleman found his raiment under similar circumstances of necessity when having had his clothes stolen while bathing he was escorted home wrapped in a newspaper. JUNIUS.

WEIGHTS AND MEASURES.

[A Communication to the Photographic Club.]

AMONG the numerous difficulties which beset the path of the would-be photographer, none is perhaps as perplexing as the much vexed question of weights and measures.

Even those who have long since mastered the various manipulations which tend to the production of the finished photographic picture, and who can boast of long experience in the art, are at times puzzled by the formulæ which are proposed in the photographic periodicals.

A very superficial glance over the developing formulæ which have been compiled by Messrs. Lyonel Clark and Ferrero, and in which they have reduced all quantities to grains and minims per ounce, will show what complication is brought about by the most empirical system of writing formulæ now in use.

No doubt every plate maker who prints a formula on his plate

boxes has excellent reasons for recommending the proportions indicated, but as there is absolutely no possibility of comparing one developer with another, so as to modify the one in use to suit the prescriptions set forth on the new brand of plates about to be tried, the only resource is to make up a lot of developer especially for the purpose, and here the photographer is placed at a disadvantage. When using the solutions to which he is accustomed he knows perfectly what effect a drop or two more of this or that solution will have on the development. With the unfamiliar mixture he is very far from having the same amount of certainty.

All developers are made up of a limited number of chemical substances, the proportions only being varied. It seems, therefore, natural that standard solutions should be adopted in the same manner that interchangeable elements have been introduced into machinery and apparatus. If this were the case, nothing would be easier than to suit the developer to the brand of plate in hand. All the formulæ being given in parts of standard solution, it would only be necessary to measure out the number of parts recommended by a given plate maker, to obtain at once the developer wished for.

A step has been made in that direction by the introduction of ten per cent. solutions. Unfortunately, plate makers have not modified their printed formulæ to suit this departure, and besides, with our existing system of weights and measures, a ten per cent. solution seems to be a very difficult thing to describe accurately, if one is to judge by the many discussions which have, from time to time, appeared in the technical papers.

A great deal might be said and written on the subject of percentage solutions, and I must ask you to excuse me if I go into details which may seem elementary to you. I am desirous of putting things as clearly as I can, and I believe that clearness is inseparable from completeness.

I will now define a "standard solution." This is a solution of which a given volume contains an exact and constant quantity of a chemically active agent. Standard solutions have long been used in chemical analysis, but it is only justice to give Friedrich Mohr the credit for having established volumetric analysis on a scientific basis by introducing a systematic method of compounding the solutions used.

The standard or normal solution of a reagent is always made such that one litre at 60° Fahr. shall contain exactly the hydrogen equivalent of the chemical compound to be used. Thus, if hydrogen is taken as one, the hydrogen equivalent of caustic potash will be fifty-six, and it will therefore be sufficient to dissolve fifty-six grammes of caustic potash in one litre of distilled water at 60° Fahr. to obtain a normal solution of caustic potash. It will at once be seen that as such a solution is always prepared under precisely the same conditions, its chemical action will always be constant for a given volume.

Mohr employed the decimal system of weights and measures. He, however, proposed that special weights should be constructed, each one being exactly equal to the weight of a given chemical to be dissolved in one litre of water. Thus for caustic soda a weight equivalent to forty grammes was to be constructed.

As this system introduced new weights it did not find much favour among chemists, and it has not been adopted. The decimal system is besides so easy to employ that the want of any novel or improved system was not felt.

In England Mr. Griffin and Mr. Acland introduced a decimal system based on the gallon, each author denominating differently the various subdivisions. This system is still in use for certain Government tests, and is certainly a great advance on the old fluid measure.

One of the greatest sources of uncertainty in making up a formula is the want of information as to the system of weights which the author has used. We are told in all the books on the subject that in photography the apothecaries' weights are to be used. Many writers, however, appear to have based their formulæ on the avoirdupois system. Again, it is often difficult to determine whether the author means that the solid chemicals shall be dissolved in a given volume of water, or that the solution is to be made up to that volume.

Standard solutions would do away with all these causes of doubt, and nothing would be easier than to compound by their use any ratio of reducer to alkali.

One of the great advantages of the decimal system of weights and measures, is that the weight of a given volume of water, expressed in cubic centimetres, is always a definite number of grammes. It is, therefore, quite easy to make a solution of a proposed strength. One is only limited by the coefficient of solubility of the chemicals to be dissolved.

It may be argued that the decimal system is but little known in

England, and less used. Also, that an Act of Parliament would be requisite to bring it into universal use. Photographers have long since appreciated the value of scientific methods, and it may be said that day by day the development of the negative is becoming an operation requiring more and more precision and scientific correctness. Sooner or later the photographer will, therefore, have to resort to more precise methods of making his solutions, and there does not seem to be any reason why he should not follow the example of other English scientific people who have adopted the gramme, the litre, and the centigrade thermometer. They have been able to do this without waiting for an Act of Parliament, why should he not do likewise?

It has also been said that the introduction of a new system of weights and measures would necessitate new apparatus, of which the cost might be an objection. I do not think that the expense incurred would be very serious, as a very small quantity of apparatus would be required.

Messrs. Townson and Mercer have kindly placed at my disposal the glass measures and sets of weights which are on the table, and these, I believe, are more than what may be wanted by even the most fastidious. Without wishing to describe the decimal system in its entirety, it may be well to remind you that the cubic centimetre weighs exactly one gramme when the temperature is 4° centigrade. The measures before you have, however, all been graduated at a temperature of 15½° centigrade or 60° Fahrenheit. This is more convenient, as the temperature in a laboratory is generally about that mark. It is, therefore, possible to make up the various solutions with absolute correctness as to volume if care is taken to have the water at 60°. This is, however, not actually required in photography. I strongly recommend the use of stoppered measure glasses for the larger volumes, such as would be used in making up the stock solution. The dry chemicals are put in the test mixer, and a quantity of warm water added. This can be well shaken up without any loss, and the chemicals much more quickly dissolved than when the usual stirring rod is resorted to. When all is dissolved the solution is allowed to cool, and the bulk made up with cold water. In making a solution of pyrogallie acid the sulphite of sodium would be dissolved in this manner, the liquid, after cooling, poured over the pyrogallie acid, and then returned to the test mixer, to be made up to bulk with cold water. This method would have the advantage of exposing the pyrogallie acid as little as possible to the air. With the test mixers and an ordinary pair of scales solutions can readily be made up to any desired strength. There only remains now to decide upon the strength most suitable for photographic purposes, taking into account the fact that the existing concentrations to which operators are accustomed must not be altered in any great degree. For pyrogallie acid I propose that 50 grammes should be made up to 500 cubic centimetres. The cubic centimetre would then compound to '1 gramme, or about 1½ grains. Looking through the tables of developers above referred to I find that 1½ grains to the ounce represents about the average.

Therefore, 2 cubic centimetres made up with water to 50 cubic centimetres, would represent very nearly the usual 2 ounces of developer for a half-plate.

For soda the average is about 16 grains per ounce. The solubility of anhydrous carbonate of sodium being 20 parts in 100 parts of water, I propose to make this solution by dissolving 100 grammes to a volume of 500 cubic centimetres. The cubic centimetre would then be equal to '2 grammes. I think that this dilute solution would be an advantage since development could be made very gradual with it. Five cubic centimetres would correspond to 15½ grains.

Other solutions could be adjusted in the same manner. I hope that the rather dry subject which I have dealt with to-night has not tired you, and if the few crude suggestions made lead some more experienced operator than myself to take up the subject, I consider that some advance will have been made towards furthering an improvement of which every one must feel the necessity.

ADOLPHE M. LEVY, C.E.

ABSTRACT OF E. H. JAKUES' PAPER ON NORWAY.

[Communicated to the Birmingham Photographic Society.]

IN the course of a few introductory remarks, Mr. Jaques said:—

"He had much pleasure in again describing and illustrating some portion of Norway, a country alike interesting to travellers and the amateur photographer. On this occasion he proposed to deal with the district traversed by their mutual friend, Mr. William Rooke, and himself in June and July last, namely, the Valdres route between

Christiania and Bergen. The scenery of the Valdres and Leardal was unique in its way, and if, to some extent, it lacked the magnificent waterfalls that rendered the Romsdal so attractive, and which he endeavoured to illustrate on the occasion of his first lecture, he ventured to think the absence was compensated in the ever-varying and majestic character of the scenery at almost every point. At the present time all obstacles to comfortable travelling had been overcome; good conveyances can be hired, and excellent food and sleeping accommodation obtained, generally speaking, at a moderate cost.

"He intended on this occasion to treat his subject in a popular manner, and in order to make it as interesting as possible, proposed to give a representation of their actual tour, starting from Birmingham."

The lights having been turned down, a picture of the Grand Hotel, the headquarters of the Society, was projected on the screen (sixteen feet), powerful dissolving lanterns being used, and was immediately followed by a view of the interior of New-street Railway Station; this was a very difficult subject for the camera. The coupling of the engine to, and mimic departure of the train for Hull proved most realistic, and was awarded well-deserved applause. Representations of the train travelling at full speed, the arrival at Hull, and sailing of the Wilson Line steamship *Angelo* for Christiania followed, several amusing and interesting incidents on the voyage receiving due notice. Mr. Jacques spoke of the kindness of Captain Johnson, whose name was so well known by all Norwegian travellers.

After pointing out the proposed route on two well-defined maps, views of Christiansands were shown, also of the Christiania Fjords, a glimpse of which tourists generally miss, owing to the approach being made by night.

The views of Christiania included the Parliament House, the King's Palace, Karl John's Gade, the Torvet, the Harbour, &c. These sets of slides were succeeded by a very fine series of views illustrating the famous Valdres route, *rid Sandviken*, *Honerfos*, and *Lake Spierlien*.

Those of Fjeldhiem, Vangsmjosen, Smeddal, Borgund, and Haeg, being particularly excellent. The effect of sunrise at Leardalsoren evoked repeated rounds of applause, as also the scenes in the Aardals Fjord, Naro Fjord, and Naro Dal.

Bergen, with its quaint old buildings and busy fish-market, received ample illustration, many characteristic views being depicted.

The concluding pictures gave a good idea of the coast from Bergen to Stavanger, and the subsequent sailing of the Wilson *Eldorado* and its arrival in the Humber (a very cleverly contrived effect) brought a most enjoyable lecture to a close, the lecturer bidding the members adieu with a slide of the Paragon Railway Station, Hull, in the midst of well-merited applause.

The number of pictures shown was one hundred and fifty-six, all of which had been made by Mr. Jacques from negatives taken last year, the lantern plates used being Messrs. Fry's, Mawson's, and Thomas's, and in point of technical excellence and artistic effect left nothing to be desired.

THE STRIPPING OF FILMS FROM GELATINE NEGATIVES FOR PHOTO-MECHANICAL PROCESSES.

The stripping of a negative film when it is in collodion is a comparatively easy matter, but, in the present state of photography, it is quite necessary for one who takes up certain photo-mechanical processes to have a ready means of stripping gelatine films. The descriptions that we have of such processes are, so far as I know, meagre. Wilkinson, for example, in his excellent little book on photo-engraving and photo-lithography, describes methods of stripping collodion negatives only. Such descriptions as I have seen are not generally wrong in principle, they are merely insufficient in detail. Any one taking them up and trying to work from them will find that he is not at once able to strip negatives and get satisfactory films from them, but that he has to work out all the details himself.

The process generally advocated is that of Plener, in which hydrofluoric acid is used to separate the film from the glass. Plener's method is so ingenious, that one is sorry to pour any cold water on it; but, apart from the use of hydrofluoric acid, which every one will avoid who possibly can, it would appear that the etching action of the acid on the glass has nothing to do with the stripping, inasmuch as almost any other acid will act as well as hydrofluoric acid.

This is not an observation made originally by myself, but was, if my memory does not fail me, made by Mr. W. B. Bolton some six months ago. The action, whatever it is, is really the same as the "frilling" of the plate. Although almost any acid that is strong enough, or that has a strong enough action on gelatine, will serve to strip, it is, perhaps, scarcely correct to say that any other acid will do as well as hydrofluoric acid, inasmuch as I have found differences in the

certainty in the action of different acids. After many experiments, I have adopted sulphuric acid as the most certain in its action of any acid, hydrofluoric acid included.

The difficulties that will generally be found in stripping are as follows:—(1.) The films refuse to strip at all. A process which will be quite successful with a negative freshly developed and fixed will often be found not to work at all with a negative that has been treated with alum, and is, say, a year old. (2.) The stripping takes place between the new support and the film, instead of between the film and the glass. (3.) The film after stripping stretches so that, not only is the negative to a larger scale than before—and with a corresponding increase of density—but probably there is likewise distortion, as it is highly improbable that a film will stretch exactly to the same extent in all directions. I saw a complaint of this stretching in one of the photographic journals only a few weeks ago. (4.) The film is so hard and brittle when dry that it cannot be handled without danger of cracking it. And (5.) The film twists or curls in drying, so that it is impossible to get perfect contact between it and a flat surface, such as a collotype film. It has taken me more trouble to ensure getting the film in a perfectly flat and flexible form than has anything else.

If the following directions be precisely carried out, it will be found that any negative, however old, may be stripped with certainty and without encountering any of the difficulties just enumerated. It need scarcely be mentioned that, if the negative has been varnished, the varnish must first be removed by the application of hot methylated spirits.

The following is made up:—

Hard gelatine	2 ounces.
Water	10 "

The gelatine is, of course, soaked in the water till it is soft, when heat is applied. I can recommend Coignet's "Gold Label" gelatine. The solution should be heated to not very far short of the boiling point, and should then be filtered through flannel.

A negative to be stripped is warmed,* accurately levelled, and a certain amount of the gelatine solution is poured on the surface, and is guided with a glass rod till it covers the surface evenly. It is of great importance to measure the quantity, as the ultimate thickness of the film depends on this, and it has to be borne in mind that printing has, if the film is to be used as a reversed negative, to go on through the gelatine.

A quantity of four ounces per square foot will be found suitable for average work. This gives a film, when dry, of about a hundredth part of an inch thick. This sounds very thin, but, in fact, it is a good stout film. The film of an average gelatine dry plate, when dry, is only about one two-thousandth part of an inch thick. Still one-hundredth of an inch will not interfere with ordinary work. For very delicate work the amount of the gelatine solution may be reduced to two ounces per square foot. It is not advisable to use less than this, as otherwise the films will be too delicate for free handling. It is quite possible to flow as much as ten ounces per square foot on glass without any special arrangement for preventing it from overflowing the edges; but a film of the thickness so got is, in my opinion, far too thick for any practical use.

If, however, such a film be wanted for anything, it will be necessary to give four times as long in each solution as is hereinafter directed, as it takes a long time for any liquid to penetrate a very thick film.

A saturated solution of chrome alum is taken, and there is added to it, drop by drop, liquid ammonia, till there is the slightest possible permanent flocculent precipitate. This is merely to neutralise any free acid that there may be, as any such free acid greatly impairs the setting powers of the alum solution.

The gelatine solution having set on the plates, the latter are placed for five minutes in the chrome alum solution. They are then removed and are washed till all the blue colour of the chrome alum has disappeared. They are then placed in a bath of methylated spirit for from half an hour. They are taken from this, the surface is blotted with blotting paper, and they go into a bath of—

Sulphuric acid	1 ounce.
Water	2 pints.

I use ordinary commercial sulphuric acid. I do not know the exact

* I assume here that the negative is one that has been treated originally with alum. If it has not been, it is necessary before the stripping process is begun to treat the negative with alum and allow it to dry, otherwise the hot gelatine solution will probably have the effect of destroying the negative by melting the film. It is particularly necessary to observe this in the case of negatives that have been developed with ferrous oxalate.

specific gravity of it, nor is it of much importance, as a considerable variation in the strength of the bath is permissible.

The following solution is now needed:—

Liquid ammonia	1 ounce.
Glycerine	1 "
Water	2 pints.

The films are left in the sulphuric acid bath till the greasiness caused by the alcohol disappears; this will take about half an hour. At the end of that time, it will be found that the corner of a film may be lifted, and that the whole will leave the glass with the greatest ease. The films go direct from the sulphuric acid bath to that of ammonia and glycerine. The object of the glycerine is to secure flexibility of the films, the object of the ammonia is to neutralise the sulphuric acid. It takes a long time to wash sulphuric acid out of a thick film, and if a long time be given in this case the film will stretch. The small amount of sulphate of ammonia produced in the film by the acid and the ammonia is quite harmless.

Glass is prepared by rubbing the surface with a solution of a few grains of beeswax in each ounce of benzine, and by polishing this away with powdered talc. A film is taken from the last solution as soon as it tastes of acid—no longer, probably in about five minutes; it is placed on a piece of glass, a pad of blotting paper is placed on the back of it, and the squeegee is applied with great vigour. The plate supporting the film is then placed in a fairly warm place, so that the latter may dry; but I find it necessary, after a few hours have elapsed, to paste down the edges with narrow strips of paper and gum solution, otherwise they are sure to rise from the glass before the whole film is dry, and it will be found impossible to get flatness. An attempt must not be made to strip the film from the temporary glass support until it is perfectly dry. Then it is only necessary to insert the thin blade of a knife, when the film will come away in a form in which it is quite handleable, is beautifully flexible, and may be printed from either as a direct or a reversed negative.

It is to be observed that if the film, before it goes into the sulphuric acid, be dried spontaneously in place of by the aid of alcohol, the gelatine support will probably part from the film instead of the film parting from the glass.

The acid bath may, of course, be used for a long time; in fact, as long as it acts. The ammonia and glycerine bath may be used as long as it continues to smell distinctly of ammonia.

I tried drying the stripped films on vulcanite, but found it impossible to prevent them from leaving the surface before they were dry, with the effect that they were hopelessly far from flat.

I fear that the process as I have described it reads as if it were very complicated. It is not really so. A negative may easily be stripped and be drying within two hours of the time of beginning operations, and quite a number may be done at the same time. The drying is the thing that takes longest. With films of average thickness it takes twenty-four hours.

W. K. BURTON.

TRIALS AND TRIBULATIONS OF THE PHOTOGRAPHER.*

THE earliest photographic literature that I remember was *Humphrey's Journal*, and a journal—I think he called it *The Photographic and Fine Art Journal*—by Mr. H. H. Snelling. If there were earlier ones I do not remember them. I have several of the pictures by which they were illustrated after they commenced making photographs, but they are pretty poor things compared to what we make nowadays. Still at that time they were considered wonderful. I well remember the first paper picture I ever saw, and the first little *carte-de-visite* that I ever saw—a friend of mine brought it from Paris. It was a full length picture of a man standing by a fluted column, and his head was a little larger than the head of a pin; and I laughed when I saw it, and I thought it was a very curious little thing; but, however, it was not long before I was making them at the rate of a hundred to a hundred and twenty-five dozen a day.

I have the old photographic publications—a good many of them—and I want to state to you, gentlemen, that this dry plate you are using to-day is the work of care and experience and experimenting almost beyond our reasonable conception. Men have worked with mind and brain for half a century to bring the art of photography to its present status, and they know of the difficulties that were encountered before its success was ultimately obtained, and they can better appreciate its worth than the novice of to-day who finds his apparatus quickly and easily adjusted, his plates and developers all prepared, with printed directions how to use them. In this respect, photography is far different at the present day from what it was in former times. The dry plate, now so universally used, has required an amount of time and labour, discussion and money upon its preparation that one would hardly believe. In its early stages it was thought that it would be desirable for outdoor photography, but the long exposure that was necessary—nearly three times longer than the wet plate—made it doubtful whether it ever would be available. . . .

* Concluded from page 184.

Now I will give you, with your kind permission, a few incidents as they happened day after day. It is a very easy thing to write and talk about photography, but to the man that stands under the skylight it presents a very different attitude. People may not think so, but let them try it. To see thirty and forty different people come up in the course of a day, all different faces—you are expected to make the best view of each face—a face that you never saw before and perhaps never will again, and you are expected intuitively at a moment's notice to make the best picture of that face—it requires an amount of brains that very few have any conception of. And you are asked unreasonable things all the time.

I remember once a lady brought three children, two boys and a girl, to my gallery. They came well armed. The little girl had a doll; there was a hobby-horse brought up; and the other boy had a gun. It was evident that the girl was to hold the doll—that was agreed; but which boy was to ride the hobby-horse? That was to be left to my superior judgment. It was not an easy thing to decide, because both wanted to mount the hobby-horse, and after I had decided it, the mother said she did not want this picture taken like all the "doggertypes" were taken. She wanted the girl in the middle of the room, the boy on the hobby-horse over on the other side of the room, and the boy with the gun on the other side of the room. Well, it was a very brilliant idea, but how my quarter-size camera was going to represent them all, I could not tell, and I told the lady that it was impossible, and I tried to explain to her about the concentration of the light, the lenses, and all that sort of thing, but she did not know anything about that; and she finally said to me that she heard I was supposed to be accommodating, and that she had been to three different places and they all told her what I did, and she did not think that I was any better than any of the rest of them.

One day a Paddy brought in a small case and he said he wanted a life-size picture put into it. It was a difficult thing in those days to make people understand the difference between a full-length and a life-size, and I told him it would not hold a life-size, and then he said, "Well, then, take it with the legs hanging down!"

When General Logan was at my place having a sitting, I remember something that occurred. The General was usually a very reserved man. It was seldom that you could get him to talk, but this time he saw on the walls a man he did not like, and he said to me, "I see that you take anybody's picture." "Oh yes," I said, "that is my business. I don't have time to inquire into a man's private character when he comes here for a picture." "Well," he said, "I suppose you would take the devil if he would sit for a picture." And I said, "Undoubtedly we would;" and I added, "I suppose we could run off a good many down around Washington." "Yes," he said, "that is the place to sell them."

A man came to me one day; he did not like his picture. Oh, how many didn't like them! He said to me, "My picture looks like the devil." "Well," said I, "I could not say, for I never had a sight at that individual; but sometimes a likeness will run all through families."

One morning a lady came into my place, who had two other ladies with her; she ran up to the counter and said, "My picture is twenty years too old, I won't have it, and I want to sit again." The man at the desk passed her right upstairs as soon as possible for another sitting, and as she was passing up, one of the ladies said in an undertone, "Ugly old thing, she looks exactly like it; she only wants to try another dress."

There is another incident that I wish to mention right here before I forget it. It is something that never came under my experience, but I heard of it. The man, in pointing his camera at the sitter, knocked it a little on one side, and instead of having the picture in the middle of the plate he got the man sway off in the corner, and afterwards scolded the man because he did not sit in the middle.

Another old lady came in one day and said she wanted her picture "front face, but a little three-cornered."

I recollect one day two ladies bringing in their mother. A sitting then required thirty seconds. We had a side screen, and after the great deal of preliminaries and the daughters' fixing the old lady's cap in a way that they thought would be the most becoming, I raised the cloth and stepped behind the screen, so that she could not see me, because I did not want to disturb her, and at the expiration of the thirty seconds I emerged from behind the screen and went to the camera and found the old lady looking out of the window.

Here is another one. I wish you could have seen it. A very fine-looking girl came in, with a diminutive specimen of an escort, for a picture, and after I had arranged the position and got my camera all ready, she said to me, "Where must I look?" This little fellow jumped out from behind the screen—he was fully three feet high—and cried out, "Look at me!" and the young lady commenced laughing, and we could not make a sitting of her.

Another time an old lady was in the chair—we set her about thirty seconds, I think; when it was about half over I heard some talking in behind there, looked, and she was motioning with her hands and crying out, "Stop it! stop it! I winked!"

Dr. Tyng—the old gentleman—was sitting one day, and I said to him, "Doctor, I have now made some sittings front face, now I wish you would turn to the left, because I would like to take some side views." And he turned around and said, "Mr. Bogardus, I am an upright man, and I would not turn to the right or to the left for any one."

Then we have had some sad scenes. I remember one day a German woman came in with a bundle and commenced to unroll it, and after she unrolled it I

found it was her dead baby. She brought it there to have a picture taken. So that with all the hilarity, as we call it, we have some sad scenes now and then in the practice of the art.

There was a very singular remark made to me once in my gallery by a judge who was sitting for a picture, and the gentleman who accompanied the judge there that day said, "Now, Judge, look dignified. Look just as you did the last time you sentenced a man to be hanged." And the judge said, "I don't know about that, for that man was reprieved."

But in my experience in the profession I have learned a good many things, and one of the things I have learned is that stout people always want to look thin, and thin people always want to look stout. The older ones don't want the wrinkles to show, and they all want to look a little younger. Many and many a time old ladies have come up to me and would ask me if I could take their picture without showing the wrinkles. "Yes," I would say, "but where will the likeness be?"

A photographer is said not to have any mercy. I remember once a certain judge came with his wife to have a picture taken. The judge was suited with his picture, but when we showed the lady her picture she doubted whether she had quite so many wrinkles; and he straightened himself up and said, "My dear, if you had wanted a handsome one you ought to have commenced thirty years ago." That settled it. I did not have to say another word.

But there were sometimes very laughable scenes in my gallery. I received one time as many as three different letters from a person whom I had never seen; she was a lady; she wanted to sit for a picture. She had been so unfortunate; she had tried here and there to have a satisfactory picture of herself, and they were all "horrid." Well, of course, I had my misgivings about the matter. What the trouble was I could not tell exactly. So I felt very anxious to see her come on the appointed day. A private carriage rolled up to the door and the dressing-maid jumped out and brought all the paraphernalia in. I suppose she weighed at least two hundred and fifty pounds, was gorgeously decked out in a low-necked dress, skin very nearly the colour of a lobster, and was very particular to tell me that she had had so many last ones taken of herself. I made up my mind that, with the material I saw before me, it would be a pretty difficult job to suit her, and so, sure enough, after I took the picture she agreed with me exactly, "that it did look horrid." I did not have to say any more. I never got any pay for my picture.

In conclusion, I would say, young gentlemen, I am glad to meet you. I am glad there are efforts being made to elevate photography, because I have a high idea of it myself, and I believe it is yet undeveloped. The possibilities of photography are still unknown to us. There are more secrets in it than we have ever solved. People think it is about exhausted, but I think there is a future to it, and I think somebody, with patience, study, and experimenting, will bring that future out.

To all interested I say, study well, delve deeply into this great mystery, and some mind will yet evolve from photography results that will cause mankind to look with wonder and astonishment; and, as I have said elsewhere, some name will go ringing down the ages as having added to the pleasures and requisites of a man, and, crowned with the applause of his fellows, his fame shall last as long as time and light continue. ABRAHAM BORDAC.

DAGUERRETYPE.

First operation.—A small phial of olive oil, some finely carded cotton, a muslin bag of finely levigated pumice, a phial of nitric acid diluted in the proportion of one part of acid to sixteen parts of water, are required for this operation. The operator must also provide himself with a small spirit lamp and an iron wire frame, upon which the plate is to be placed whilst being heated over the lamp. The plate being first powdered over with pumice by shaking the bag, a piece of cotton dipped into the olive oil is then carefully rubbed over it with a continuous circular motion, commencing from the centre. When the plate is well polished it must be cleaned by powdering it all over with pumice and then rubbing it with dry cotton, always rounding and crossing the strokes, it being impossible to obtain a true surface by any other motion of the hand. The surface of the plate is now rubbed all over with a pledget of cotton slightly wetted with the diluted nitric acid. Frequently change the cotton and keep rubbing briskly, that the acid may be equally diffused over the silver, for if it is permitted to run into drops it stains the table. It will be seen when the acid had been properly diffused from the appearance of a thin film equally spread over the surface. It is then to be cleaned off with a little pumice and dry cotton. The plate is now placed on the wire frame, the silver upwards, and the spirit lamp held in the hand and moved about below it so that the flame plays upon the copper. This is continued for five minutes, when a white coating is formed all over the surface of the silver, the lamp is then withdrawn. A charcoal fire may be used instead of the lamp. The plate is now cooled suddenly by placing it on a mass of metal or a stone floor. When perfectly cold it is again polished with dry cotton and pumice. It is necessary that acid be again applied two or three times in the manner before directed, the dry pumice being powdered over the plate each time and polished off gently with dry cotton. Care must be taken not to breathe upon the plate or touch it with the fingers, for the slightest stain upon the surface will be a defect in the drawing. It is indispensable that the last operation with the acid be performed immediately before it is intended for use. Let every particle of dust be removed by cleaning all the edges and the back also with cotton. After the first polishing, the plate is fixed on a board by means of four fillets of plated copper; to each of these are soldered two small projecting pieces which hold the tablet near the corners, and the whole is retained in a proper position by means of screws.

Second operation.—It is necessary for this operation, which is really the most important of all, that a box be provided, hereafter called the saline box; that is, the box

in which the plate is iodised. To prepare the plate, the cover being taken out, the cup is charged with a sufficient quantity of iodine broken into small pieces and covered with the gauze. The board is now, with the plate attached, placed face downwards in its proper position and the box carefully closed. In this position the plate remains until the vapour of the iodine has produced a definite yellow colour, nothing more nor less. If the operation is prolonged beyond the point at which this effect is produced a violet colour is assumed, which is much less sensitive to light; and if the yellow coating is too pale the picture produced will prove very faint in all its parts. The time for this cannot be fixed, as it depends entirely on the temperature of the surrounding air. No artificial heat must be applied, unless in the case of elevating the temperature of an apartment in which the operation may be going on. It is also important that the temperature of the inside of the box should be the same as it is without, as otherwise a deposition of moisture is liable to take place over the surface of the plate. It is well to leave a portion of iodine always in the box, for as it is slowly evaporised it is absorbed by the wool, and when required it is given out over the more extended surface more equally and with greater rapidity. According to the season of the year, the time for producing the required effect may vary from five minutes to half an hour or more; it is therefore necessary from time to time to inspect the plate. This is also necessary to see if the iodine is acting equally on every part of the silver, as it sometimes happens that the colour is sooner produced on one side than on the other, and the plate, when such is the case, must be turned one quarter round. The plate must be inspected in a darkened room to which a faint light is admitted in some indirect way, as by a door a little open. The board being lifted from the box with both hands, the operator, turning the plate towards him rapidly, observes the colour. If too pale it must be returned to the box, but if it has assumed the violet colour it is useless, and the whole process must be again gone through. From description this operation may appear very difficult, but with a little practice the precise interval necessary to produce the best effect is pretty easily guessed at. When the proper yellow colour is produced the plate must be put into a frame which fits the camera obscura, and the doors are instantly closed upon it to prevent the access of light. The third operation should, if possible, immediately succeed the second; the longest interval between them should not exceed an hour, as the iodine and silver lose their requisite photographic properties. It is necessary to observe that the iodine must never be touched with the fingers, as we are very liable to injure the plate by touching it with the hands thus stained.

Third operation.—The third operation is the fixing of the plate at the proper focal distance from the lens of the camera obscura and placing the camera itself in the right position for taking the view we desire. This instrument reverses the objects—that which is to the right in nature being to the left in the photograph. This can be remedied by using a mirror outside. It is at an angle of 45°. This arrangement, however, reduces the quantity of light and increases the time of operation one-third. After having placed the camera in front of the landscape or any object of which we desire the representation, our first attention must be to adjust the plate at such a distance from the lens that a neat and sharply defined picture is produced. The adjustment being satisfactorily made, the glass is removed and its place supplied by the frame containing the prepared plate. The length of time necessary for the production of the best effect, varying with the quantity of light, is a matter which requires the exercise of considerable judgment. At Paris this varies from three to thirty minutes. It is very important that the time necessary is not exceeded. Prolonged solarisation has the effect of blackening the plate, and this destroys the clearness of the design.

Fourth operation.—The apparatus required for this operation is a box as sketch shows. The board and the fixed plate being withdrawn from the camera are placed at an angle of 45° within this box, the tablet with the picture downwards, so that it may be seen through the glass. The box being carefully closed, the spirit lamp is to be lighted and placed under the cup containing the mercury. The heat is to be applied until the thermometer, the bulb of which is covered with mercury, indicates a temperature of 60° Cent. (140° Fahr.). The lamp is then withdrawn, and if the thermometer has risen rapidly it will continue to rise without the aid of the lamp, but the elevation ought not to be allowed to exceed 75° Cent. (167° Fahr.). After a few minutes the image of nature impressed, but till now invisible, on the plate begins to appear. The operator assures himself of the progress of this development by examining the picture through the glass by a taper, taking care that the rays do not fall too strongly on the plate and injure the nascent image. The operation is continued till the thermometer sinks to 45° Cent. (113° Fahr.). When the objects have been strongly illuminated, or when the plate has been kept in the camera too long, it will be found that this operation is completed before the thermometer has fallen to 55° Cent. (131° Fahr.). This is, however, always known by observing the image through the glass.

Fifth operation.—This process has for its object the removal of the iodine from the plate of silver, which prevents the further action of the light. A saturated solution of common salt may be used for this purpose, but it does not answer nearly so well as a weak solution of hyposulphite of soda. In the first place, the plate is to be placed in a trough of water, plunging and withdrawing it immediately, it is then to be plunged into one of the saline solutions, which would act upon the drawing if it was not previously hardened by washing in water. To assist the effect of the saline washes, the plate must be moved to and fro, which is best done by passing a wire beneath the plate. When the yellow colour has quite disappeared the plate is lifted out, great care being taken that the impression is not touched, and it is again plunged into water. A vessel of warm distilled water, or very pure rain water, boiled and cooled, being provided, the plate is fixed on an inclined plane and the water is poured in a continuous stream over the picture. The drops of water which may remain upon the plate must be removed by forcibly blowing upon it, for otherwise in drying they would leave stains on the drawings. This finishes the drawing, and it only remains to preserve the silver from tarnishing and from dust.

The shadows in the Daguerreotype pictures are represented by the polished surface of the silver, and the lights by the adhering mercury, which will not bear the slightest rubbing. To preserve these sketches, they must be placed in cases of pasteboard with a glass over them, and then framed in wood. They are now unalterable by the sun's light.

These constitute the substance of the directions given by M. Daguerre in his pamphlet and patent specification. The process was, however, much simplified and shortened, the enormous expense of the original apparatus having been found quite unnecessary.

Should any one possess a Daguerreotype which may have become tarnished, they should carefully remove the plate from the mount and pass a camel's-hair brush lightly over the surface, then pour over two or three times from a measure some alcohol; now plunge the plate into a cyanide solution (of fifteen grains to the ounce of distilled

water) and rock it until all the tarnish has disappeared and the plate looks bright. This may take from three to six or seven minutes. The plate must now be well washed in clean water, and finally with distilled water, and dried in the following manner:—Hold the corner by a pair of pliers and with a spirit lamp warm the back of the plate, at the same time blowing with the breath, without stopping, until the surface is dry. If care has been taken the picture will be as bright as on the day it was taken. Every care must be taken not to touch the surface except with a camel-hair brush should dusting be necessary. Great care must be taken in remounting the Daguerreotype; it must be bound round with this gummy paper, to prevent the air getting in between the plate and the glass, or it will soon show signs of tarnishing; if well done it will have secured it a new lease of existence.

Simultaneously with the discovery by Nicéphore and Daguerre in France, our own countryman, Mr. Fox Talbot, had perfected researches upon which he had been engaged in the same direction since 1835, and the result was in 1839 made known by him, under the name of photographic drawing, and which he perfected in 1842 under the title of the Talbotype or calotype. This process differed from Daguerre's, inasmuch as it was on paper, and the picture being negative, that is with the lights and shadows reversed, it possessed the power of a plate from which an unlimited number of positive proofs might be printed, the diaphanous texture of the paper used allowing the passage of sufficient light. But this process had likewise its disadvantages, although they were in another direction; it was rather too slow in receiving the action of light to be applied to portraiture and the life, and was deficient in fineness and delicacy of execution when landscape, architecture, and still-life were treated by it.

Fox Talbot was certainly the first to publish his process. But it was proved at a trial, Talbot *versus* Laroche, in 1854 that the collodion process invented by Mr. Scott Archer was no infringement of the calotype process, and that the Rev. Mr. Beadle, vicar of Stoue, near Aylesbury, had practised a similar method to that of Mr. Talbot as early as 1837.

Fox Talbot patented every process he practised, and intended to renew his patent, he having applied for a renewal when he entered an action against Laroche for infringement of his patent. The trial took place at the Guildhall, London, before Lord Chief Justice Jervis and a special jury, and lasted three days, when Laroche was found not guilty of infringement. Fox Talbot's patents were consequently upset; the result of the trial, therefore, being that photography was thrown open to the world for any one and every one to practise it.

In conclusion, I may say that the large specimens of Daguerreotypes I have brought for you to see to-night are the work of Silvestre Laroche, the photographer before mentioned in the trial with Fox Talbot. He took a medal in the Exhibition of 1851 for Daguerreotype pictures, some of these being among them. He had the honour of taking several portraits of Her Majesty the Queen; he photographed the whole of the interior of Hampton Court Palace, copies of which Her Majesty, the Prince Consort, and other members of the Royal Family took sets. Also a series of the late Mr. and Mrs. Charles Keen in several of their historical plays at the Princess's Theatre, London, including his Macbeth. He was also an ardent worker in the laboratory of Scott Archer at the time he discovered collodion.

W. THOMAS HORTON.

TWENTY YEARS OF AMATEUR PHOTOGRAPHY.

(A Communication to the Dundee and East of Scotland Photographic Association.)

A ~~mere~~ recital of the ups and downs of an amateur's photographic experience for either a long or a short period would scarcely command your attention. An historical account of the processes introduced and forgotten would scarcely be much better, and yet I think I myself would have been thankful had any one, fifteen years ago, pointed out to me a few of the many things I have learnt by bitter experience since.

It is my intention to refer to a few matters photographic, having little connexion the one with the other, and yet all of them interesting enough, I hope, to take up a little of the Society's time. Comparing the past with the present, there is one point which strikes me somewhat painfully. I may be mistaken, but I am under the impression that twenty years ago there was a bond of sympathy between all who practised the black art that there is not now; amateur and professional fraternised with each other, and exchanged items of experience in a very friendly way. There was no mention or hint then that amateurs were taking the bread from the professional, or that they were amusing themselves in any but a perfectly legitimate way.

However the feeling comes about, or whoever is to blame, there can be no doubt that amateur and professional are drifting apart, and that jealousies are springing up which ought not to be. I know that there are exceptions, and our worthy President is one of them, but, after some consideration of this matter, I am convinced that for some reason professional photographers do as a rule look with somewhat of suspicion on the modern amateur. But some one may say, is this to be deplored? What can the professional do for the well-read and perhaps scientific amateur? may he not be allowed to sulk as he likes—who cares? Provided the amateur has done nothing unworthy to bring this about, certainly he may; but, and here comes the whole reason for the introduction of such a subject, are amateurs always careful enough in recollecting precisely what an amateur is? I am sure that not one of us would willingly take the bite from any man's mouth, but I know, not one, but a few, who, out of sheer want of consideration, undertake work which is purely in the province of the professional. When this is pointed out, the answer sometimes is: All that ever I got for my photographs would scarcely cover the expense of my kit. But it should be remembered that to the extent of their remuneration they are not amateurs but professionals. An amateur is one who pursues a certain pastime or study purely for the love of it and in no case for payment, especially in money. Amateurs in every profession or sport are in honour bound to live and let live, and should never be the means of diverting one single penny from their professional brethren, who of course have to earn a livelihood by their work. It is sometimes said that amateurs are thriving off the brains of the professionals. This I do not go in with at all. The history of photography quite plainly shows that amateurs have generally been the pioneers in discovery, and, indeed, if you run over in your minds the great names in the photographic world, not only now, but since the earliest discovery in connexion with the subject, you will find very few professional photographers amongst them. It is certainly not on the score that amateurs have done nothing for photography that I would have them to keep carefully the amateur status, but simply because it is an ungenerous thing to so ride a hobby to the injury of an honourable and obliging profession. My idea is that an amateur may photograph where and what he chooses, and

he is also entitled to preserve his pictures in any form he likes, framed, if he likes, by himself, but there I would have him stop. It may be over particular, but I scarcely think he is entitled to print a single copy to give away, for then he diverts a possible customer from his professional brother, and this, I think, is not fair. I have a right and invariably do print a copy for myself, but for some years now have always had a professional to print prints which I wished to give away, and this, I think, is the only fair way to do.

These views may give rise to discussion, but so much the better if they do, and I shall try to defend my points by arguments at greater length than are possible in a short paper.

CHAPTER II.

There are generally three stages in an amateur's photographic life; there were at least three in mine. The first stage is when the tyro, knowing no better, attempts everything, and much to the surprise of the experienced, produces, at rare intervals, real pictures. It is quite true that he himself is not aware of the fact, and generally looks upon these accidental gems as his worst productions. At this stage quantity is the word. He exposes two dozen of plates in a day's outing, and when he has developed them all and found three-fourths of them which even he has to apologise for, he nevertheless religiously prints half a dozen copies from good and bad alike, and sits up half the night mounting this huge batch, to the intense disgust of the entire family, who anathematise him as he mounts the creaking stairs to bed, cold and shivering. At first he hordes these paltry things, but as he gets into the way of toning and fixing, &c., he becomes lavish and gives them away freely. It is generally at this stage, too, that the amateur begins an album, a record of his progress, and to be continued, perhaps, for a lifetime. He prints a batch of about nine (very carefully) and mounts them in the book. As he climbs into higher regions, however, he looks back upon the first fruits of his prentice hand and wishes he had delayed the commencement of his album. From this moment the book is doomed. What a week ago was to be a life's record is tossed into a press and forgotten; no, not forgotten, for one's sisters and his cousins and his aunts constantly demand to see what has been added since they last saw the book, and it requires a most experienced romancer to find a good and sufficient excuse every time they call.

The second stage is associated with very different symptoms. The amateur has now grown experienced, his terrible productions have scared him, and now in place of risking a plate upon anything and everything he can never get all the circumstances just what he would like. In the morning there is a haze which almost makes him hypochondriacal; at midday there is a puff of wind which makes him say bad words, while in the evening the sun either shines into his lens or, if he turns the other way, his giant shadow disfigures the foreground of his picture.

It is at this stage that he gets a bigger camera; at this stage he also makes his own plates at fourpence a-dozen, at least so he says—generally too rapid and good for getting pictures on however. It is now that he begins to discover that he cannot get good tones in his prints. While in church he connects in his mind's eye a toning bath to be tried to-morrow, if he can wait so long; if not, then as soon as possible. He has by this time been introduced to some professional photographer, and pesters his very life out over mysterious spots on his plates or his prints. He carries a negative or two in his pocket, and always half a dozen prints, generally portraits badly retouched (for he has commenced that), and asks you for your honest opinion. Things begin to look serious at home, too. It is on the parental side an open secret that you are spending by far too much, both time and money, on that trash; sisters begin to refuse to sit to you, and negatives which have been left to dry have been carefully dusted for you on the film side with a ragged duster.

Worry, care, and anxiety are beginning to tell. In an evil moment he had taken his whole-plate camera to a picnic, and having exposed half a dozen plates in six different ways, all of them good, he finds that he has promised no fewer than a hundred and five prints, work to occupy every spare moment for the rest of the summer. Things look bad; he neglects everything and everybody for the cursed infatuation. The very sanctuary he cannot get to, and at last his conscience awakens to its lost condition. Then it is that the third stage begins.

This is something reasonable at last. Our amateur now discovers that a little mist or haze in the distance may soften the harsh outline of a far-away hill. He can wait with patience for a quiet moment when a little wind is blowing, nor does he imagine that every blade of grass must be stock still or his picture is ruined. In the evening, when the sun is low, he brings forth his camera—not puts it away—and secures the lovely sunset and the quiet village. He throws aside his whole-plate camera as being a toil rather than a pleasure, and takes to a light and simple 5×4, or even less.

The plates are good and cheap to buy this size, and he ceases to make his own, and consequently gets to bed with other people. He does not bother his head about toning baths, but either makes at his leisure a lantern slide, infinitely to be preferred to any print, or should he wish to present a print, asks his professional friend to do him a couple—done well and for little money. He returns to Christian habits, and actually can follow the sermon once more in church.

These are the three stages. I congratulate myself at having arrived at the third, and pity from the bottom of my heart those who are at the first, or even more so at the second.

CHAPTER III.

I have already said that I have arrived at that stage where a light and simple outfit is a *sine qua non*, and I think that this idea would stand a little amplification. I often wonder what those gentlemen who work large-sized plates do with the pictures after they have got them. As a rule, a print is printed and pasted into an album. If it is on albumenised paper, in a dozen years symptoms of fading will have very likely begun, and just as time wears on and the interest increases in the picture, it gets yellower and yellower till for very shame the book is produced no more. Prints in platinum are permanent and very beautiful, but if a picture is to be held in the hand when looked at it need not be of large size, while if it is to be framed and hung, a 10×12 photograph is even too small for decorative purposes. My argument is, that from the fineness of detail of a photograph it must either be looked at in the hand, or, if hung on the wall, it must be very large, say 20×30, before any good effect can be produced by it. A water or oil colour is quite a different thing, and suppression of detail so gives breadth of effect that size for size they are doubly effective compared with photographs.

Those who have nothing else to do but amuse themselves might well take to a size of 20×30 direct pictures. Paper coated and stretched upon light frames would be quite workable, and the results would certainly be worth all the trouble to get them. But for those who can snatch a day only now and again, they should adopt no middle

size—too big for the hand, too little for the wall—but adopt the handiest and simplest they can get and be content with lantern slides. It may be argued that to set up a lantern and screen each time the pictures are to be looked at is very troublesome; but transparencies are very beautiful, even looked at in the hand, while they have the additional advantage of being suitable for the lantern if required. A carefully made slide is practically indestructible with ordinary care, and should a silver or platinum print be required at any time, a negative of any size can be made with a minimum of trouble from the transparency.

CHAPTER IV.

Developers.—A very elaborate series of experiments last summer with soda and ammonia, tried critically the one against the other, brought me some interesting information. I found, for instance, that while soda developed a plate to perfection, if to be used for printing on albumenized paper, ammonia made a far superior developer for a negative to produce a transparency from. Soda seems to pile up density at the expense of detail, which gives a grand printing negative, but which produces a transparency lacking in fineness and detail. Soda gives greater latitude in exposure, indeed the exposure, within reasonable limits, may be anything, and this is a great boon; but since all my negatives are now to be for lantern slides only, I intend to give up soda and keep by ammonia.

CHAPTER V.

Lenses.—After due consideration it seems to me a difficult thing to understand where makers get in the high prices for lenses. Why, for instance, should a lens of six-inch focus be about half the price of a lens of twelve-inch focus, the diameter remaining the same? The mere difference in the curves cannot make this difference in the cost of production. The fact that it covers a larger plate is an accident of its form and in no way due to finer workmanship on the part of the manufacturer. In portrait lenses there might be some excuse for higher prices, for here the diameter of the lens is so great that the getting even of flawless glass in sufficient sized discs is something. The introduction of the rapid gelatine processes has had this advantage, that cheap lenses may be used and give as good results as higher priced instruments. I shall show, by means of the lantern, pictures taken with lenses ranging in price from 1s. to 50s. in which the definition is equally good in the cheap as in the dear. When it was necessary to work with as great an aperture ratio as possible, then truly fine lenses were necessary, but when apertures of one-sixteenth to one-sixty-fourth became the general rule, the necessity for fine lenses, or any lenses at all for that matter, is not so evident.

To have no lenses at all is more a theoretical curiosity than anything else, but very good pictures may be produced without any lens, and that with by no means a very prolonged exposure with our rapid plates. The principle of the thing remains, that as the aperture ratio gets less and less the lens has less to do, and consequently need not be so perfect an instrument. In other words, whatever the fault of a lens, stopping it down will cure or mitigate it, and in every case give enhanced definition. A lens not quite correctly achromatic will not be improved in this respect by stopping down; but this is an extremely rare fault, even in the cheapest of lenses.

This then is an experience of mine, that in the great majority of instances more money is spent on a lens or lenses than is necessary, even when the very finest work has to be done. Of course, makers insist that to do fine work very expensive lenses are necessary. Experience, however, proves the contrary. I have never been able to see where the advantage came in using the rapid rectilinear type of lens unless where a very wide angle had to be included with straight lines at the margin. I find that the most of half-plate rectilinears, for instance, have an equivalent focus of nine inches. Now a nine-inch single lens will be quite rectilinear on a half-plate, and as to aperture, it will work very well at $f/12$, which is as rapid as is necessary for instantaneous work, and, indeed, has greater depth of focus than a rectilinear working with a slightly larger aperture. Where a half-plate has to be covered with a three and a half inch focus lens a double combination becomes a necessity—otherwise distortion.

Cameras.—I have found nothing to equal the sleeve camera, especially for plates up to $6\frac{1}{2} \times 4\frac{1}{2}$. Its advantages are its simplicity, little bulk, perfectly light-tight, and the great number of plates which may be carried and changed in it. I will show the working of this camera.

Pictorial Effect.—As a rule, by far too much attention is paid to the purely photographic part and too little to the artistic. So much am I personally convinced of this that I would have all photographic competition pictures to be judged by no other standard than their artistic value, and to that end would appoint judges who knew good pictures but were quite ignorant of photography. The end and aim of photography is to make pictures, not mere mechanical copies of objects, however perfect. Nothing could certainly be more absurd than the method taken by this Society to judge the lantern slides, for, assuming that we are none of us perfect (which is putting it mildly), since the award is the average of the members, with very different tastes and ideas, it is simply a case of the blind leading the blind, and the result must always be that the mediocre set will come out first. This result is brought about in this way. Assume for a moment that every member of the Society has his own special quantum of artistic knowledge, and that, as is most likely, no two members have exactly the same quantum. It follows from this that a slide not too much above Dick and not too much below Harry will take the first place, for it will get votes from both, although in point of fact it is not actually the best slide. But leaving this aside, where does the educational value come in if a whole class agree to correct each other's exercises? Mainly the best scholar is howled down by the majority whether he be right or wrong. Who need compete at our lantern competitions when he knows nothing whatever of his neighbour's judging powers? The Society is wealthy, why not pay to have the services of an artist to judge our productions, one whose judgment would be welcomed by every member, and trusted? One would then compete, and, successful or unsuccessful, he would learn from an undoubted authority either how to do it or how not to do it.

If technical excellence is to be taken into account, then let there be two judges and two prizes—one for artistic excellence and one for technical excellence, any attempt to strike a balance between sets, taking both qualities into account, being simply ridiculous, as any one will admit who has ever tried the experiment. Listen to the remarks, for instance, over some prize photographic picture; can you ever get two to agree as to its precise value? One man judges it from a purely technical point of view because he knows nothing about the artistic; another judges it from its value as a picture and sinks its technical imperfections, or, at least, judges them less harshly. These two are diametrically opposed to each other and are quite incompatible with each other, therefore never can be found in one man. Undoubtedly the best plan is to have our productions judged as pictures, set up no standard of technical excellence, but let the judge be purely an artist, indifferent as to whether they are good or bad

from a photographic point of view, but saying with no uncertain voice whether or no they contain the subtle something which measures the mind that conceived them. It must be remembered that pictorial value appeals to every one, while photographic value is only evident to photographers.

While upon this subject I cannot help mentioning that three handbooks, entitled—Green's first, second, and third parts—*Sketching from Nature*, have proved of great value to myself, and as the price is only half-a-crown for the three I cannot do better than advise the small sum to be invested in them.

Orthochromatic Photography.—I have exposed a good many plates supposed to be orthochromatic, both home made and bought, but cannot say that I knew much difference in the result. I shall show a few slides, the negatives for which were made from plates deeply stained with turmeric yellow, home made. I also used at the same time a yellow screen in front of the lens diaphragm. The advantages from orthochromatic plates were not sufficiently striking to induce me to continue their use.

The Flash Light.—Notwithstanding the drums and trumpet with which the advent of this invention was heralded, I myself have got no satisfactory results from it. The light and shade of a portrait must be studied carefully before exposure of the plate, and this is, of course, impossible with the flash light. I shall show a slide of my most successful flash light portrait, always admitting that chance helped largely in the result.

V. C. BAIRD.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4226.—“An Improved Form of Fastener for Photographic Double Dark Slides.” R. L. ALLAN.—*Dated March 11, 1889.*

No. 4261.—“Improvements in Photographic Lens Shutters.” T. R. DALLMEYER and F. BEAUCHAMPE.—*Dated March 11, 1889.*

No. 4268.—“A Combined Apparatus and Improved Appliances for ‘Developing,’ ‘Washing,’ and Drying Photographic Negatives, and for Washing Photographic Prints.” A. RATMENT.—*Dated March 11, 1889.*

No. 4302.—“An Improved Case for Holding and Exhibiting Loose Photographs or other Pictures.” H. WILD-WIRTH and P. F. WILD.—*Dated March 12, 1889.*

No. 4324.—“An Improvement in Film Photography.” G. C. WHITFIELD.—*Dated March 12, 1889.*

No. 4512.—“A New Method of Making Metal Mounts for Wooden Holders, or Backs of Photographs, Mirrors, and Pictures.” W. D. WILKINSON.—*Dated March 15, 1889.*

No. 4649.—“Improvements in Shutters for Photographic Cameras.” T. W. GREENALL and F. BISHOP.—*Dated March 16, 1889.*

PATENTS COMPLETED.

A POCKET SUPPORT FOR PHOTOGRAPHIC CAMERAS.

No. 5096. GEORGE LOWDOX, 65, Reform-street, Dundee.—*April 17, 1888.*
To provide a portable apparatus as a means of fixing photographic cameras to trees, palings, sides of ships, &c.

This apparatus is constructed of two pieces of wood or other material, of small size, hinged together at the end so that by attaching one of the pieces by means of a thumbscrew, armed with a self-inserting screw, to a tree or other standing support, the other hinged-on part may be brought down to right angles, or any angle required, more or less. On this lowered part is attached the camera. To strengthen and support the camera, and to adjust its position more accurately, I have a dovetailed slide in the one part, preferably the upper. This slide is again hinged, and by being pushed in, in the said dovetail, is lowered and attached to the lower, or fixed part, and so acts as an adjustable bracket or support—when the weight of the camera is upon it.

MEASURING THE SPEED OR TIME OF EXPOSURE OF PHOTOGRAPHIC INSTANTANEOUS SHUTTERS.

No. 5755. WILLIAM JOHN WILSON, 1, Chapel-road, Ealing, Middlesex.—*April 18, 1888.*

To carry out my invention I use a sheet of glass or other transparent or translucent material, upon which are marked one hundred or other convenient number of dots, lines, or other divisional marks, arranged in a circle and at equal distances apart. This plate marked with the graduated circle may be made of translucent material, the divisional marks being opaque, as above described, or the plates may be opaque and the divisional marks translucent. For instance, in the latter case the plate may be made of metal, and the divisional marks holes through which the light can pass. The graduated circle plate being fixed in an upright position, an opaque circular disc, a little larger than the graduated circle, is placed parallel and very close to, and concentric with, the graduated circle. The opaque disc is perforated with a radial slot, the width of which is the same as that of one division on the graduated circle, and the disc is arranged so that it may be caused to revolve on its centre at any required speed. It will now be understood that if the graduated circle plate be illuminated from the back, and the disc be caused to slowly revolve, the divisions on the circle will become visible, one at a time and in succession, to an observer standing in front of the revolving disc. In order to measure the speed of a shutter I set the disc in motion and keep it revolving at a uniform rate, say, for example, once in each second. I strongly illuminate the graduated circle plate from behind with sunlight, electric light, the light of burning magnesium, or other sufficiently powerful illuminant, and then, using the shutter to be tested with a lens and camera in the usual way, I photograph as much of the graduated circle as becomes visible through the revolving slot during the action of the shutter. If the time of the revolution of the disc is greater than the time of exposure of the shutter, the latter is shown by the number of divisions which appear in the resulting photograph. For example, if the circle be divided into one hundred parts, and the disc be revolving at the

rate of twice per second, and twenty-five divisions appear in the photograph, then the time of exposure of the shutter is evidently twenty-five two-hundredths, or one-eighth of a second.

AN IMPROVED PHOTOGRAPHIC SHUTTER.

No. 12, 174. LOUIS HOUSSARD, 5, Wilmington-square, Clerkenwell, W.C.
—August 30, 1888.

An improved shutter for photographic cameras, being an improvement in quickness and regulation of speed of exposure, also being shakeless in action. The shutter is composed of a thin brass box of rectilinear form, an aperture being in the centre. Inside of the box are two sliding plates which open from centre of the aperture in opposite directions. The aperture of the sliding plate can be made to open round, oval, or square. At the bottom to the left of the box is a small divided wheel for regulating the speed of exposure. On the right-hand side of the box is fitted pneumatic and hand release, also a focussing lever; the shutter can be fitted on hood or between lens.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 23	North Middlesex Club	The Iron Room, Stroud Green.
"	Great Britain (Technical)	5A, Pall Mall East.
"	Bolton Club	The Studio, Chancery-lane, Bolton.
"	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
"	Barton-on-Trent	The Institute, Union-street.
"	Halifax Photographic Club	Mechanics' Hall.
"	Liverpool Amateur	St. George's-crescent North.
"	Oldham	The Lyceum, Union-st., Oldham.
"	London and Provincial	Masous Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 14.—Mr. F. W. Cox in the chair.

Mr. F. A. Bridge exhibited an enlargement on pink bromide paper, but it was not considered to possess any advantage over white paper.

Mr. A. HADDON remarked that pink paper was manufactured by a firm in France, and inquired whether the sample before them came from that source. Mr. BRIDGE believed that it did.

The CHAIRMAN submitted a negative which had become yellow and asked the best means of intensifying it.

Mr. J. TRAILL TAYLOR thought it required clearing only in order to print well.

Mr. F. C. Kellow was elected a member of the Association.

Mr. T. E. Freshwater landed round a number of bromide and silver prints of views in India, also two small bronze gods.

The CHAIRMAN announced that the question box contained a query to the following effect:—"It having been stated that the best form of condenser for using with an oil light was not considered the most applicable for use with a limelight, what were those best adapted for the purpose?" and suggested that the question be allowed to stand over until the next meeting.

On a former occasion it having been decided that members make lantern transparencies from the same three negatives and submit them for competition, the products were exhibited by means of the lantern, two pictures at a time being projected side by side upon the screen, the better one—which was decided by vote—to remain upon the screen and the other withdrawn, and in its place substituted another, and so on, the last one remaining in view being that which had been voted to take the first place. The first place in all three cases was awarded to Mr. J. R. B. Wellington, two of his pictures being on gelatine and one on a bromide plate. The second places were awarded, one to Mr. H. M. Hastings—a gelatine plate, and two to Mr. Cooke for collodion and gelatine respectively.

Mr. FRESHWATER then exhibited, by means of the lantern, a number of views to which he had previously referred, and gave a description of each—these illustrating the manners and customs of some parts of India.

The HON. SECRETARY announced the third annual Conference of the Camera Club, to be held on March 27 and 28.

At the next meeting of the Association Mr. F. P. Cembrano will speak upon *The Novelties at the Crystal Palace Exhibition*.

CAMERA CLUB.

At the lantern evening on March 14 a very large number of slides were exhibited on the screen. The photographs shown included the work of the winners in Messrs. Fry & Co.'s recent lantern slide competition, also slides toned with gold, by Mr. O. F. Blackmore; experimental work upon rapid and slow chloride plates, by Mr. J. D. England, showing the range of colour obtainable; flower studies and groups, by Mr. Henry Stevens; photo-micrographs, by Mr. Charters White; interiors at Sandringham, the slides by Major Nott, from negatives of Mr. Lemeray's; collodio-bromide work, by Mr. Hussey; and general landscape scenes, by Messrs. Fluney, Noel-Cox, Ferrero, Seyd, Howlett, Leventhorpe, Elder, Rodgers, Lanrie, Fitzpayne, Gladstone, Grinshaw, Wilkison, and the Hon. A. W. Friskine.

On March 28, the Thursday of Conference week, novelties in apparatus will be shown at the Club and explained by the exhibitors.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Committee of this Association met on the 15th instant at 181, Aldersgate-street, E.C.

The minutes of the previous meeting, having been read, were confirmed.

Acting upon the resolution carried at the general meeting, steps were taken towards the settlement of the proposed Orphans' Fund, also the initial stages of a complete revision of the rules of the Association.

It was decided that an additional 100% of the funds be invested in Goschen's Two and three quarter-Per Cent. Consols.

Messrs. F. W. Cox, G. T. Harris, and E. A. Whittemore were elected members of the Committee.

HOLBORN CAMERA CLUB.

At the headquarters, 100, High Holborn, on Friday last, the HON. SECRETARY explained to beginners in photography *How to Use a Camera and Photographic Lens*, and on Friday, April 19, he will deal with *The Correct Exposure and Best Means of Developing Plates*.

The President (Mr. W. Rice) has promised a series of papers on *Technical Tricks*, the first of which will be commenced soon after the annual general meeting on April 5, and will be on the subject of *Diaphragms*.

In addition to a new set of rules, which will be submitted to the members at the annual general meeting, the Committee will suggest an extensive programme for the coming season. All who think of becoming members should send a line to the Hon. Secretary before that date so that they may have a voice in the future management of the Club.

Messrs. E. H. Bayston, John Brittain, and Frederick Knights were elected members.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

MARCH 15.—the monthly lantern evening.—Mr. Tollett in the chair.

Mr. J. B. RINTOUL read a paper entitled *In and Round London*, illustrated with dissolving views. About sixty slides were exhibited.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 8.—Mr. Pringle presided.

Mr. Hawkins showed two prints from negatives of highly coloured engravings. They were taken on ordinary plates, and, notwithstanding this, the range of colours was well represented by an equally good range of tone in the finished print. The room in which they were taken was lighted with yellow light. It was remarked that if such good results could be obtained by such simple means, orthochromatic plates would not be required for such subjects. Mr. Hawkins also contributed a print to the album.

Mr. Sanderson brought some lantern slides for criticism, some of which were curiously marked in spots and patches. These were apparently caused by the hypo not being eliminated, or by some splashing after they were washed.

Mr. CHARLES HUSSEY then proceeded to deliver an address upon *Lantern Slide Making*. The lecturer said that he was in the habit of using a small camera, most of his slides being printed by contact; he also found that his negatives would produce pictures of sufficient dimensions when enlarged from to suit the most exacting on that score. To illustrate this, he handed round a three and a quarter negative and three enlargements from it, the largest being about 30 x 22. The original negative being sharp and full of detail, the enlargements were perfect, the largest being equally good with the smallest. Mr. Hussey next handed round two cameras, a quarter-plate and a three and a quarter square. The camera was made of long extension, so that lenses of varying focal could be used. At least four lenses should be carried, one being a wide angle, which, however, should only be used when absolutely compelled to do so. Here is a valuable hint as to the use of the camera as a view meter:—Place your eye to lens hole in front of camera (having previously removed focussing screen) and rack out the camera until the subject just fills up the view, then choose a lens of corresponding focus. He also showed a few examples of negatives. Comparing the two processes, gelatine and dry collodion, the lecturer expressed his opinion in favour of the latter, as with it one is enabled to give any tone to the transparency that may be desired after the development has been completed; with the gelatine process this cannot be done. A number of slides and negatives were shown at the conclusion of the address.

The next meeting will be held on the 22nd instant, on which occasion the Secretary, Mr. E. G. Adams, will give an address upon *Warm Tones on Gelatine Lantern Slides*.

BRIGHTON PHOTOGRAPHIC SOCIETY

FIRST lantern evening, March 12, at the New-road Lecture Hall. There was large attendance of members and their friends.

Upwards of one hundred slides were exhibited and were warmly applauded.

Mr. Harcastle sent a dozen by Messrs. Fry & Co.; Mr. Rean showed one of the moon and others; Mr. Webbing, a varied assortment and one of the ill-fated *Vandalia*, now a wreck off Brighton; Mr. Tate, miscellaneous views; Mr. Jago, portraits; Mr. P. Morris, local views round Lewes; and the Hon. Secretary (Mr. Corder), views in and round Canterbury and local subjects.

It was decided that at the next meeting, on March 26, the subject for discussion should be *Lantern Slide Making*.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

MARCH 14.—Dr. Hill Norris (President) in the chair.

A letter was read from Mr. A. Tate, of the Ulster Society, informing the Hon. Secretary that he had sent off a selection of slides of Irish scenery for exhibition.

Bound copies of the annual ALMANAC were handed in from the editor of THE BRITISH JOURNAL OF PHOTOGRAPHY for the library, and thanks were accorded for the same.

After some remarks from Mr. J. R. STONE, J.P., who spoke of his experience and visits to Norwegian scenery, Mr. E. H. JACQUES read a paper on *Holiday Trips with the Camera in Norway* [see page 198].

The paper on the 28th instant will be on *Various Printing Processes*, by Mr. W. Griffiths.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

MARCH 14.—The President (Mr. Paul Lange) in the chair.

Messrs. W. C. Bustard, F. E. Patchet, and E. P. Hale were elected as members.

The PRESIDENT, in compliance with his promise of February 14 re "outdoor excursion competition," then read the conditions of the competition for which he has promised a silver medal, and which reads as follows:—"For the best set of six pictures taken on an excursion to take place on a Saturday afternoon, probably in May, 1889, place of excursion to be posted to each member two days before the date fixed for the trip. All subjects eligible for competition. The chief point of merit for the award to be artistic selection of subject, and next, the number of results obtained by any competitor out of six exposures. It is to be understood that each competitor is limited to six exposures only."

The PRESIDENT read a letter from the Birmingham Photographic Association in which they state that they had sent on a loan of two hundred slides which had been taken by the members of their Association. In return for this kindness the President urged the members to send in some slides on loan to the Secretary, so that we may return the compliment by sending slides done by our members to the Birmingham Photographic Association.

Mr. Kerry exhibited a detective camera which he had made from his own lens, and with which thirty plates could be exposed with very little trouble, there being no necessity to use dark slides for same.

Messrs. H. B. Sharpe and W. B. Beaton exhibited some stands, developers, shutters, &c., which met with much commendation from the members present.

The President exhibited the silver medal which he had received from the Vienna Exhibition, its magnitude surprising many present.

The PRESIDENT then announced that Mr. B. J. Sayce would give a demonstration of the development, &c., of Eastman's paper negatives.

Mr. SAYCE, in proceeding with his demonstration, stated that the full instructions given by the makers with each spool of paper would be found sufficient to produce excellent results. He then cut off with a pair of scissors an exposure from the spool, using a sheet of glass, half-plate size, as a gauge; having soaked the sheet in water, which he poured frequently off and on both sides to avoid air bubbles, he then commenced to develop with the normal pyro, sulphite, and carbonate of soda, without bromide. At this stage a difficulty occurred with the position of the red lantern, and on its correction it was found that the exposed surface had darkened to an extent which caused the bystanders to believe that no negative could be secured on account of over exposure, though the actual exposure had only been cap off and on at ten minutes to nine a.m. on a dark subject with $f/22$ stop of Wray's rapid rectilinear eight-inch focus lens. Mr. Sayce promptly changed the solution to acidulated pyro and sulphite, with bromide, and development being arrested, density began to assert itself; the finishing touch was a double dose of the carbonate of soda solution, and when fixed, to the surprise of all, a vigorous bright printing negative resulted. A second exposure of the same subject, but with $f/16$ stop, was treated from the onset as an over exposure, and two excellent negatives produced scarcely differing from each other and perfectly free from grain. Mr. Sayce holds the opinion that grain is entirely due to uncorrected over exposure, and with proper exposure or proper development it will not show even when lantern transparencies are made. He added that the film being acted upon from two sides answered to the developer or the restrainer much more quickly than the same film on glass where one side is sealed, and thus there is more latitude in exposure. The operation ended by the negatives being squeezed on opposite sides of a sheet of elastic, and in this condition they were extremely portable. Mr. Sayce mentioned that he never oiled his paper negatives, and only stripped the films when many prints were required.

Mr. H. B. SHARPE then proceeded to develop a Carbutt celluloid film, eclipse brand, sensitometer 27, exposure one-fortieth of a second, Aptas rectilinear lens, picnic basket, detective camera, very dull day, threatening rain. The developer he used for same being hydroquinone, Thomas's formula. After development had taken place, the film negative was passed round, the density of which was marvellous. Mr. Sharpe stated that before pinning the film up to dry it should be treated with a bath of glycerine, one ounce, and water, twenty ounces. This he said would prevent the films from curling when dry.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 20.—Colonel Playfair in the chair.

The present position of the Association having been discussed, a strong feeling was manifested in favour of increasing its efficiency and influence.

It was proposed by Mr. HOOD DANIEL, "That the Association be continued, and that its future be dependent on the attendances from now until the end of the year."

The motion was seconded by Mr. E. BRIGHTMAN, and carried.

The Chairman then received the resignation of Mr. Brightman of the post of Secretary and Treasurer, which he has most efficiently fulfilled since the resignation of Mr. Hood Daniel.

It was agreed that the names of certain members in arrears for their subscriptions should be posted in the Association's rooms.

Mr. BRIGHTMAN announced the resignation by Mr. Davey of the post of President.

Mr. Daniel was elected to that office, and Mr. F. Bligh Bond to be Secretary and Treasurer.

The Chairman and Mr. Brightman were nominated Vice-Presidents, and Mr. Tribe and Dr. H. Brown, Auditors.

The Committee were then re-elected, Mr. Norgrove's name being substituted for that of Mr. Boyden.

DERBY PHOTOGRAPHIC SOCIETY.

MARCH 12.—Mr. Keene presiding.

One member was elected.

Mr. A. H. BENNETT read a paper on *Cycling as an Aid to Photography*.

On March 14 the Society entertained the members of the Nottingham Photographic Association at their rooms, when about thirty availed themselves of the invitation, including the President, Mr. H. Blandy; Vice-Presidents, Messrs. G. A. Bull and S. Wells; and the Hon. Secretary, Mr. P. E. Knight.

After a hearty welcome by Mr. Keene, an exhibition of lantern slides made by the members of the Derby Society was given, amongst the exhibitors being Messrs. Keene, Scotton, Bounlin, Cooper, Lovejoy (Hon. Secretary) Chadwick, and Dean.

After some remarks by Mr. Blandy, it was arranged that the two Societies should meet at the trip to Ashby-de-la-Zouch on April 27.

The walls were tastefully decorated, and hung with a large number of photographs taken by members of the Society.

The gathering afterwards resolved itself into a smoking concert.

IPSWICH PHOTOGRAPHIC SOCIETY.

MARCH 12.—Mr. J. Dixon Piper in the chair.

Mr. P. Woods (Stowmarket) was elected a member.

Mr. J. C. WIGGIN read a paper on the *Chemistry of Photography*, and illustrated the same with numerous experiments showing the various chemical reactions taking place in the different photographic processes.

In the discussion that followed the PRESIDENT remarked that Mr. Wiggin was one of the earliest workers in platinum printing, and many years ago showed him prints by that method.

A lantern night is fixed for April 9.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

MARCH 13, Mr. George Bankart (President) in the chair.

The meeting was devoted to the exhibition and award of prizes for general outdoor work by the members, being the first local competition which has taken place since the formation of the Society. Each member competing contributed six mounted prints in one or both of two classes, viz., Class A, for prints upwards of half-plate size; and Class B, for prints of half-plate and under; and though the entries were not so numerous as might have been desired, the average quality of the work was good. Silver and bronze medals had been presented to the Society—in Class A by Mr. W. S. Hobson (past President), and in Class B by Mr. Bankart (President), the medals having been founded specially for the use of the Society.

After an afternoon and evening devoted to the careful examination of the prints, the award of prizes was made by ballot, each member present being entitled to two votes in each class, one for the silver and one for the bronze medals, the voting being for the *best average of six prints*, and not for individual pictures, and the result justified the expectation of the proposers of this method of deciding the winners, and corresponded almost exactly with a forecast made by two members of the Society qualified to form an opinion on the subject, except that in consequence of the nearly equal merit of work two winners changed places in the voting.

The voting for the silver medals took place first, by general desire, in order to avoid confusion as to record of votes for the bronze medals, the result proving strongly in favour of Mr. Bankart for Class A, and Mr. J. Porritt for Class B. The voting for the bronze medals was much closer, and illustrated considerable variety of opinion, the result being finally in favour of Mr. W. T. Tucker, of Loughborough, for Class A, and Mr. A. W. Wilson for Class B, though Mr. S. S. Partridge was only one vote behind Mr. Wilson.

The system, though novel, seemed to work smoothly and to give general satisfaction, and as the names of competitors were not stated and the prints classed by numbers only, there can be little doubt that the awards were correctly made on the actual merits of the work.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

On March 14 a party of the members made a return visit to the Derby Photographic Society, and were met on the Derby platform by a deputation who conducted them to the Society's new rooms, where they were heartily received by the members of the Derby Society. A large collection of photographs was displayed upon the walls and tables, especially noticeable being the prints taken during the Photographic Convention held in Derby in 1887. The visitors were then "shown about Derby" (on the screen), some very fine views being exhibited. Refreshments having been partaken of, the President of the Nottinghamshire Association proposed a vote of thanks. The return journey was made by the quarter-past ten p.m. train.

On Monday evening, March 18, the usual fortnightly meeting of the Association was held, when a number of the novelties of Mr. Tylar, Birmingham, were exhibited. The President (Mr. Henry Blandy, L.D.S.) occupied the chair.

Mr. John Merriman was elected a member.

Mr. J. C. LANCASTER read a paper on *The Magic of Science; or, a Night's Amusement with Photographic Chemistry*. Mr. Lancaster said:—

The title of my paper is, perhaps, a somewhat unusual one, and I may say at the very outset that I do not propose to enter into the art of mystery, or even to closely define the meaning of the word magic. It may mean imposture or acting, by practising the secret operations of natural powers, or, in other words, apparent deception.

Again, science is defined to be knowledge grounded on demonstration or art built on mere principles, and, by inversion of terms, we arrive at a scientific deception. Deception by means of scientific experiments now serves only two useful purposes—one is instruction and the other is amusement. In early times, however, it was otherwise, for science combined with deception served only one purpose, for does not universal history tell us how powerful an instrument it was when employed to awe the people by their rulers?—and to this end prince, priest, and sage were leagued together to impose upon the masses, who at times could not be impressed unless by what they in their ignorance considered to be supernatural. The means they employed would seldom deceive people living at the present day, who are daily accustomed to some optical or acoustical wonder due more or less to scientific contrivance; although in a harmless way, one may still practise devices which threw the judgment entirely at fault, no matter how educated one may be, and I think it will not be difficult to show by the very simplest means how the senses of vision, hearing, and touch may be readily deceived. [Experiments on this were then given.] When our judgment has played us false, as in the instances just given, we have been, without doubt, victims to a kind of deception which has been termed scientific for the simple reason that it comes within the pale of science to analyse and ascertain all that it is possible to learn concerning these peculiar and singular phenomena, magic photography. A few years ago small pieces of white paper were offered for sale which on being covered with blotting paper and sprinkled with water displayed an image as if by magic. The sheets of white paper, to all appearance a blank, were in reality photographs which had been bleached by immersion in a solution of chloride of mercury; in the blotting paper sold there was hyposulphite of sodium; this was dissolved on moistening the paper, the solution penetrated to the picture and made it visible. The magic elgar holders were then fully explained, as were indelible inks. Experiments were given, as alcohol dropped on chromic acid immediately taking fire; fire produced by dropping H₂SO₄ on chlorate of potash and lump sugar; turning iron into gold, silver, or copper, &c.

The proceedings then terminated.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

MARCH 12.—The President (Mr. A. S. Stevenson) in the chair.

The PRESIDENT, in thanking the members for having honoured him in electing him to the position he held, spoke of the great advancement which had taken place of late years in the photographic art. He himself lectured on the subject in the Hall of the Literary and Philosophical Society about thirty years ago, and at that time hardly anything was known of photography by the public.

It was announced that Mr. Stevenson would give a silver and bronze medal for the best and second-best series of not less than twenty-four lantern slides, open to all professional and amateur photographers in the world; and also that Mr. J. P. Gibson would give a silver and bronze medal for the best and second-best series of six lantern slides by an amateur member of the Association. The competition for these will take place in November, 1889.

Mr. H. C. HEMY read a paper upon *Lenses—Photographic and Microscopic* [this will appear in a future number], and numerous examples were shown.

At the next meeting, April 9, Mr. J. P. Gibson will read a paper on *The Intensification and Reduction of Negatives*.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

MARCH 7.—Mr. William Lang, jun., F.C.S., in the chair.

The following gentlemen were admitted members of the Association:—Messrs. E. B. Clark, W. Anderson, J. W. White, J. Humphreys, A. Fitz-Conroy, W. Smith, B. Simons, J. E. Hanbridge, J. Dove, D. Dove, Councillor J. M. Primrose, and Dr. J. C. Woodburn.

Mr. ADOLF SCHULZE read his paper on *Photo-micrography*. Beginning with a description of the microscope and the various lenses in use, he went over the points of his photo-micrographic apparatus. This was compactly arranged on a long table. At one end the microscope itself rested on a turntable, so that when the object to be photographed had been properly set on the stage plate a simple movement of the turntable brought the microscope and Dallinger paraffin lamp into position in front of the camera. The focussing screen was a sheet of clear glass on which the enlarged image could be readily seen with a focussing glass. A long rod brought the fine focussing adjustment of the microscope within reach of the operator at the back of the camera. When photographing objects which could not be placed in a vertical position the whole top of the table could be turned on end and the focussing worked from the top of a step ladder. Mr. Schulze gave a demonstration and produced a very good half-plate negative of the proboscis of a fly.

A large number of photo-micrographs were then thrown on the screen and explained by Mr. Schulze. The one which provoked the greatest enthusiasm was a group of one hundred and sixty diatoms.

Correspondence.

Correspondents should never write on both sides of the paper.

CAMERA CLUB CONFERENCE.

To the Editor.

SIR,—Would you kindly give a notification in this week's BRITISH JOURNAL OF PHOTOGRAPHY that the Camera Club Conference will be on at the Society of Arts on Tuesday and Wednesday, the 26th and 27th of March, and that all interested in the subjects are cordially invited to attend the meetings, including the International Lantern Exhibition at 8 p.m. on Tuesday, the 26th, at the Society of Arts?

Slides have been sent to us from French, Austrian, and American Societies for this Exhibition. All the meetings are open to ladies.—We are, yours, &c.,

G. DAVISON,
E. G. SPIERS, } Hon. Secs.

Camera Club, 21, Bedford-street, W.C., March 18, 1889.

PERMANENT HYDROQUINONE.

To the Editor.

SIR,—We are reluctant to trouble you again in this matter, but our rivals in your last issue charged us with treating them unjustly. The charge should, we think, emanate from us, and if there be reason for complaint it is on our side, inasmuch as they just made a statement with regard to permanent hydroquinone which yourselves, Mr. Levy, and Dr. Byk have emphatically proved to be incorrect. They do not now attempt to substantiate their original complaint, but merely try to lead the public off with the cry of unjust treatment to which we reply, "*qui s'accuse s'accuse*."

Your correspondents write as if they alone supplied "pure" chemicals, and as if photographers required to be told the custom of the chemical trade, and that purity is at best but a relative term. It is just seven years since they wrote (March 31, 1882) an interesting and instructive article on *Chemical Purity*, from which we make the following extract:—

"The most careful and skilful operator cannot prevent a variety of adverse results attending the use of indifferent chemicals. Following up the interesting controversies which form the principal subject of the JOURNAL, it cannot fail to escape notice that they turn more or less upon the varying purity of the reagents employed. As Mr. Schering has very properly observed, it is necessary to speak of 'photographic purity' as a something superior to ordinary chemical purity, in the same manner as we are in the habit of speaking of analytical purity as a something characterising a higher degree of the ordinary term of 'chemical purity.'"

It was to obviate this *varying purity* that Dr. Byk sought, and, we believe, has successfully achieved in introducing his *permanent hydroquinone* which Messrs. Schering's agents are pleased to term a "compound," but which has been proved to be at least equal in quality to the "pure and real" article which they are so zealous in distributing.

Truly our friends may say, "*tempora mutantur et nos mutamur in illis*." In the course of a few days we hope to send you Dr. Byk's own remarks on the whole question.—We remain, yours, &c.,

27 & 28, Jewry-street, March 19, 1889. BERNSTEIN & VOOT.

THE CONSTITUENTS OF AZALINE.

To the Editor.

SIR,—Allow me to make a correction respecting the exact name of the chemist whose analysis of Dr. Vogel's azaline you were kind enough to publish last week. His correct name is not Dr. O. W. de Witt, but Dr. Otto N. Witt, the same gentleman mentioned by Mr. J. Spiller as his friend in a previous letter, and, therefore, a well-known authority on such matters.—I am, yours, &c.,

19, Buckingham-street, Strand, March 18, 1889. J. R. GORTZ.

PSYCHIC PHOTOGRAPHY.

To the Editor.

SIR,—In reference to your suggestion as to the ultra-violet rays alone being the source of chemical action in the psychic photographs, it occurs to me that some elucidation might be given to the matter by the employment of a sheet of paper coated with sulphate of quinine in place of the gelatine plate.—I am, yours, &c.,

Clifton, March 18, 1889. Geo. S. THOMSON, M.D.

P.S.—Some years ago I made some experiments in the matter, but they were unavoidably interrupted.

A REMEDY FOR THE BICHROMATE DISEASE.

To the Editor.

SIR,—The use of bichromate of potash has become so general in photography, and its effects on the health are so serious, that I think it is my duty to indicate to my fellow carbon printers a remedy which I have found most effective. Naturally the greatest care is necessary in handling this salt, whether in its dry state or in solution. In sensitising one should always use indiarubber gloves, and, above all, it is necessary to live soberly and refrain from all excess which might endanger the purity and vigour of the blood. During development the hands should be brought as little as possible in contact with the bichromate, as the warm water opens the pores of the skin and renders it liable to absorb a large quantity of the salt, but gloves are much in the way of a professional printer when there is a quantity of work to be got through. The amateur should always use gloves. The presence of the salt in the tissues causes violent irritation and an irresistible inclination to rub the parts most affected. In winter especially, when the skin is chapped, the action of

the bichromate salts is really terrible, and the results may be most dangerous.

Fifteen years' practical experience at the establishment of M. Stroud, in Jersey, where carbon printing is a speciality, has rendered me conversant with all the difficulties and dangers incident to the carbon printer. I have taken the precautions indicated, and, even in winter, though my fingers have been covered with cracks, they have never been more than very slightly attacked, and I have never been obliged to discontinue my work even for a day. Below is the remedy which I use; it is very simple, and after one or two applications (with friction) all cutaneous disorders disappeared. It is as well to use it every day, after work is over, as a disinfectant.

Glycerine ½ ounce.
Pure carbolic acid 10 drops.
Water 2½ ounces.

—I am, yours, &c., BEAUMONIS, Carbon Printer.
Stroud Establishment, Jersey, March 19, 1889.

PHOTOGRAPHING IN ITALY.

To the Editor.

SIR,—In reply to "X. Y. Z." about photographing in Italy, I think he need not be afraid of any interference from the police or the Customs. I have passed the frontiers a good many times, mostly with a lot of glass plates, and on only two occasions was I very near having my plate boxes examined. Each of those times I was allowed to pass after explaining the nature of the plates contained in the boxes. Still, one cannot help feeling anxious at the possibility of having to show some of the sensitive films.

As I am starting early in April for a long Italian tour, if "X. Y. Z." likes to communicate with me we might arrange a meeting.—I am, yours, &c.,

P. H. FINCHAM.
West Dulwich, S.E., March 19, 1889.

To the Editor.

SIR,—In reply to "X. Y. Z." I can only speak for Northern Italy, having three years ago entered from Germany via the Brenner Pass, and, after visiting the chief towns, gone out again by the St. Gothard.

I had no trouble at all with the Italian Customs authorities, although I carried a good stock both of films and glass plates. On the other hand, I had endless contests with both French and German Customs, the latter forcing me to pay duty twice, although the stamps from the first payment were still attached to my boxes. My advice to the photographic amateur is, therefore, avoid France and Germany.

Three years ago only the ordinary Eastman paper (spools) was in the market, and that I used. The rapid would be best for groups, market scenes, or shots from the train. The Gothard carriages are the long Swiss make, open at the ends, and I set up my camera in the doorway of the last carriage, and worked away as the train rattled along. A quick lens and shutter are necessary for this.

Although this trip was taken in August, I did not find the light any stronger, actinically, than further north. But I place no trust in exposure tables; inactin and experience are better than any tables I ever used. When in doubt develop a plate or two, and so acquire certainty. Chemicals (saturated solutions) take up very little space, and any hotel chamber at night gives a sufficient dark room. I never carry a lantern. One or two thicknesses of canary or ruby cloth round the tripod legs have done efficient duty for years, whilst a few extra lengths and some drawing pins soon dispose of leaky doors or windows. I had no trouble in North Italy from police or crowds, even in the towns or at stations.—I am, yours, &c.,

KENNIS B. MURRAY.

Botolph House, Eastcheap, London, E.C., March 16, 1889.

DETECTIVE CAMERAS.

To the Editor.

SIR,—In the last number of the JOURNAL a description is given of a detective camera by Mr. Gaskin Wood. The camera is well known to those who have had any lengthened connexion with photography. It is simply a copy of a camera which was invented by Mr. Aird about seventeen years ago. In the early part of 1875 Mr. Aird read a paper before the Edinburgh Photographic Society, describing the camera and showing drawings of details. These were duly published in full in your JOURNAL at the time. Messrs. Kemp & Co., of Edinburgh, made several.

Mr. Aird exhibited his camera at the large photographic exhibition held in Edinburgh, December, 1876, and was awarded a medal for it. In the meantime, from the drawings and description published in 1875, M. Ionté, of Paris, constructed an improved "Aird's Camera," several of which I have seen, and had an automatic arrangement which punctured a strip of paper, showing what plates had been exposed. An article on this camera will be found in the JOURNAL of March 24, 1876.

Both these cameras after a time went out of use, the principal reason being the very large bulk and weight the camera assumed when made of any size, and the Siamese-twin character it had of having to carry the whole affair into the dark room when filling, emptying, or developing the plates. It altogether proved too cumbersome, and instead of replacing double slides, as was expected, it was eventually found that slides were much better, and the camera was relegated to the limbo of the past.—I am, yours, &c.,

PYLOS.

Edinburgh, March 19, 1889.

[On looking up the description of Aird's camera we find the one described last week to differ in several essential features.—ED.]

COPYRIGHT IN AMERICA.

To the Editor.

SIR,—I wish to copyright some pictures in the United States, kindly give me particulars and tell me how to proceed.—I am, yours, &c.,

S. J. WELLS.

[The term of copyright in the United States runs for twenty-eight years, but within six months before the end of that time the author, or designer, or his widow, or children, may secure a renewal for a further term of fourteen years, making forty-two years in all; but you cannot obtain what you desire, for citizens or residents of the United States only are entitled to copyright. ED.]

A COUNTY PHOTOGRAPHIC GUIDE.

To the Editor.

SIR,—Was there not a suggestion made, some time ago, that each Photographic Society throughout the kingdom should supply or publish hints and particulars as to the best "bits," historical subjects, &c., in its immediate vicinity?

I should now like to ask if it would not be worth some publisher's while to compile "a series" of local guides on some systematic plan? You, sir, have done so well with your ALMANAC, and, being in communication with all the Societies, could, it seems to me, best undertake such a venture. The cyclists find that it pays to publish literature of this sort; the photographic amateurs now form an army so large that they would, I should think, supply a good market for such guides.

If urged thereto, say, by the Parent Society, or the Camera Club, the country Societies would, I have little doubt, nominate Committees to obtain information from their members, which could be supplied to a centre in London and published cheaply. Could we commence with a "sub-urban London?"—I am, yours, &c.,

PROGRESS.

March 15, 1889.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange 15×12 Dallmeyer's Triplet for 12×10 camera with three double slides.—Address, H. H., 31, Lynton-road, Crouch End, N.

Exchange, balcony and trelliswork for balcony; must be in good condition.—Address, E. WHITE, Photographer, Radcliffe, Manchester.

Will exchange tall-cased quarter-chime clock for modern tourist's camera and lenses for large-sized plates.—Address, WALKERMAN, Photographer, Shanklin.

Wanted, half or whole-plate portable camera and double slides, lens, and folding stand, in exchange for good limelight dissolving apparatus.—Address, MR. PAINGOLF, 20, Bath-street, Hanley, Staffordshire.

Wanted to exchange, a japanned zinc water-wheel print washer, size of cradle, 16×13, for two good second-hand backgrounds, balcony, or posing chair.—Address, W. TAYLOR, Tregeana-place, St. Ives, Cornwall.

Dallmeyer's stereographic portrait lens; wanted, whole-plate wide-angle rectilinear. Also would exchange valuable tricycle for 15×12 (or larger) rapid rectilinear or rapid symmetrical.—Address, WATKIN, Oakland-road, Hanwell, W.

RICHARD BROWN.—We are sorry to learn of the death of Mr. Richard Brown, of Liverpool (Brown, Barnes, & Bell), which took place on the 14th instant.

We have received from the Frederick Crane Chemical Company, of Birmingham, samples of varnishes prepared for makers and users of photographic apparatus. Enameloid is a hard, dead-black varnish; which adheres to either metal or wood; protectaline, is a negative varnish possessing a good body; enamelene is a shellac wood varnish for which special properties are claimed. All these articles seem to be valuable to photographers.

Answers to Correspondents.

• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

DENT. Try Judson's.

R. BROOK.—The address is Florence-villa, Cavendish-road, Aylestone-road, Leicester.

J. H. PETERS.—By all means secure a landscape lens for the special purpose mentioned.

PRESTON.—1. By sulphide of potassium.—2. Not worth saving.—3. Same as number one.

W. N.—There is no difference, except as regards mechanical convenience, between the fused and stick form.

1, 2, 3.—Hydroquinone can be employed for the development of bromide enlargements. Some prefer it to the ferrous oxalate.

GEORGE McDONALD.—1. One or four.—2. We employ three, five, six, and eight, and cannot indicate a preference for either.

BOHR.—This is purely a case for a solicitor, who will determine whether there have been misrepresentations or not. We cannot advise respecting the matter.

BLOW-THROUGH. 1. You must employ three lanterns to get the effects you speak of.—2. No, it cannot be done.—3. Not with the lens you at present possess.

A. S. BUTLER.—The writer of the article does not silver glass as a profession. There are several firms in London who do so, and would be very glad to undertake such work as you require.

ATKINSON.—1. Sulphide of potassium.—2. The easiest method is to dissolve the bromide in hyposulphite of soda and precipitate as before.—3. The one with the largest aperture is the quickest.

A. B.—Your picture is spoiled by having such a large uninteresting piece of foreground; had a stray dog or other animal appeared upon the scene at the time of exposure it would have had quite a different aspect.

MISS H.—You can use your lens (quarter-plate) for enlarging heads, but if you wish to enlarge groups, it will be requisite to use a stop in order to get marginal definition, or you can use a lens of longer focus.

WARDER.—If you are using a rapid symmetrical lens for taking refractory sitters, you are certainly working at a disadvantage. You should obtain a quick-acting portrait lens, which will work in a quarter of the time.

D. MACLEAR.—Your experience is not exceptional. It is not every formula that is issued with the plates that is the most suitable for them. If you find your own developer so much better, why trouble further about the other?

N. L. COX writes: "Many of the labels have come off the bottles in my dark room owing to the damp; how can I prevent this?"—Paste the label on the bottle, when dry brush a little varnish over it, this will prevent the moisture acting upon it.

SEPTIMA.—French chalk, or powdered talc, may be had from most dealers in lithographic material; the price is only about sixpence per pound. There must surely be some mistake when you were charged at the rate of five-and-sixpence per pound.

PARAFFIN asks the cause of a paraffin lamp in a lantern smelling, and what will cure it.—Wash the lamp thoroughly, warm it, and fill with oil just before use. The smell is caused by the surface of the lamp becoming coated with oil, which as the lantern heats is given off.

BUENOS AIRES writes: "Can you, or any reader of the JOURNAL, give me any information concerning the Argentine Republic, its climate, and the possibilities of obtaining employment as artist, retoucher, &c.? Any information whatever on the subject would be thankfully received."

S. S.—If the varnish remains tacky for two days after it is applied to the negative, and the paper sticks to it when printing in the sun, it is clear that it should not be employed. Return it to the maker. We cannot say if you can recover the value of the negatives spoilt. We do not express an opinion on purely legal matters.

SUKARINA says: "Some time ago I coated the cells of a lens with black varnish, but it has chipped off. Is there anything besides varnish that will effect this purpose, and if so, what is it, and how is it used?"—Make them quite clean, then apply a solution of nitrate of silver and nitrate of copper, heat the cell, and a fine stain will be the result.

R. WORREY asks if there is any difference between the "powder process" and the "dusting-on process," or whether they are the same process under different names? Also where he can get working details of it or them?—The powder and dusting-on are one and the same process. The working details of it will be found on page 466 of our volume for 1885.

LEVEL.—1. Thanks; the subject is one of great interest.—2. In about two weeks.—3. You need not necessarily have two levels in the camera, one will suffice if it is the proper shape. We employ a circular one about one and a half inches in diameter, which is simply placed upon the camera; when the air bubble is in the centre the camera will be perfectly level.

EYLES R. says: "I noticed a microscope lately with two eye tubes, but one seems to enter into the other at an angle. How is it possible for the eye looking into the oblique one to see the object?"—By means of a prism inserted in the tube at or near this junction, which causes the rays of light to be deflected to the requisite angle. Hence both eyes see the same object.

G. B. W. writes: "By this post I send you some negatives which I developed with ferrous oxalate, but they have several spots upon them."—In reply: The negatives came in a smashed state, but sufficient remained for inspection. The spots are caused by the formation of air bubbles at the time of development. Rinse the plates with water before developing, and if any air bubbles form disperse them with a tuft of cotton wool.

J. J. says: "I recently had sent to me in India some albumenised paper, and on its arrival the sheets were all, more or less, stuck together by damp absorbed in transit. Is it usual to send paper out here simply packed in brown paper between boards? Can anything be done to make the paper workable?"—Usually in sending such goods to India they are secured in metal-lined cases, soldered down; then they travel without injury. There is no remedy for the damage done; the paper is worthless, except perhaps for parcelling.

LUX writes: "Will you direct me as to the best means of connecting a really good Beck microscope, with two-inch, one-inch, and quarter-inch powers, to a camera to photograph minute objects to be ultimately shown by the optical lantern? I am entirely ignorant of the method of connecting the two, although accustomed to do tolerably good work with either single."—Tilt the microscope in a horizontal position and connect it with the camera. If the camera will not extend sufficiently to make an image the size desired, an extension cone may be used to connect them.

A. C. W. writes as follows: "I am making myself a detective camera to take instantaneous lantern negatives on quarter-size plates, and ask your opinion as to the most rapid lens I can use for the purpose. Last year I used a lens working at f-8, but that is not nearly quick enough for my present purpose. How would a portrait lens do?"—The quickest lens, and one that will be most suitable, is what is known as an "instantaneous stereoscopic lens," which works at an aperture of about f-3, and will cover a lantern-size plate very well. It is a modified Petzval combination.

J. R. WHITE complains that in mounting prints on glass, as "opalines," he cannot get the prints flat owing to the gelatine setting before the excess can all be squeezed out. The gelatine he says he employs is ordinary dry plate gelatine. The trouble, no doubt, arises from the sample of gelatine being unsuitable, or maybe the solution is too thick. The gelatines usually employed for dry plates are quick-setting ones, and are, consequently, not well adapted for mounting purposes. Our correspondent should obtain another kind with tardy setting properties, such as Nelson's No. 2 soluble.

A SEVEN YEARS' SUBSCRIBER asks how he can obtain a finer ground glass than that generally used for the focussing screens of cameras?—The fineness of the grain is dependent upon the fineness of the emery with which it is ground. To obtain the finest emery, take some "flour emery" and stir it up in a large jar of water; allow it to stand for a few minutes for the coarser particles to subside, then decant the water into another jar. The fine emery suspended in the water will in time settle to the bottom of the vessel, and may then be collected. Now take a piece of patent plate glass and grind it with this fine emery, using a piece of thick plate glass as a muller.

C. WAINE says: "I have been making some experiments in photo-lithography, but with no success. I have not got a lithographic press, so have been using my rolling press, which is a very powerful one. Do you think my failure is due to the want of a proper press or to other causes?"—With regard to the probable cause of our correspondent's failures it is impossible for us to say. In a lithographic press the pressure is a scraping one, and not a rolling one. In experimenting in a new (to him) process, makeshift appliances should always be avoided if possible. Our correspondent may possibly be able to obtain the use of a press at a lithographer's in his neighbourhood, and perhaps the aid of the printer.

A. FRASER.—1. For enlarging by the electric light you require a "focus-keeping lamp." The Siemens arc lamp that you name is one of the best you can have; the price, if we remember rightly, is about sixteen pounds. It is not necessary that you have a dynamo on the premises to feed it, if you can obtain the current from an installation in the neighbourhood. But, mind, it must be a continuous, and not an alternating current.—2. So far as we are aware the process is not commercially worked in England nor is it patented. No fuller working details are given than appear in the article referred to. The details, as in most photo-mechanical processes, you will have to work out to suit your requirements by experiment.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday March 26, at the Gallery, 5A, Pall Mall East.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, March 27, will be *Lantern Matters*. This is a lantern night, the last of the season.

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THE BRITISH JOURNAL OF PHOTOGRAPHY

No. 1508. Vol. XXXVI.—MARCH 29, 1889.

DEPTH OF FOCUS IN PORTRAITURE.

FOLLOWING the reading of a paper *On Depth of Focus* by Mr. Conrad Beck at the Camera Club Conference on Tuesday, arose, in the discussion thereon, the subject of the desirability of lenses for large heads, the construction of which, with a fairly large angular aperture, there should remain a certain amount of uncorrected spherical aberration. This, by removing the acme of definition, optically speaking, from the nose of the sitter, should prevent, by contrast, other planes of the face—the eyes and ears for example—from seeming to be out of focus. Let it be at once understood that our remarks at present are confined to the direct production of large heads, and to this alone, landscapes or copying not here entering into the computation.

Is absolute optical sharpness desirable in a large head? Not by any means. As we stated, microscopic sharpness in one plane—that of the nose for example—while quite undesirable in itself, would be a sorry counterpoise for a serious falling away in the definition of the eye or ear, to which it would act as a foil in virtue of its very sharpness. Far better a pencil-point sharpness throughout than a steel-pen sharpness in one place and a crayon sharpness in another. This kind of definition cannot be obtained by a portrait lens corrected in the highest style by a good optician. We well recollect, when this subject was brought before the the Nottingham meeting of the British Association in 1866, by the late M. A. Claudet, in a paper *On a New Process for Equalizing the Definition of all the Planes of a Solid Figure represented in a Photographic Picture*, this eminent *savant* and clever photographer spoke of excessive minuteness being the greatest reproach made by artists to the best photographic portraiture, in order to obviate which some had suggested taking the portraits a little out of focus. Having combated this from a scientific point of view, M. Claudet showed by what means a compromise might be made, in virtue of which the lens was made to travel backwards and forwards to ensure each plane of the face and figure being brought into sharp focus at one stage of the complete exposure, thus removing, if possible, from photographic portraiture that "mechanical harshness" due to the action of the most perfect lenses. The present writer then suggested that the object aimed after, viz., the diffusion of the focus over several planes, could be better obtained by optical means more specially adapted for the purpose, and he then and there exhibited a portrait of large dimensions made by Mr. H. P. Robinson by a modified triple lens, in which the central element was very much larger than any previously constructed, and which, when worked with full aperture, gave precisely the same class of soft definition as that secured by the more cumbersome system of M. Claudet.

What we desire at present to point out is this, that assuming

crisp definition not to be the desideratum for the special purpose in hand, a single lens, worked at a larger aperture than that at which any high-class optician would care to send it out, will give the effect desired, which we once more repeat is soft in contradistinction to sharp optical definition. The easiest way for a photographer to get this with the means at his disposal, is to take a portrait lens of any make, remove the back combination entirely, and transfer the front one to its place. In this state it will give an image of a more or less confused nature, but by commencing with the largest diaphragm and proceeding downwards, carefully examining the definition at each step, one will be eventually found by which a delicious softness of definition will pervade the image on the ground glass. This, it will be observed, is only a species of landscape lens worked with a larger aperture than usual; but what signifies the nature of the tool, or the name by which it is known, so long as it serves the purpose desired?

BICHROMATE OF POTASH AND ITS PHYSIOLOGICAL EFFECTS.—II.

IN this article we shall indicate more fully the first symptoms of the pernicious effects of the bichromate as used in photography, and the best remedies to apply. As already stated, the injurious action of the salt may be experienced in two different forms. One is from the use of cold and comparatively strong solutions, which result in unpleasant, and sometimes serious, wounds. The other from the more continuous employment of warm and dilute solutions, such as are formed in the development of the bichromated gelatine image in warm water.

The first form of evil is not likely to occur unless there happens to be an abrasion of the skin at the time the solution is employed. We have it, on the authority of those medical men who have given most attention to the subject, that the hands and arms may be continually immersed in concentrated solutions without injury, provided the skin be intact. If, however, it be broken an inconvenience, though not necessarily a lasting one, will be experienced.

Supposing, for example, in using a solution of the salt, there happens to be a hitherto unknown scratch in the skin, it will be immediately rendered manifest by a smarting sensation. Now the part should, without loss of time, be well washed for a minute or two under the tap—the water being allowed to impinge on the place. Then it should be sucked for a few minutes to get out the poison. After this simple treatment no further inconvenience will, as a rule, accrue. If, however, after the lapse of a few hours any smarting is again felt, the part should

be soaked in warm water for a time, and afterwards bathed with very dilute ammonia, followed by poulticing. It is seldom, when this treatment is adopted, that any ill-effects result; but if it is not, a painful wound may follow. An ulcer often forms which continues to eat deeply into the flesh, frequently till it reaches to the bone, and obstinately defying all efforts to heal it; and when the wound does ultimately heal a deep scar remains. We have seen several such scars on the hands of those who have suffered.

This particular action of the bichromate is not confined to human beings alone, as it affects the lower animals as well. Mons. Chevalier and Bicourt, in the *Annales d'Hygiène Publique* in 1863, mentioned the case of a horse, employed in a factory in carrying the salt, which was attacked in one of its legs. The suppuration, they say, went on over nearly half its body, and finally resulted in its death. It is also mentioned by these gentlemen that dogs and cats at the factories, through walking on the refuse, were frequently affected in the feet; and that on one occasion a rat was killed which was found to have all its feet suppurating and partially destroyed.

The second form of evil, that arising from the use of the bichromate in warm dilute solutions when the skin may be intact, takes the form of a disease. It is purely a cutaneous one, and is confined to the hands and forearms, or such parts as come in contact with the solutions. The premonitory symptoms in this instance are an irritation on the backs and sides of the fingers, which if closely examined will show minute watery pustules. At this early stage the disease somewhat resembles one form of *scabies*. Indeed, we have been informed, it was once mistaken for it by some medical students at one of the London hospitals.

When the symptoms above indicated make their appearance, it is unmistakable evidence that precaution should be immediately taken, and remedial measures adopted if further inconvenience is to be avoided. The hands should be frequently washed, using "coal tar soap"—carbolic compounds, it may be mentioned, appear to be generally beneficial at the early stages of the disease. At bedtime strong nitrate of mercury ointment—the *Unguentum Hydrargyri Nitratis* of the *Pharmacopœia*—should be applied, sparingly, but well rubbed into the affected parts. If this treatment be followed for a few days, and the use of the bichromate discontinued, or only employed when the hands are protected with indiarubber gloves, further trouble is seldom experienced. If, however, the use of the salt be continued, and no remedial steps are taken, the disease in time, though sometimes slowly, assumes very unpleasant proportions, such as those described a fortnight back.

In the advanced stages of the disease, when the skin dries up and exfoliates the itching becomes almost intolerable. Then the best palliation is the lotion given by Mr. E. W. Foxlee in our ALMANAC for 1885. It stands thus:—Alcohol, five ounces; crystallised carbolic acid, forty grains; glycerine, four drachms. If this lotion causes a painful smarting, which it may do if the skin is much cracked, a little water may be added, or a dilute solution of the subacetate of lead may be used. But the former lotion is the best if the smarting it produces can be borne. The treatment here described appears to be the best at present known.

Prevention is at all times better than cure. Whenever there is known to be an abrasion or other injury in the skin, that part should be protected from the action of the salt. Also after work, in such operations as developing the gelatinous image with hot water, thoroughly wash the hands in warm water, using

by preference a carbolic soap, and afterwards well rinse them in cold water. In no case should the hands be wiped after using a solution—however dilute it may be, even with the developing water—without first washing and rinsing them under the tap to ensure the removal of every trace of the salt. Furthermore, as soon as the first symptoms of the disease show themselves, all future work should be done in rubber, or other impervious gloves.

The bichromate seems to be very erratic in its action. Many persons have used it even in a very careless manner for a great number of years without ill-effect. Others, on the contrary, have suffered badly after working with it only a few weeks. As we mentioned in the previous article, there appears to be but little risk of ill-effects from the bichromates as they are used in photography, provided proper care, such as above described, be taken, even when working on an extensive scale.

EXPOSING TRANSPARENCIES.

In our previous article we called attention to the necessity for tolerable accuracy in timing the exposures of transparencies, and briefly pointed out the comparative ease with which gaslight exposures may be made with a fair amount of certainty. It is, however, in employing daylight or the more powerful forms of artificial light, such as magnesium, and especially with gelatine plates, that the real difficulties of transparency making will be experienced.

For contact printing on gelatine plates, we should always endeavour to dissuade beginners from even attempting to employ these stronger sources of light, for though in skilled hands it may be possible to get good results, it is almost hopeless in the case of the inexperienced. Not only is it next door to an impossibility to give a sufficiently short exposure to negatives of moderate density—that is to say, to perform the mechanical operation with sufficient rapidity without some elaborate arrangement for the purposes—but it is also to be taken into account that the deposit of silver forming the highest lights of an average negative at the present day is not sufficiently thick to protect the exquisitely sensitive surface from the action of light, however brief the exposure may be. In other words, powerful daylight or magnesium light will penetrate every portion of a negative of ordinary density, and consequently it will be impossible to secure transparent lights or sufficient contrasts in the positive.

We do not mean to say that negatives cannot be made that would be suitable for daylight printing upon rapid gelatine plates, for occasionally such a one will be met with, one which, in fact, requires daylight or similar powerful means, and is incapable of giving a satisfactory result with any other kind of illumination. What we mean is, that unless negatives of special density are made for that purpose alone, the powerful light is not practically available, and to make such special negatives would be to render them unfit for any other style of printing. As gas or paraffin are everywhere available, and in every way superior for contact printing, there is therefore no reason for going out of the way to raise trouble.

With gelatino-chloride or collodion emulsion plates, on the other hand, the more powerful forms of light may be utilised with advantage, even when the exposures are made in the ordinary printing frame, though still with these slower films the exposure must be brief and carefully adjusted. For camera printing on such films, daylight alone can be said to be avail

able to the amateur, as the exposures necessary with gas or similar light are so prolonged, while electric light or limelight are not often likely to be available. With magnesium at its present price that medium may perhaps be pressed into service, but a properly constructed lamp will be needful; and even then it is difficult to see what advantage is gained over daylight, which costs nothing, unless the operator be unable to avail himself of daylight hours.

Turning back again to gelatino-bromide plates exposed in the camera, we have the choice of every kind of light, from daylight to gaslight, the range of sensitiveness of the films bringing them within the scope of all, without necessitating either inconveniently short or inordinately long periods of exposure.

We think, undoubtedly, that the best light for general purposes is daylight, using, of course, diffused light preferably falling direct from a clear sky upon the negative. When we say "clear" sky we do not speak in the sense of "cloudless," but merely of a sky unobstructed on the one hand by terrestrial objects, or having the uniformity of its illumination destroyed by heavy or irregular masses of cloud or broken sunshine on the other. What is wanted is a tolerably even sky, no matter how apparently "dull" if the general quality of the light be good; indeed, a clouded sky is superior to one of unbroken blue, and if the clouds be of the white, fleecy character, the light will be the very best that can be obtained both for uniformity and rapidity.

It not unfrequently happens, however, that a direct and clear view of the sky cannot be secured, or, at least, that it is not conveniently available for printing purposes. Under such circumstances it will be necessary to use reflected light in the manner so frequently described. The reflector may consist of silvered glass, opal, or other dull white surface, as may be most convenient, but the first named is the best for general purposes. For merely printing transparencies it is scarcely needful to resort to any elaborate permanent arrangement of reflector as is usual for enlarging purposes. It will generally suffice to fix the reflector at the proper angle, 45° , on the end of a board which is caused to project outside the window, the negative being arranged in a vertical position on a table within the room, and opposite to the source of borrowed light so produced; the brilliancy of the image produced upon the ground glass will of course depend upon the extent to which extraneous light not passing through the negative is shut off from reaching the lens.

We are often asked what is the relative difference between the exposures required, when direct and reflected skylight respectively are employed; but on this point it is scarcely possible to lay down any fixed rule, as the exposures vary so greatly with circumstances. While in a general way the direct light will enable shorter exposures to be given, this is by no means the invariable rule; indeed, if sunlight reflected from a dead surface be employed extreme rapidity is secured, while the direct light from a cloudless, blue sky will produce a directly opposite result.

In using artificial light, whatever the source may be, some arrangement is necessary for diffusing it equally over the whole surface of the negative. This is a comparatively easy matter with small negatives, such as are most conveniently printed by contact, but become proportionately greater as the transparency is to be reduced from a negative of larger dimensions, say 12×10 , when a condenser becomes, for the amateur, out of the question. With rapid gelatine plates no difficulty, however, exists, on the score of lengthened exposure, in so arranging the

light or a series of lights at such a distance behind a translucent screen as to secure its pretty even distribution, the negative holder and camera being arranged in front of this illuminated screen in the ordinary manner, precautions being as usual taken to cut off as much of the light as possible not passing through the negative. With gelatino-chloride or collodion emulsion plates, however, the exposures under these conditions are extremely protracted.

The subject of development will be dealt with subsequently.

At length we have before us the full details of the dry collodion process spoken of by Dr. Hill Norris at the Birmingham meeting of the Photographic Convention of the United Kingdom in July last, and which created a species of sensation at the time. We shall here give merely an outline of its nature, as the full specification will be published next week. The silver salt is dissolved in the collodion, and the plate, coated with this, is immersed in a bath containing one or other of a mixture of haloid salts, some of which are insoluble in the ether and alcohol which form the menstruum in the collodion. After washing, the plate is subjected to the action of an alkaline bath (hydrate of potash), thereafter to a solution of gelatine, and, lastly, to a dilute solution of a soluble iodide or bromide, by which the silver bromide (or other haloid) is converted into the corresponding iodo-bromide. Modifications are described and full working details are given. The object of the whole is to produce a dry collodion plate of an exalted degree of sensitiveness. The specification is received at too late an hour to permit us at present making any observations on the discovery.

Among those who are about to migrate from this country for a time is Mr. A. L. Henderson, who leaves for Australia and New Zealand on the 5th proximo per *Oceana*, one of the P. & O. Company's ships. He purposes being absent from this country for nearly a year. Mr. Henderson has for some time experienced very indifferent health, which we hope will be fully restored by the voyage. When abroad he purposes visiting most of the leading studios of the southern world. His address will be—c/o Thos. Hodson, Norfolk Villa, Liverpool-road, Sydney.

Our contemporary, *La Nature*, contains in its last issue a very interesting article by its editor, M. Gaston Tissandier, entitled, *The Kite Photograph*, which is an account of a remarkable photographic feat well worthy of being recorded, from its containing the germs of a novel method of photography capable of useful applications. Our readers are familiar enough with balloon photography, and kite photography is not a new idea, its practical realisation having last summer been achieved by a clever amateur, M. Arthur Batout, whose kite is diamond-shaped, and measures over two and a half yards high. The camera is fixed to the edge of the wooden upright of the kite by a triangular support, and the "string" is attached to a kind of trapeze fastened to the kite in such a way as not to interfere with the field of view of the lens, which is an splanatic of 16 metre (about six and a half inches) focus, and used with the full aperture. The exposing shutter is of the simple guillotine pattern worked by two india-rubber springs, and is so arranged that when the exposure is made a little scrap of paper is loosened, and flying in the air indicates that the view is taken. The actual release of the shutter is brought about, not by electricity, as might be expected, but by the burning of a slow match which is lighted when the kite is flown. A further ingenious device consists in the mounting of a small aneroid barometer alongside of the kite. It is kept in a thoroughly light-tight receptacle, and the same match that releases the exposing shutter of the lens causes also a momentary uncovering of the barometer face, and imprints a record of the shadow of the registering needle of the aneroid. Thus a view is taken and a record made of the height of the camera at the moment. It is easy to conceive of the great use that could be made of such an arrangement in times of war, and the character of the negative obtainable is indicated by the accompanying engraving. It is a perfect plan in minia-

ture of the house and surrounding buildings of a farm taken at eleven o'clock in the morning of February the thirteenth last. We may add that the camera and lens weigh 1200 grammes, or about two pounds and a half.

At a meeting of the Academy of Sciences at Paris, on the 11th instant, a paper was read by Paul Poire upon the use of sulphite of soda for development. The abstract given in *Nature*, from whose pages we extract the information, is not explicit, but in its incomplete form is suggestive. "Numerous experiments carried out by the author with a solution of sulphite of sodium, and pyrogallic acid as a developing bath, show that the best results are obtained when the sulphite is in the proportion of twenty-five per cent., with 1.5 gramme of pyrogallic acid added." We do not learn to what it is that the sulphite bears the proportion of twenty-five per cent., nor to how much solution the gramme and a half of pyro is to be added. We are further told that "the developer is slower, but more intense and clearer than when the sulphite contains carbonate; the bath may be used repeatedly, and preserved for months in corked bottles." We gather from this that M. Poire used no alkali or other accelerator but the sulphite itself, and it has long ago been shown in these columns that this was a practicable, if slow, process.

A TWENTY-FIVE per cent. solution, *i.e.*, one four ounces by measure of which contains one ounce of sulphite, is a saturated solution, and if 1.5 gramme is to be counted one and a half per cent., we should then have about the ordinary strength of a pyro developer made with a saturated solution of sulphite. Judging of our own past experience, we think that an image of printing might possibly be obtained in from a quarter to half an hour.

We would draw particular attention to the reputed keeping strength of this mixture. It is quite certain that the full power of sulphite is by no means understood by the majority of photographers. We recently described experiments we had been making to ascertain the best proportion to use this salt in ordinary alkaline development, and to that article we would refer readers interested. There is one point that may be further elaborated. If a solution containing sulphite three grains to pyro one grain be used, the gradual colouration will soon supervene, so that at the end of half an hour the developer used for several plates in one dish would be too discoloured for comfort. If the large proportion of twelve grains to one be used, the solution at the end of that time would be little discoloured if placed in an open measure and allowed to stand till next day, and would be quite free enough from colour to permit of comfortable development.

CONFERENCE OF THE CAMERA CLUB.

THE Annual Conference of the Camera Club was held on Tuesday and Wednesday in the house of the Society of Arts. The attendance was fair, although scarcely up to that of previous years. Captain Abney presided on both days. The following is a list of the papers that were read:—

Tuesday, March 26, at 2 p.m. Conrad Beck, *Depth of Focus*; J. Brett, A.R.A., *The Relation of Photography to the Pictorial Art*; P. H. Emerson, *Science and Art*; Lyonel Clark, *A Comparison of Developers*; Captain Abney, F.R.S., *The Law of Error and Photography*; T. R. Dallmeyer, *Shutters*; G. Lindsay Johnson, *A Shutter Speed Measurer*. At eight p.m., exhibition of lantern slides in the theatre; slides from Paris, Vienna, American, and English societies.

Wednesday, March 27, at 10 a.m. C. H. Bothamley, *Chemical Changes from the Modern Point of View*; A. A. Common, F.R.S., *Irradiation in Astronomical Photography*; A. Dawson, *The Field of Photogravure*; W. T. Wilkinson, *Dry Plates for Photo-Litho and for Collotype*; A. Pringle, *Photo-Micrography*; Captain A. M. Mantell, R.E., *Photography applied to Military Purposes*.

In the evening of Wednesday the annual Club dinner took place at the Holborn Restaurant, a large number of members and friends being present. Captain Abney presided.

CRYSTAL PALACE INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—II.

IN our issue for January 4 for the present year we spoke of a new camera, possessing several novel and excellent features, which had just then been finished by Messrs. Watson & Sons, High Holborn, which we described as folding into a smaller compass, and being lighter and more portable than any other pattern we had hitherto seen. Since that time this new style of camera has been manufactured, and has received a distinctive name, "The Acme." Of this style there are several sizes in the Exhibition, ranging from half-plate up to 15×12. By the aid of diagrams we shall endeavour to give a description of it in detail. Commencing with the baseboard. This is fitted with a combined turntable and tripod head, which, although light, yet looks very strong, being made of metal, and turned accurately into the baseboard, as shown in the cut.

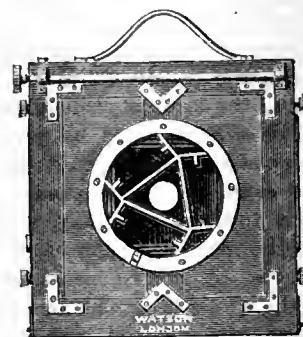


Fig. 1.

When fully extended, the camera presents the appearance shown in fig. 2.

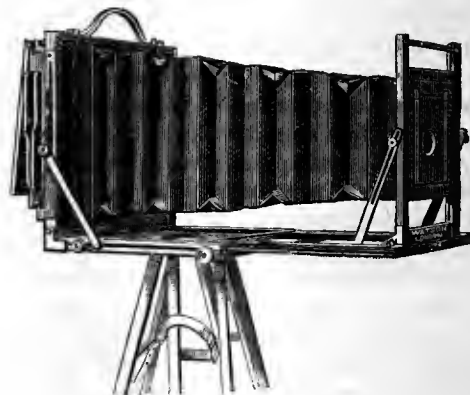


Fig. 2.

One among the several features in this is, that the front and the back may be brought very close together, without the baseboard protruding to interfere with the angle of view, no matter how great.

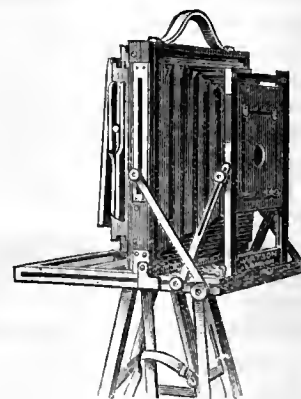


Fig. 3.

This peculiarity is shown in fig. 3. As we have previously said, the portability of the camera and the saving in size is very apparent, espe-

cially in those intended for plates of the larger dimensions. The back has reversing frame for vertical or horizontal pictures, and also swings in both directions. The drawings show the mechanical features with sufficient plainness to obviate the necessity for further descriptions. It is admirably made.

This firm also exhibits a fine 24 x 24 camera, of their "Premier" pattern, mounted on a mahogany studio stand, which would have delighted the heart of Jabez Hughes could he see it, for it is an outcome of his original Archimedian stand, which has here been subjected to a high process of evolution. This one has a spiral rack and pinion for raising and lowering, the same that is usually employed in many microscopes of the higher class, the advantage of which is that the cogs of the wheel never leave the teeth of the rack, which responds to the slightest movement without any backlash, and works with perfect smoothness. The arrangement for tilting the camera is exceedingly perfect, an important feature when one considers the great size of the instrument. They also show a fine specimen of their ordinary studio cameras; this one being 15 x 12, with double swing backs, operated by rackwork. The dark slide is made with a roller shutter, and the interior of it is fitted with a mechanical carrier to suit every size of plate. Tourist cameras, detective cameras, universal studio cameras; tripods of every kind, both for tourists and cyclists; enlarging lanterns; shutters of various kinds; optical lanterns; various styles of lenses, with and without iris diaphragms, complete the summary of the Watson exhibit this year.

An attractive feature in the Polytechnic School of Photography is a sailing boat, designed and fitted for photographing in shallow waters. The boat, as a boat, is arranged in a tempting manner, but its *raison d'être* is a fixed stand, on the top of which swings a somewhat large camera, the level position of which is insured by a pendulum-like appliance, which hangs below and dips into a tank intended to be filled with some slightly viscid fluid, such as glycerine. This "School" also shows a variety of other useful photographic appliances, including specimens of illustrations of the silver-gold printing process, described last year by Messrs. Howard Farmer and H. K. Tompkins at one of the meetings of the Photographic Society of Great Britain.

Mr. A. R. Wormwald, of Sutton, Surrey, exhibits an enlarging apparatus, which he designates "The Al fresco." It may be roughly described as a telescopic baseboard, lengthening out to about 5 feet 4 inches, and closing to 2 feet. There is a camera at one end of the base-



Fig. 4.

board, with bellows of the necessary length in proportion to the size of the apparatus, and filled with screw winch for adjusting the focus. The bellows is provided with a sleeve, in which is inserted the hood of the lens of a smaller camera containing the negative to be enlarged. Suitable arrangements are made for illuminating the negative that is to be enlarged, and also for receiving and holding flat the bromide paper on which the enlargement is to be made, this being of a nature somewhat similar to a printing frame. We presume the name is given from the apparatus being made ready for use at any moment, no preparation being required. "The Archon" may be considered as the antithesis of the "Al fresco," being intended for the production of lantern slides by reduction from larger negatives. It is in all essential respects similar to the foregoing one, only the light is projected into the camera from a reflector placed at the large end; but its nature is shown so very plainly by the accompanying cut that no further explanation is necessary.



Fig. 5.

Under the general title, Photographic Apparatus and Sundries, The Photographic Artists' Company Supply Association, of Charterhouse-square, exhibit cameras of various classes, including "The

Empress" and "The Standard;" lanterns, lenses, mounts, camera stands, studio furniture, with other appliances for use in the studio.

Among the exhibits of Taylor, Taylor, & Hobson, of Leicester, we observed the outcome of one feature which we have repeatedly mentioned with commendation, either as a desideratum or as having been accomplished by other makers of lenses. We allude to casket sets of lenses of various foci, all of which are capable of fitting one mount. One of these, for example, comprises a rapid rectilinear, mid-angle rectilinear, ordinary landscape, and wide-angle landscape; much ingenuity being displayed in bringing the zero of each cell—if such a term might be used—opposite to that of the scale by which the iris diaphragm is opened or closed. A battery of lenses of this class is, we need scarcely say, of great utility to the photographer. Besides these, this firm also exhibits quite a variety of landscape, rectilinear, portrait, detective, and other lenses and instruments. Shutters also form a section in their exhibits; in like manner do view finders, photometers, camera spirit levels, and appliances of a like nature.

Several months ago we described in these pages a most ingenious machine for engraving letters, figures, or designs, either on a flat plate or on the cylindrical surface of a lens mount. The machine in question also forms part of the exhibits of Messrs. Taylor, Taylor, & Hobson.

Among the various exhibits of Messrs. R. & J. Beck, Cornhill, we find several novelties, which include a stereoscopic hand camera, of different design to any we have hitherto seen. It takes pictures



Fig. 6.

on 6½ x 3½ plates. The shutter consists of a plate of metal passing through both lenses, thus opening and closing both by one continuous action. It is provided with Newman's pneumatic brake, giving exposures from one second to one-hundredth of a second, and with iris diaphragms worked by the same lever, which registers on a scale at the bottom of the box. Its general configuration is shown in the above diagram. Like most of the other hand cameras now in use, this can be used for time exposures on a tripod.

Their exhibit also includes rectilinear lenses of various degrees of rapidity, and a new series of autograph combination lenses. Cameras, stereoscopes, view finders, focussing glasses, shutters, lanterns, together with complete photographic apparatus, sum up the exhibits of Messrs.



Fig. 7.

Beck. We give an illustration of the mount for the combination series of lenses just referred to, to which a variety of lenses of different foci are adapted.

ECHOES.

My colleague, "Free Lance," in a late issue has some remarks on the subject of coloured screens in orthochromatic photography, from which, if I read him correctly, I must dissent. He says, "It is certain that no danger to definition need be apprehended from the use of screens" if a series of exposures are made in a reasonable time. I fancy the "printer" must have been "at work," for the meaning of the sentence as it stands does not appear very clear.

I scarcely think it can be meant that ordinary screens, *i.e.*, common glass, even of good quality, can be meant, for surely one who "knows his way about" as well as "Free Lance" does would scarcely make such an assertion: probably he intended to say "such screens," referring to the stripped collodion films just previously mentioned, in which case I quite agree that, properly used, little if any effect upon the defining power of the lens would be produced. But even then the thin collodion pellicle must be strained tightly over a suitable frame so as to present a perfectly plane surface, and this is not always an easy job.

The best coloured screen I have ever tried for the purpose, and I have used many, consists of a small disc of microscopic "covering glass" coated with stained collodion, and recessed into a piece of metal or card made to fit the diaphragm slot. If a perfect piece of the thin glass be selected, such as would be chosen for a slide to be used with high powers, the interference with the definition is, so far as my experience goes, quite undiscoverable, and I do not think there need be any surprise at the result. If such covering glass can be interposed between a test object and a high power without serious injury to definition, it is not likely to entail much trouble with the rougher work of the photographic objective.

Coating the lens itself with coloured collodion is effective so far as result is concerned, but objectionable on many grounds; but I have found even that method destroy the definition in one particular instance—that of a French portrait lens of very old make. A perfectly sharp image on the focussing screen became hopelessly blurred on the plate, while by racking it out of focus on the ground glass a well-defined negative was the result. No doubt the method of correction had something to do with the ease.

The *Flash Light Experiences* of "Guncotton" are interesting as proving that practical work can be done with very simple appliances, for surely nothing could be much simpler than the means he adopted for fancy dress ball portraits. This kind of experience is not, in actual practice, the plain sailing that previous arrangement and careful calculation apparently reduce it to, and on more than one occasion I have really pitied the poor photographer in his endeavours to face his sitters with an unruffled countenance in spite of untold worries. These worries would not, I should think, be lessened by the substitution of an ordinary guncotton "flash" light for the more carefully got-up electric installation, but the securing of a large number of negatives bears testimony to the feasibility of "Guncotton's" plan.

I formerly referred to this subject, and especially to Mr. A. L. Henderson's proposal to incorporate magnesium powder with celluloid, to which objection was raised in some quarters that the most explosive kinds of guncotton are not sufficiently soluble for the purpose. Since that I have tried an "idea" which may be of use, and seems to answer well. Thin Swedish filter paper was treated with cold concentrated acids to make the most explosive compound. When dry, two pieces of this were dipped into enamel collodion, quickly dusted with magnesium powder, and pressed into contact until dry. Result, a magnesium sandwich of excellent "flashing" power.

While on the subject of magnesium lighting, I note in a late issue, simultaneously with my mention of Mr. Henderson's proposed celluloid and magnesium mixture, the report of that gentleman's actual experiments in that direction. With regard to the objection raised at the meeting on the score of the dangerous character of the mixture owing to the admixture of chlorate of potash, I should judge, from my knowledge of the properties of celluloid, that the danger is chiefly imaginary, or, at least, that it is infinitely less than in the case of chemical mixtures containing that ingredient. Both celluloid and powdered magnesium may be regarded as practically inert substances chemically, the mixture being, in fact, a purely mechanical one, in which the particles of chlorate of potash are isolated and protected by the celluloid, which acts the part of an insulator.

Moreover, the mechanical admixture of the two substances in powder with the liquid celluloid or collodion would, I should think, tend to remedy the defect I alluded to last week, namely, the want of porosity; by breaking up the otherwise horny mass into a more spongy form, and by the provision of an additional supply of oxygen the combustion should be easy and rapid.

The question of comparative solubility is the point which strikes me as being of greatest importance, for, as is well known, the explosiveness of the different forms of nitro-cellulose varies almost inversely with its solubility. But this I think refers chiefly to the *rapidity* of combustion, which, in a manner, constitutes explosiveness. This characteristic is conferred upon the preparation by the employment, in the process of manufacture, of strong acids and a low temperature; the reverse conditions being conducive to the production of a soluble or photographic pyroxyline. But the highest of "high temperature" cotton, though it may not ignite with explosive violence, undergoes complete and rapid combustion when submitted to a sufficient heat; and in the comparative slowness of its firing perhaps serves its purpose—the thorough ignition of the magnesium—more perfectly than the more explosive kind, except when really "flash" exposures are required. In fact, when exposures of any duration are given I believe the less explosive kinds of guncotton will be found to answer best.

Another form in which nitro-cellulose can be conveniently employed for this purpose is in the shape of papyroxyline—"Chinese lightning" I think the toy shops call the little scraps of paper treated with nitro-sulphuric acid, and impregnated with a metallic solution to colour the flame. A drawback in employing ordinary guncotton is that if the powdered magnesium be thoroughly incorporated in its fibres, the mass is clogged and combustion retarded, a slight flash being succeeded by the slow incandescence of the bulk of the powder. On the other hand, if scattered only loosely over the pyroxyline much of the magnesium is blown away unburnt; and this is not only wasted, but gives rise to great uncertainty in the matter of the precise amount of light supplied. But by the substitution of papyroxyline the "flash" material is obtained in an equally combustible form, and with a far more extended surface, over which the magnesium may be sprinkled with any degree of thinness, so as to present as little retarding effect as possible on the combustion. By this means not only is the metal fully utilised, and therefore economised, but a large area of flame can be secured without the necessity for employing dangerous quantities of the explosive; and by suitably dividing the material the exposure may be varied to any extent. I will give Mr. Guttenberg the benefit of this suggestion for his time "train."

JUNIOR.

SITTERS AND THE COPYRIGHT IN PHOTOGRAPHS.

The latest exposition of the law of copyright in photographs is contained in the case of *Pollard versus Photographic Company*, which is reported in the current (March) number of the Law Reports. The case is of considerable importance to portrait photographers, whether professional or amateur, the essential facts being these:—The Photographic Company carry on business at Rochester, whither Mrs. Pollard went one day to have likenesses of herself taken from negatives made by assistants of the Company. Apparently when she sat for her likeness no special terms or conditions were mentioned between herself and the photographer, the transaction being one of the ordinary kind, thousands of which take place every day. Mrs. Pollard, who is presumably a lady of considerable attractions, subsequently found her physiognomy figuring upon and embellishing a Christmas card, with the superscription in leafy letters, "A merry Christmas and a happy New Year," and a copy of this card was exposed for sale in the shop window of the Company. Mrs. Pollard thereupon brought this action in the Chancery Division of the High Court to restrain the defendant Company from selling or publicly exhibiting copies of her likeness, and has succeeded in obtaining a perpetual injunction against the Company, who also had to pay the costs of the action. The judgment seems to be in accordance with common sense and natural justice, but the real interest to photographers lies in the arguments used by the counsel on either side, and in the remarks of the learned judge before whom the case was argued.

Mrs. Pollard, as is usual with most sitters, had not registered any copyright in her photographs, so that the judgment in her favour depends in nowise on the copyright acts, the case being decided simply on the common law rights of contract and property.

From the official report, which virtually now swells the law on the subject, it may be gathered that a photographer who has been employed by a customer to take a portrait is not justified in printing copies of such photograph for his own use, and selling and disposing of them or publicly exhibiting them by way of advertisement or otherwise, unless the customer has given him an "implied" or "express" authority to do so. Now the contract "implied" by law (there was no "express" contract) which was entered into between the parties when Mrs. Pollard sat to the photographer on this occasion was that he contracted not to use the negatives for any other purpose save for supplying her with copies. There is, therefore, a difference between a sitter who pays the operator for the photographs and the case where a snap shot results in a likeness secured. In this latter instance there is no contract implied, or express to take the likeness; there is no consideration for the work and labour done; there is no money payment made to the photographer, and, therefore, it may be presumed that if the portrait thus acquired does not transgress the rules and regulations of the law pertaining to libel, if it be not calculated to expose the person, for instance, to contempt or ridicule, the photographer may sell it or exhibit it. As one of the counsel argued for the defendant Company in this case:—"A person has no property in his own features; short of doing what is libellous or otherwise illegal there is no restriction on the photographer using his negative." From this it would appear to follow that where an amateur photographer gets a person to sit to him the artist has a right to exhibit the portrait because there is no contract that copies are only to be supplied to the sitter; there may even be no contract to supply him with copies at all, and, further, there is no consideration, no *quid pro quo*. The sitter sits to please the artist, the artist takes with the full intention of exhibiting the result if it prove satisfactory. That the amateur photographer intends to make some such use of the negative would be in the contemplation of both parties at the interview, though not actually mentioned. This is different from the case of Mrs. Pollard, where Mr. Justice North says:—"The phrase, 'a gross breach of faith,' used by Lord Justice Lindley in that case" (*Tuck & Sons versus Priester*) "applies with equal force to the present, when a lady's feelings are shocked by finding that the photographer she has employed to take her likeness for her own use is publicly exhibiting and selling copies thereof."

It was argued for the Photographic Company that inasmuch as the property in the glass negatives was in them, that they were only using their own property for a lawful purpose. In reply to which the learned judge observed, "But it is not a lawful purpose to employ it either in breach of faith or in breach of contract." This is the pith of the whole case—contract, breach of contract. Similarly there is a well-known case as old as 1753 (*Duke of Queensberry versus Shebbeare*), where the defendant was restrained by injunction from publishing a work, although a person had been expressly allowed by the owner to make and retain as his own a copy of the MS, which copy he had sold to the defendant; an agreement that the MS was not to be published was here implied. So also a student may not publish a lecture which he hears and takes down in shorthand; and the receiver of a letter may not publish it without the writer's consent, although he might argue, like the photographer with respect to his glass and chemicals, that the property in the paper and ink is in him.

Though, as has been said, this case did not go off upon any law of copyright, still, as a matter of fact, the copyright in a photograph, where the sitter sits to the photographer in the usual way of business, is in the possession of the person whose features are portrayed. There is an act (25 & 26 Victoria, c. 38, s. 1) which provides that when the negative of any photograph shall be made or executed for or on behalf of any other person for a good or a valuable consideration, the photographer shall not retain the copyright thereof, unless it be expressly reserved to him by agreement in writing signed by the person for or on whose behalf the negative is made; the copyright in the photograph shall belong to the sitter. Therefore, if a photographer wishes to make any other use of a sitter's photograph other than supplying copies to the sitter's order, he should get the sitter to sign

a written agreement that the copyright is thereby given to the photographer, who should pay something, even though a very small coin, for the same, and this sum should be mentioned in the agreement as the consideration.

But though the sitter paying for his photograph has thus a right to the copyright in his own features, by statute law he can bring no action against any one for infringement of his copyright until he has registered the same in the usual way at Stationers' Hall.

J. HARRIS STONE, *Barrister-at-Law*.

THE COMPOSITION OF HYDROQUINONE.

I wrote a fortnight ago that I had placed three samples of hydroquinone over sulphuric acid *in vacuo*, intending to leave them for a week in order to see if they gave up any water, and if so, how much. I should have given the result at the end of my article last week, but, unfortunately, I clumsily lost a minute quantity of one of the samples in removing it from the desiccator, and that one, of course, the most important. However, having now repeated the trial I can report.

All I have to say is, that after seven days, or, in the case of my repeated experiment with permanent hydroquinone, eight days, exposure over the strongest sulphuric acid, in a vessel partially exhausted of air, I have found absolutely no loss of weight, at least none that I can detect with the aid of a tolerably sensitive balance. The quantities operated upon varied from between six and seven to between nine and ten grains, and considering that the balance used will turn easily with the one-hundredth part of a grain, any moisture given up must have been at any rate less than one-sixth of one per cent. of the total weight—a very different proportion to that spoken of by Mr. Levy.

I said a fortnight since that if I found no appreciable loss of weight I should consider that the formula and composition of hydroquinone require revision. My reason for saying this was that if water were present simply from imperfect or insufficient drying of the crystals, or as a wilful adulterant, the treatment given could not fail to remove it, or, at any rate, the bulk of it. If present as water of crystallisation it might or might not be given up to sulphuric acid, but sublimation would be certain to separate it.

But since I wrote those words I have come to the conclusion that it is impossible that hydroquinone can exist in two states—i.e., anhydrous and hydrated—otherwise one would imagine that at least some of the numerous chemists who have examined the substance would have mentioned the fact. Yet such is not the case, nor is there the slightest doubt as to the formula and composition of hydroquinone. I can only conclude, then, either that the water Mr. Levy found was the result of imperfect drying, which does not seem likely from my own trials, or that he has come to an erroneous conclusion. So large a proportion of mechanically contained water is a very unlikely occurrence in these days.

If combined water were present it would be found in some definite proportions—so many equivalents or molecules. The figures given by Mr. Levy for white and yellow hydroquinone respectively, namely, 12.8 and 27.3 per cent., fall not a great distance away from the theoretical proportions of water that would be found in samples containing one and two molecules of water. These theoretical quantities would be a trifle over fourteen per cent. for the one and barely twenty-five per cent. for the other, and the approximation is sufficiently close to offer encouragement as an explanation of a discrepancy between results expected and those obtained, and I cannot help thinking that Mr. Levy has set down to "water" what must be sought for elsewhere.

Since I wrote last I have crystallised a quantity of hydroquinone from hot, dilute, sulphuric acid, and after drying thoroughly, have boiled, fused, sublimed, and otherwise misused it, without obtaining the slightest trace of the manifestations of SO_2 that can easily be got from the yellow crystals.

W. B. BOLTON.

THE LATENT IMAGE AND DEVELOPMENT: A THEORY.

At various times a great number of different theories have been proposed to explain the mystery of development. A few of these hypotheses are good or at least ingenious, and are to a certain extent supported by the facts; others are independent of such adventitious

support and stand alone, firmly rooted in the imagination of their inventors. I wish to add another to the already large number of explanations, hoping to be enabled to call up sufficient facts as witnesses to testify that the theory I am about to describe has at least as much, if not more, foundation than any of the others.

What the scientist calls an explanation can never in the nature of things be final. On the contrary, an interpretation of any set of facts always opens to view new and unexplored regions of nature. Science has been aptly likened to a sphere always growing, and so coming into widening contact with ignorance. It is common, though wrong, to speak of a fact or an experiment as having been explained, when in reality it is only classified along with others of its kind. We are often able to show that many phenomena hang together and must depend upon the same principle, without our being able to tell what that principle may be. This process of classification forms a very important step towards a true explanation, though it is not itself worthy of that name.

The operation known as redevelopment in the wet collodion process appears to me to furnish the key whereby to interpret all the phenomena depending on the "latent image." In this operation we make up a solution containing ferrous sulphate and silver nitrate. If these solutions are mixed in a concentrated state, a precipitate of metallic silver is produced immediately; if, on the other hand, both solutions are dilute, the precipitation of silver takes place very slowly, though it is eventually complete. The collodion negative before redevelopment contains all the detail but is very thin. The redeveloping solution forms a deposit of silver on the image and not on the clear parts of the negative; in other words, the silver is deposited on the silver already existing in the film. In some mysterious way, then, the presence of metallic silver assists the decomposition of the very unstable mixture of silver nitrate and ferrous sulphate.

A great number of similar cases are known to chemists, a few of which I may cite here; they are usually known as "nuclear" actions. The formation of crystals of any sort indicates that the substance crystallising has a preference, so to speak, for its own company, and can deposit itself more readily upon a piece of its own substance than elsewhere. Most substances will crystallise upon any sort of a nucleus, and the crystals start from specks of dust in the liquid or from the walls of the containing vessel. But there are other substances which will only crystallise when a nucleus of a particular sort is provided. Sulphate and acetate of soda are the best known instances, these substances being apparently almost incapable of crystallising until a nucleus of the salt itself is provided. Most metals when thrown down from solution show a tendency to crystallise. For instance, when a rod of zinc is placed in a solution of a lead salt, the zinc is dissolved and metallic lead deposited at first on the surface of the zinc. After a time points begin to grow out, the lead is deposited more rapidly on these points than elsewhere, so that they may grow to a relatively great length, say two or three inches, forming the so-called "lead-tree." A similar phenomenon occurs when a globule of mercury is left in contact with a strong solution of silver nitrate, the silver being precipitated in brilliant needles sometimes an inch or more in length. I cite these instances to show that metallic particles which are seeking a resting-place seem to have a preference for depositing themselves upon others of their kind. Although crystallisation is probably a chemical phenomenon depending on the combination of a substance with itself to form heavy molecules, or a polymer of high molecular weight, little is definitely known of the nature of the changes which accompany crystallisation.

For this reason it may be well to mention a few other chemical actions which start from a centre or nucleus of one sort or another. To this class belong many of those actions which are difficult to start, but which, once under way, go very rapidly. When a solution of chloride of calcium is mixed with sulphuric acid of a certain strength, no change is apparent for a few minutes or longer, then a cloud of calcium sulphate appears, and in a second or two the liquid may turn solid from the rapid formation of a dense precipitate. One other instance will suffice. Sulphurous acid acts upon iodic acid (not hydriodic), reducing it, and causing the separation of free iodine, or if starch be present in the liquid, of iodide of starch, which, as is well known, has a splendid blue colour. With solutions of ordinary strength this reaction appears to be instantaneous, but if the solution of iodic acid be extremely dilute, it may be mixed with the sulphurous acid and starch without any change being apparent for a time, which depends on the amount of the dilution. The reaction begins from some point in the liquid, and in a moment the whole turns of a magnificent dark blue. This experiment is in its way one of the prettiest in the whole range of chemistry.

I have dwelt thus long on these phenomena in order to show that

in the explanation I am about to propose I am not drawing on my imagination, but am attempting to class development along with a number of other phenomena, some at least of which are fairly well understood.

When bromide (or other haloid) of silver is exposed to strong light metallic silver is formed and bromine set free. Any one may convince himself of this by taking an ordinary gelatine plate into strong sunlight, when the odour of bromine will be quite perceptible. As to the sub-chlorides or bromides of silver, I consider their existence to be still questionable; the substance taken for sub-chloride of silver being, in many cases at least, merely a very intimate mixture of metallic silver with unchanged chloride. Now, if strong light can cause the separation of metallic silver in a visible quantity, it is obvious that feeble light may cause the separation of an amount of silver which is not detectable by optical examination. All developers are reducing agents, or substances which can cause the decomposition of a compound of silver with separation of the metal. Now at last we have all the conditions necessary: first, for the formation of an invisible or "latent" image; secondly, for its conversion into a visible negative. In the gelatine film there are particles of bromide of silver. When the plate is exposed to light, an extremely minute proportion of some of these particles is decomposed, and the number of particles in this way effected is proportional to the amount of light falling on the film. When the plate is developed the silver bromide is reduced, and this takes place first or most easily where there already exists a nucleus of silver to start the action. In other words, the greatest amount of metallic silver will be produced at the place where the light has acted most strongly. The reducing action of the developer is assisted and encouraged by the presence of minute particles (conceivably single atoms) of silver in certain parts of the film; at other places, *i.e.*, in the shadows, the action is not thus aided, the developer acts but slowly, and the operator has time to remove the plate from the solution before any perceptible reduction has taken place. This, then, is my theory in its outline. There are several minor points which are worthy of attention.

Although I have spoken of gelatine emulsion plates, it is self-evident that the exact same explanation will apply equally well to the collodion process.

The question has been often asked why gelatine plates are so much more sensitive than collodion. The usual answer is that it is due to the properties of the gelatine, which is much less stable than collodion, and, in fact, acts like a feeble developer. This explanation is at the best incomplete, for, if it were true, all that would be necessary to make collodion plates as quick as gelatine would be to use a developer so far stronger as to compensate for the indifference of the material of the film. I propose the following as an hypothesis, not as a full explanation:—The silver salt exists in the film in distinct minute particles, each of which must be supposed to consist of a very large number of molecules. Under the influence of light, points of metallic silver are produced in the particles of precipitate, and when the plate is developed these serve as nuclei, and lead to the decomposition of the particle in which they are situated. Now it is only natural that the range of the nuclear action should be bounded by the particle of silver salt, and should not extend through the material of the substratum so as to affect the neighbouring particles. This means then, that supposing light to produce a given amount of reduction in a number of different plates, and these to be all developed in the same way, the greatest amount of reduction will take place and the darkest image be produced in those plates in which the particles of silver salt are the *largest*. This is the reverse of what might be expected, as most chemical actions proceed more rapidly the more finely divided are the reacting substances. The increase of sensitiveness of an emulsion by long boiling may be accounted for in a similar way. Every analyst knows that freshly precipitated silver chloride is quite unmanageable, passing through even the thickest filter papers, and refusing to subside to the bottom of the liquid. On digesting the precipitate for a considerable time its particles aggregate and become much heavier, so that they settle down rapidly and are stopped by filter papers. The same process occurs, no doubt, during the boiling of an emulsion, only that in presence of the gelatine the process of aggregation would be much slower. The different physical condition of the sensitive salt in collodion and gelatine plates is readily explained by the different processes of formation; in the former case gradual diffusion into a film of extremely compact substance, in the latter sudden precipitation by mixture of liquids. We would expect to obtain a coarser precipitate in the latter case, and I believe it is true that the grain or texture of a gelatine negative is more pronounced than that of a collodion one. It seems to me possible that microscopic examination of plates prepared from an emulsion at various stages of the boiling process might

show whether there is, in fact, any increase in the size of the particles of silver bromide. The experiments would not be easy, and would require a very good microscope with graduated measuring apparatus, and even with the utmost care I should think it very questionable whether any definite result would be obtained. It is quite possible that though boiling might cause a real aggregation of the particles, the microscopic examination might lead one to suppose that the change was one of disintegration; such an appearance being caused by the breaking up of minute flocks of silver bromide, formed at the moment of precipitation. But all this is merely speculative; I have not made such investigations, and at the present see no prospect of having leisure so to do. I stated at the beginning that what I had to bring forward was only an hypothesis, and far from a complete, sound explanation, and now I may as well admit candidly that there are several peculiarities of sensitive films which I can by no means see my way to explaining by the theory described above. The chief of these knotty questions is the reversal of the latent image by over exposure. Another is the fact that gelatine plates are more sensitive when dry than when wet. This last may perhaps be explained in this way: The water covering the film may absorb the bromine rendered free by the action of light, and allow it to recombine with the silver and so destroy the latent image. It would not be difficult to "evolve" explanations of the reversal, but to that sort of thing there is no end, and I hesitate to enter on the war path of speculation, "for that way madness lies."

C. I. BURTON, B.Sc., F.C.S., F.R.S.E.

MERCURIAL INTENSIFICATION IN RELATION TO GELATINE NEGATIVES.

IN treating of this subject as related to the stability of collodion negatives in page 806 of the last volume of the *BRITISH JOURNAL OF PHOTOGRAPHY*, I promised to give the results taken in the same systematic way of a similar treatment of gelatine negatives since their general introduction.

Before entering on that subject, however, it may be mentioned that as one result of that exhaustive examination a series of experiments have been entered on and carried through which go far to show that the causes of the different varieties of fading there described were due principally to insufficient washing out of the mercury from the collodion film, aided by the latter being in some cases of a more or less porous nature than others. The more porous the film the more difficult, as a matter of course, is it found to remove the last traces of the soda, and these were found, or believed to be, the cause of the failures referred to.

In examining the gelatine series of negatives which have been produced within the last half a dozen years, I found, much to the annoyance of my professional friend, that the *quality* of the *clichés* in the gelatine series are by no means up to that of his collodion work. This is not so marked, say, within the last two years, but at the beginning of the gelatine period the difference is most marked. This may be most easily accounted for by the fact that the process was a comparatively new one and worked "per instructions." In such a case, as it must have been in many, if not most, of the professional studios, the results show that the work was pretty much hit or miss; in fact, if a very special subject had to be done, the old collodion was invariably resorted to in addition to the newly introduced gelatine dry plates, and, in most cases, to the disadvantage of the newer process, as might have been predicated.

Still the inveterate use of mercurial intensification is distinctly visible, and to attain rapidity with the collodion process the most attenuated and sensitive films were made use of, and the negatives, without the use of the mercurial intensification, would have been useless, would have been simply positives, with all the fine qualities of that class of work rendered permanent by the intensification referred to.

It was at this stage of the investigation that we found what I believe to be the true key to the failures with the use of the bichloride intensifier.

The spongy nature of the gelatinous surface of the (then) new plates far excelled that of the most porous collodion, and the necessity of (I had almost said) excessive washing, not being considered, we found the results to be as might have been expected, viz., a very large percentage of the plates which had not been looked up for, say, the last five years, practically useless as *clichés*.

The greatest curiosity was that not one of the collodion negatives taken as duplicates showed the slightest signs of deterioration. This may be accounted for by the comparatively slight deposit of reduced silver forming the image, and also as a secondary element, that very few of them had been subjected to the severe strain of a very large number of impressions being taken from them.

As we came down the series of negatives, it became evident that greater knowledge of the process, increased power of handling and management, came into operation, and this brought what is the one thing necessary: the capacity of producing the negatives without the need of intensification in any form.

It would be needless here to say that almost every form and kind of gelatino-bromide emulsion was made and tried with the usual averages of success and failures as there must be in all new, or newly attempted, processes; but this may be said now that, after thirty years' experience, and over twenty of that working the late Mr Lacy's (of, I think, the Isle of Wight) mercurial intensification, he has come to the very sensible conclusion that the best negatives which are got are those which need no intensification beyond the first development.

In reference to the failures—and they were many—it may be said that in every case that I examined, whether critically, chemically, or analytically, the cause of failure seemed to be the retention of the atoms of bichloride of mercury in the body of the film. In the case of the collodion, it must have been imperfect washing in the first instance, and exposure to light, air, and actinism in the second, allowing the imprisoned atoms to act at their own sweet will on the reduced silver, which had as yet been untouched by the intensifier; and in this instance the practice of showing the customer the partially blackened collodion negative, which showed as a fine positive, must have conducted to the large number of failures of the process.

With the gelatine plate this tempting method is impossible, but it renders it all the more imperative that the most thorough washing of this most insidious friend of a weak negative should be washed out of existence in every instance in which it is made use of.

To conclude, I may mention that the number of destroyed and deteriorated negatives taken by the gelatino-bromide process and intensified with mercury in the way I have described and gone over on the photographer's holidays, bad days for ordinary work show about an average of three to one against the gelatine; but while by no means liking mercurial intensification in this exhaustive examination, I must jot down that I believe the failures are more due to careless work than to the process itself.

W. H. D.

PHOTO-MICROGRAPHY.

[A Communication to the Camera Club.]

I AM sure that every one here will feel with me and sympathise with me in the difficulty that I have in properly treating the subject which is before us to-night, because although my audience is very large—for the rooms—and considering the subject fairly respectable, still I am well aware that there are three very distinct classes among you:—1st, Those who know nothing whatever about the subject; 2nd, Those who have certainly attempted the work which I wish to speak of; and 3rd, A class—the one I fear most of all—who know a very great deal more about the matter than I do. It is, probably, perfectly well known to all of you that of late years photo-micrography has come very markedly into public notice. There is hardly a branch of science which has not called in the use of photo-micrography, and for certain reasons the practice of photo-micrography has also been very greatly of late years improved. The results are very superior to anything that could have been produced a few years ago. Part of my task to-night will be to dwell upon what I conceive to be the reasons that have led to this improvement in photo-micrography, and to emphasise what I conceive to be the more critical points in photo-micrography to lead to the results that are being accomplished by some persons, now sought to be accomplished by all who give the matter their proper attention. In the first place, there are a great many members present who for many years attempted practical photography. If they try this photo-micrography they will find themselves very greatly in a position of advantage over those other gentlemen, who, however expert they may be as microscopists, are unacquainted with photography. I found myself, at my start, in a position of very much greater ease from the fact that I had been for twelve or fourteen years studying the *technique* of photography. My whole trouble practically lay in setting up an accurate image, and in, course, learning the means by which that accurate image has to be set up. When I got the image on the ground glass my chief difficulties were at an end. I said before that I believed that very great marked improvements have been made within the last two or three years in this department of photo-micrography. Most of you are aware that *photo-micrographs* have been of late used for books and illustrations of various kinds, where before drawings was the sole method of delineation. I believe myself that the day will very soon come when photo-micrography, with its indisputable accuracy, with its comparative ease and celerity of production, will take the place of any manual drawings. The chief points which have led to the improvements are:—In the first place, the science of *microscopy* has very materially improved within the last decade, or within the last five years, and the reasons which led to

this improvement are, first of all, the natural growth of the science; second, the improved optical arrangements which come within the power of the optician to manufacture, and of the microscopist to use; improved methods of illumination, by which I mean in particular the use of the condenser; and, lastly, I place great stress upon the introduction of a new kind of glass on which I shall make a few remarks later. In photo-micrography another great improvement has taken place in the matter of what is known as colour correct or orthochromatic photography. I only came into the microscopic world after a very great deal of this improvement, of which I have been speaking, had taken place. In other words, I entered after it began to be perfectly well understood by the most expert, and when it began to dawn on the less expert that a great deal of the path had been pursued in the wrong direction, namely, that of low-angled objectives. It is no business of mine to inquire what led to the low-angled lenses. By means of using these low-angled glasses the quality known as "penetration" was obtained. Another improvement, I say, was in the use of the condenser, and I believe (it was before my time) that the proper—the improved—use of the condenser was to a very great extent due to a gentleman who is present to-night, Mr. E. M. Nelson. Some still believe in narrow-angled objectives, but not very many use the sub-stage condenser in the way it used to be. I may just say a very few words upon the matter of penetration. [Illustrated on blackboard.] The quality known as penetration, if it exists at all, consists in bringing two objects which are one behind the other to a focus on one plane. This is an absolute impossibility according to the laws of optics. Two things in different planes cannot focus on the same plane. There are those who still stick out for the quality of penetration. They say that if the "disc or area of confusion" is less than one-hundredth of an inch the human eye is not able to judge of it. In photography this theory does not invariably hold good, because while on a large photograph, for instance, an area of confusion of one-hundredth part of an inch would not be any serious drawback, on a quarter-plate it would be fatal, and the photograph would be set down as unsharp and blurred. In microscopy we cannot afford to deal with any areas of confusion at all. We cannot have our image sharp enough. It is admitted by everybody that as the angle of the lens increases so the penetration of the lens diminishes; and, on the other hand, it is equally true that as the angle of the lens decreases, so also do the resolution and the definition of the objective; and as in microscopy and photo-micrography you want sharpness, there seems to be no argument left, no other alternative left but to sacrifice this mythical penetration, and to neglect it in favour of the quality which is paramount with us, definition, and in some cases resolution. Another point.—To correct aberrations inherent to single lenses, the method used invariably was to put together two glasses of different refractive indices in order that one might counteract the other; but until not so very long ago the two glasses used had indices in such a proportion to each other as only to correct the lenses for two particular regions of the spectrum, and not long ago two German savants, after, I presume, a great deal of experiment, succeeded in making another kind of glass which had a refraction index of different proportion to the other glass which is used in the objective, the result being lenses which, not only for microscopy but also for photography, gave us a more correct image than ever was got before. This is one of the great improvements which has raised the whole status of photo-micrography several degrees higher. The photographic side of the question I will leave till later on. With regard to the apparatus which I use myself, and which may be used by anybody, the requisite parts are a microscope and a camera. It is much more convenient that the microscope should be turnable down to the horizontal, and that the camera should also be horizontally placed, and it is necessary to have some arrangement by which the focussing adjustments of the microscope can be used at a distance. This exists in the apparatus there, which is simple, compact, and efficacious. [Apparatus further described.]

I consider it highly important, and certainly very convenient in use, that one should be able to turn the entire microscope and light right out of the axial line, examine the image, arrange and correct it, and then turn the entire system back to its position.

Then you have a real image thrown upon the ground glass of the camera, and once the image is on the camera screen, the matter becomes one of photography. The use of the sub-stage condenser is a crucial point. [Illustrated on board.] The point of the whole matter lies here. It is absolutely necessary, if you are to get a proper image, sharp and at its best, that the object shall be precisely at the conjugate foci of the objective and condenser. The image of the light is to be sharply focussed on the objective by the condenser. To equalise the field of light there is a temptation to put the condenser a little out of focus, but when the negative is got this plan will be regretted. For myself, if I get the condenser out of focus, I cannot get a thoroughly satisfactory image. If the illumination does not cover the field required, we must use a longer focus condenser, and that is the only way to get over the thing. I simply use a longer focus condenser, and the image of my plane is larger. I sketch here (diagram) a like makeshift apparatus I sometimes use for illuminating physiological and pathological preparations where no great resolution is required. A piece of very finely ground glass is illuminated by a bull's-eye, and practically becomes my radiant. It amounts to this: I am not able to accurately focus the condenser, but can very nearly focus it. I intend to try milk and water instead of ground glass. By a very slight

putting out of focus I get the field as I want it, and do not find the "loose practice" very materially spoils my photograph.

There is a general opinion that gelatine plates are unsuited for photo-micrography. I quite appreciate the idea that there is in this, but I think that the idea is slightly erroneous. Objectors to the gelatinobromide plates say that the image on rapid plates is too coarse in grain to be of use. It is coarse in comparison with wet collodion and slow gelatine plates, but the grain is not, so far as I have found, damaging; I have never yet known visible grain even in the highest direct magnification.

Specimens were once sent to me of the best diatom photographs I had then seen, done by wet collodion and subsequent camera enlargement, and I was challenged to prove equal results direct by wet collodion, or by any process except camera enlargement process. I went into the matter thoroughly, and the first time I tried with gelatine direct I found my results were every bit as good as with collodion and enlargement.

This is another point upon which there seems to be a certain amount of divergence of opinion. Some people think that uneven objects, as diatoms, are better done by taking negatives at, say, one hundred and fifty diameters, and enlarging twice in camera, than can be done by taking them at three hundred times by direct photographic methods. I came to a conclusion totally at variance with this. The trouble is got over as well—in certain respects better—by a direct magnification in the camera with the microscope lens, always with one proviso that you do not overstrain the objectives you are using.

I believe in high-angled lenses, the higher the better, provided corrections are good. Regarding condenser in the matter of angle, any microscopist will understand that there is not the slightest use in using a lens at high angle if you have not a condenser to match. A dry condenser of 160° I have always found to be ample for any purpose which I have required outside the domain of microscopic feats, such as test diatoms and infinitesimal flagellæ.

THE FOCUSING OF IMAGE.

A very great many different methods have been used; many ingenious, and I have never seen any seriously bad. The simplest is about the best. I have tried sensitive plates, fogged and slightly developed and intensified, and I have always come back to the old original business, which simply consists in a sheet of plate glass with some diamond-drawn lines on it; in my case the diamond-drawn lines consists of strokes divided into tenths of an inch, which divisions I use for approximate measurements of objects. It is exceedingly important, of course, to get focussing eyepiece accurately fixed; I "squash" a fly on the front of my plate-screen, and set the focus of my "Ramsden" or "Aplanatic" on the fly's wing.

As to correction of lens for cover-glass by tube length or collar adjustment, I find one system as good as another. There is no rule whatever for this correction. This correction is obtained by experiment alone. You have to sit down and alter the tube or collar until you get what you believe to be the sharpest image; that is where the real science of photo-micrography comes in. If photo-micrography is not an accurate science, it ought not to be used at all.

With regard, finally, to the photographic part of the question, the most marked improvement of late has been the introduction of colour-correct plates. We now find it easy to do objects which a few years ago would have been out of the scope of the photographer. I refer in great measure to the large and useful class of objects prepared with pathological and physiological stains. You may wonder when I say that the stain I prefer is one which consists of brilliant blue, red, and yellow. That is my pet stain. In every case I have used this treble stain in preference to all others. I have got to such a pitch now that, given any reasonable colour at all, so far as the photographic art is concerned, I usually succeed at once, but it is the rarest thing possible that I succeed in making a thoroughly satisfactory negative the first time I try. Sometimes I have tried twenty or even more times, and one object I have certainly done one hundred times, and have not succeeded yet. The stains met with in pathological and physiological work are logwood and eosine or other red. As a rule if logwood is deep enough, it may be photographed without a screen at all, but it is well to use an eosine plate. Bismarck brown has beaten me more often than any other stain. I never know what sort of screen I am going to use. It entirely depends on the tint. I am very fond of intensification of any kind. If intensification is to be properly carried out you must not let that plate see the light until it is absolutely fixed. I believe there is an invisible deposit after light action, but on intensification it becomes visible; that is of course a mere theory, but the conclusion that I arrived at.

With regard to printing, I find it unnecessary to say anything. Albumen printing is very satisfactory; chloride emulsion paper good; bromide paper the best. I almost invariably glaze my photographs. I may say in landscape work I do not like glazing photographs. It is very easily done.

In conclusion, I do not, of course, pretend to have nearly exhausted the subject. The chief thing often comes out, the real benefit got, in the discussion which follows. We have here to-night several men who have made a leading mark upon microscopy of the present day. Mr. Nelson is here, and also a gentleman who has made one of the most astonishing

and creditable discoveries with regard to diatom structures which have been made for many a long year.

ANDREW PRINGLE.

DISCUSSION.

MR. NELSON.—I have enjoyed the paper very much indeed; I take great interest in photo-micrography. Mr. Pringle has applied the microscope to his already excellent photography, while I have applied photography, through the kindness of Mr. Pringle showing me how, to my microscope. He has spoken of some microscopical matters in the first part of his paper which I might just allude to. One is the penetration of objectives. This has been a crux and bugbear. When I began I was beaten by this. I have had made for me low-angled glasses for penetration. Now I know better. I saw with practical experience they were a mistake. Now I know they were a mistake, and the reason is, there is such a thing as "numerical aperture." The numerical aperture of a lens of 180° is 1, or unity. The penetration of a lens is—mathematically must be—in the inverse ratio of the aperture. The penetration of a lens whose numerical aperture is one-half is one-fifth. Penetration varies at a tremendously greater rate according to focal length; the rate that the penetration varies in a microscopical lens is one upon the square of the focus. I have a tremendous pull over a man who is using a narrow angle. I want you to bear in mind that the focus of the lens has a greater effect on penetration than the aperture. The increase of aperture gives you an enormous pull by the increase of resolution. Mr. Pringle has alluded to the condenser and sub-stage condenser. One thing he did not lay much stress on, &c., the condenser used ought to bear some relation to the objective used. You must have a condenser for each lens; apo-chromatic system. We have not had them applied to telescopes and camera lenses. There has been a perfect revolution in the microscope. Professor Abbe has made the eyepiece enter into the construction of the microscope. This question of eyepieces and lenses is extremely beautiful and interesting.

A further discussion ensued.

ON DEVELOPMENT.

[A Communication to the Camera Club.]

How often we hear the merits discussed of the various kinds of developers, with regard to the amount of detail which can be obtained with them individually, or, rather, the sensitiveness of a plate with a certain developer. One man says he can get the most detail with ferrous oxalate, another with pyro-ammonia, another with pyro and potash carbonate, another with pyro-carbonate of soda, another with the use of caustic, potash, or soda, instead of the carbonates. Lately some have given the palm to hydroquinone, and so on. Seeing very great diversity of opinion, I tried some time ago to settle this question for myself, in hopes that some difference might be found considerably in favour of a particular developer, especially when we consider that in our choice we can actually deal with a total change in the chemistry of the materials. I therefore, as carefully as possible, began without prejudice, and during my experiments, when I thought there was any perceptible difference (I now only refer to sensitiveness), I tried, by alternation of formulae, to get the best results in all cases. To my great surprise I found all developers, including ferrous oxalate, all the modifications of pyrogallol acid with various alkalis and hydroquinone, exactly of equal value in the giving of detail. I must here state that the experiments were carried out with my own plates only, so that I cannot pretend to say that the results mentioned would occur under any circumstances; however, it certainly was remarkable that all kinds of developers gave the same results, and I should be inclined to gather from this, that any future increase in sensitiveness will be found in the plate rather than in the developer.

I have often heard my friend, Mr. Payne Jennings, use the rather pretty argument that, no matter how short the exposure, the image must be "all there" if you could only develop it. The little "if," as usual, settles the question. It is not much consolation to tell any one developing an under-exposed negative of an important subject that it is "all there." His reply could scarcely be entered on the minutes of this Club.

With regard to density of image, I also found that, provided the formula was arranged, equal apparent density could be had with all kinds of developers; I say apparent, because colour has, of course, a great deal to do with this. However, as there was no difficulty in getting sufficient density with all kinds of developers, I could not make a great point in favour of any one kind.

Having mentioned colour, I will digress for a few minutes to consider a very important matter with regard to it. What I am going to say is not new, but, as far as I know, much attention has not been paid to colour of image, excepting in a wrong direction. So that I may be clearly understood, I may mention that on many occasions I have had to make special plates for photo-lithography and allied processes where great density of image is required. I happened to call on a gentleman using these plates for copying line drawings, and found him using mercury intensification with all his work. I asked whether he could not get sufficient density by development. "Yes, certainly," he replied; "but we find that when sufficient density is obtained by development, the fine lines of the drawing are blocked up and detail is lost, so we prefer to stop development, and intensify by change of colour, without further deposit of silver to clog the

negative." For line work the difference in the two methods is so remarkable as to place the matter out of question. I have still further evidence on this point. At one time I remember Mr. Payne Jennings being very anxious to have some quickly printing negatives for a very large order, and I suggested the ferrous oxalate developer to prevent the yellow stain of the film. He used the iron developer for some little time, and, without giving the reason, told me one day that he found a blocking of detail in the high lights, and so he returned to the use of pyrogallol acid. To my mind the cause of the difference is simple, it being that a greater deposit of the silver compound to get sufficient density is necessary where the image is not of such a non-actinic colour. Colour of image is, I think, a matter of very great importance, and I hope that the members of this Club will give it their earnest attention. It seems to me that we ought to strive for a red or orange colour, and perhaps some means may be found of altering the colour of a negative simply, and thus do away with mercury intensification, which has several well-known defects against its use. To sum up the matter briefly, the more non-actinic the colour of the negative the better for its delicacy and good printing qualities.

The present general use of sulphites is, no doubt, mainly due to the desire for pretty-looking negatives. There is also an idea that sulphites in a measure prevent pyro stain to the film itself; this may be so when development is not pushed very far, but otherwise I think the remedy becomes worse than the disease, as the stain which occurs in instantaneous work when forcing development in the presence of sulphites seems less amenable to the action of clearing liquids such as solutions of alum and the various acids.

There is an objection to the use of sulphites, so far as I am personally concerned; it is the lengthening of the time of development, which takes place when sulphites are present in considerable quantity: this objection is also strongly complained of by professional portraitists. I confess to liking quick development, and I need scarcely say that when there are a gross or two of plates awaiting development, one gets rather tired of lovingly watching the slowly coming image.

Another substance, the meta-bisulphite of potash, has lately come into very extensive use as a substitute for the various sulphites. I would here mention that there is a very general mistake with regard to this salt, as it is confused with the bisulphite of potash. Even many of the large manufacturing chemists seem to be under the same mistake, as I have several times had the ordinary bisulphite given to me instead. The formula is quite different; the meta-bisulphite being $K_2 S_2 O_3$; the ordinary bisulphite being $KHSO_3$.

There is only one maker of the meta-bisulphite, the process being patented. According to the maker, it is a permanent salt, and does not change by exposure of the dry salt to the atmosphere. In my own experience I find it better to use than the ordinary sulphites, less of it being required, and in consequence there is not so much slowing action in development.

I dare say that many here have noticed with me that, with a given quantity of pyrogallol acid, the presence of sulphites has a destructive effect on the density of the image; it is perhaps for this reason that formulae for development containing sulphites are generally large in the quantity of pyrogallol acid recommended.

No doubt you have all noticed that the various carbonates when used alone, without the presence of a caustic alkali, considerably lengthen the time of development as compared with caustic ammonia; it is no doubt for this reason that amongst professional portraitists the use of the ordinary pyro-ammonia is generally preferred.

Hydroquinone is now becoming a great favourite, and deservedly so, on account of its comparative freedom from staining the film. Until recently its great drawback has been in the length of time required for development; but since the use of caustic potash with it, instead of the various carbonates, this trouble has been practically overcome. I tried a short time ago a formula by Mr. J. B. Payne, given by him in a communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association. It is as follows:—

1.	
Hydroquinone	4 grains.
Meta-bisulphite of potash	4 "
Bromide of potassium	1 grain.
Distilled water	1 ounce.

2.	
Potassium hydrate	10 grams.
Distilled water	1 ounce.

Equal parts of 1 and 2.

This formula works very well; with some plates the bromide may be omitted.

I should like to say a few words on the development of landscape negatives, particularly with regard to obtaining cloud effects in the same plate as on which the picture is taken. We all know that as a rule the sky portion is over exposed, and very much so in comparison with the rest of the negative, and also that in many negatives we find clouds develop, showing all their detail at an early stage of development and then rapidly solarise away, leaving in the case of a thinly coated plate a thin, even sky portion, without detail and evidence of solarisation and halation in the picture, and in the case of a thickly coated plate, a dense

even sky portion that cannot be printed through, but as regards the half tones a better negative. Now, to get the best effects without double printing, development should be made as local as possible, the plate being washed along the sky line as soon as the sky is considered sufficiently dense, development being further carried on with the rest of the picture. Mr. Payne Jennings is very skilful with local development, and I pass round a few of his negatives to show what I mean with regard to it. A great deal may be done to help gradation in the extremes of light and shade in the make of the plate itself, and I may mention that I have to prepare a plate specially for Mr. Payne Jennings, containing a very large amount of iodide of silver. We all know how persistently Captain Abney has recommended the use of iodides in emulsions, and no doubt he is right where the best work is to be obtained. As a plate maker, however, I have to be chary in the use of large quantities of iodide, on account of the lengthened time of fixing and the alteration of colour in the image. For studio work, especially where large trade at small prices is carried on, I am afraid that a thickly coated, heavily iodised plate would be voted a nuisance, though better results would be obtained; but for landscape work, undoubtedly such a plate is by far superior where latitude of exposure, better gradation, and freedom from halation are required.

I should like to say a few words with regard to the various acids for keeping pyrogallie acid in solution. The best, I think, is sulphuric acid, and I use one drachm of the strong acid, diluted, to one ounce of pyrogallie acid. Sulphurous acid I find destroys part of the density-giving power. Next to sulphuric I should choose citric acid, though it has the defect that the citrates formed have a very softening effect on the film.

The use of sulphites for the purpose of keeping pyrogallie acid I consider bad. I find that where large quantities of them are used they create the very evil they are used to avoid, for instead of preserving the developer they destroy it—not that they may not prevent the oxidation of the pyrogallie acid, but in becoming oxidised themselves the development is stopped by the large quantity of sulphates formed; indeed, I have had, over and over again, solutions of pyrogallie acid rendered practically inert when exposed any time to the atmosphere.

A word on single fluid developers and I have done. I think them most unscientific. We all know how very thirsty is alkaline pyrogallie acid for oxygen, and, therefore, concentrated single fluid developers must soon spoil if in contact with air. All concentrated solutions of pyrogallie acid will keep indefinitely, whether acid or alkaline, provided the bottle be full and well corked, but the bottle cannot always be full, and then, of course, alkaline solutions must at once suffer. J. CADETT.

LORD RAYLEIGH ON EXPERIMENTAL OPTICS.

IV.

On Saturday, Lord Rayleigh delivered his fourth lecture on the above subject, and began by recapitulating that the mutual action of two streams of light produces the colours of thin plates; when those streams are nearly equal in intensity the result of their superposition depends upon the relative phases of the waves. In Young's language this was called "interference," but he, the speaker, was not very fond of that word, because from the point of view of the wave theory there is no superposition, and if that be called "interference," it is impossible to say what non-interference may be. If the plate is infinitely thin, then there is no interference, if the word has to be used. Interference is always measured by twice the thickness of the plate, and half a wave length must be added or subtracted, because the reflections from the two surfaces take place under different circumstances.

Every colour sensation is capable of being represented by various mixtures of red, green, and violet. Lord Rayleigh here drew attention to a colour-diagram, graphically representing the colour scale of Newton's rings. The colours of Newton's rings are rendered impure, he said, by a certain amount of white light superimposed upon them by reflection from the upper surface of the front lens. They are not the pure colours of the spectrum, and more especially in the red and green there is no approach thereto, but the blue and yellow are more nearly pure. By means of prismatic analysis the colours of the thin plates can be investigated more closely than by the eye. The lecturer here inserted a lens in a nearly parallel beam from the electric lamp, in the face of which lamp was a slit, and on the other side of the lens he placed a soap film, at such an angle as to reflect an image of the slit on to the screen; near the film, and between it and the screen, he placed a direct vision prism to analyse the colours introduced into the image of the slit by the soap film. In the same way he analysed the colours of Newton's rings, which experiment, he said, had first been performed by Young in the Royal Institution.

The colours of thin plates can be produced in another and inferior way, namely, by transmitted instead of reflected light; in the latter case they are reflected twice from glass surfaces, and in the former not at all; these transmitted rings are very faint, and the colours are hardly perceptible at a distance when an image of them is thrown upon the screen. When light falls obliquely upon a thin plate the relative retardation is less; when Newton's rings are observed obliquely they are dilated. Newton tried water and other substances in his ring experiments, but found that

they diminished the brilliancy of the colours; there was a loss of light, and the diameter of the rings was altered.

The colours of thin films sometimes came out upon a polished Daguerreotype plate when acted upon by iodine. Professor Sylvanus Thompson had lent him a piece of mica which exhibited the colours of thin plates with great brilliancy, as he would show them upon the screen. Old partially decomposed glass, such as is sometimes dug up with Roman remains, often displays the colours of thin films, and that, too, with some strength sometimes by transmitted light; in such cases, no doubt, a number of thin films are superimposed. It is easy to conceive that in the growth of insects a number of membranous films may be formed one upon the top of the other, with perhaps air spaces separating them, or perhaps some watery liquid; such combinations, supposing them to exist, would produce colours such as are seen upon the wing-cases of beetles, and upon other insects and living things in the organic world.

Newton, in his advocacy of the emission theory, devised periodic fits in the motions of particles; these fits were a kind of ghost of the real wave.

MR. MUYBRIDGE AT THE ROYAL INSTITUTION.

LAST Friday night Mr. Eadweard Muybridge lectured at the Royal Institution before the largest auditory, so far, of the session, the theatre being quite full.

Mr. Muybridge said that seven years ago he had lectured before the Royal Institution on animal locomotion, and since then had spent five years of his life at the University of Pennsylvania experimentally investigating the same subject, including the motions of children. He had but a small fraction of his results to bring under their notice that evening. His camera had a series of twelve lenses placed near each other in a horizontal row; there was also a thirteenth lens for focussing; thus twelve pictures were taken, and in rapid succession. A curtain shutter was used in the exposures, drawn down by an indiarubber spring. He did not state the focal length or nature of the lenses, or the size of each original negative. The shutters were released by means of electro-magnets governed by a wheel commutator, which would send twenty-four pulsations of electricity to twenty-four shutters in one revolution; but, as a rule, twelve pulsations only were sent by means of each alternate contact piece on the circumference of the wheel, it having been found by experience that a series of twelve consecutive exposures is enough to reveal all the details necessary to be known in a continuous series of motions by animals. Sometimes twenty-four exposures were made in a second. Three of these twelve-lens cameras were used at once over one animal, to show its position from three different points of view at absolutely the same instant. The results of all exposures exceeding one two-hundredth of a second in duration were rejected, as being too long to give results deserving consideration. None of the pictures, he said, were procured to be better than those of an amateur; they were not presented as fine art photographs, even were photography itself a fine art, which he very much doubted.

He then proceeded to exhibit on the screen positive pictures of the positions taken up when in motion by the horse, camel, lion, mastiff, tiger, "coon," buffalo, ox, goat, and hog. Also of a sloth crawling back downwards with its feet grasping the horizontal branch of a tree above. The order in which it moved its limbs was the same as with the animals previously mentioned, and a child crawling on all fours moved its limbs in a similar order of succession. Pictures of the ass and elk followed. Once, he said, it was a disputed question whether a horse in galloping ever had all its four feet off the ground at once; he exhibited a picture of one with all its four feet well in the air, and added that after such a position it always comes down first upon one of its fore feet; to this rule there is no exception. He exhibited a picture of the fastest mare in the United States, taken while she was going at a speed of fifty-two feet per second; one of her feet, he said, must have been moving at no less a speed than four hundred feet per second. He exhibited several series of pictures of a horse walking, trotting, and galloping with a naked man on its back. He also exhibited a series representing the kick of the mule and the peculiarly vicious twist it gives to its tail while flinging out its hind legs.

He likewise exhibited a series of photographs of statues of all ages and kingdoms, to show how artists had represented the attitudes of animals; some of these were exceedingly faulty, others, especially those executed by the Greeks, were remarkably accurate. The earliest representations of moving animals, he said, were not to be found in Egypt, for the preglacial man of the south of Europe executed very fair drawings upon bone; he exhibited a photograph of one of these drawings representing a reindeer. Pictures of moving animals from sculptures on the tomb of Ti, in Sakkarah, from Assyrian sources, from the sarcophagus of Amathus, in Cyprus, from representations of the victories of Rameses, and from other sources were shown.

From an artistic point of view the finest pictures shown by him were some of those representing the flight of the cockatoo; they were quite as remarkable and pleasing, if not more so, than those of Anschutz, of Lissa, representing the flying stork. He also exhibited a series of pictures representing the flight of the vulture.

Our Editorial Table.

NATURALISTIC PHOTOGRAPHY. By Mr. P. H. EMERSON.

London: Sampson Low & Co.

THE author seems to have slipped off the rails even before he made a start with his book, for in the dedication to the memory of Adam-Salomon of Paris, he alludes to him as having been the first artist of acknowledged ability who was original enough to practise photography for its own sake—a mistake the author was not likely to have made had he made himself better acquainted with the past history of photography from the art side of the question. From the apparent studious care with which others who have made for themselves name and fame as photographic "artists" are ignored throughout, a suspicion is aroused that, had not the soul of the talented French sculptor taken wing, he, too, might have remained unnoticed in his pages.

In the introduction, the author takes objection to the terms "amateur" and "professional" as usually understood, believing it to be folly to apply the former to one who does not practise photography for his living, or the latter to one who gains his living thereby. He gives it as his dicta that "professional photographers are those who have studied one branch of photography thoroughly and are masters of all its resources." An amateur, on the contrary, according to this authority, "is a dabbler without aim, without knowledge, and often without capacity, no matter how many of his productions he may sell." Under which designation does Mr. Emerson consider that he himself is entitled to rank? Photographers, accepting the universally received definition of the term, relegate him, perhaps too unceremoniously, to the professionals, because he—very wisely, as we think—practises the art for money, although not necessarily for that alone.

Passing over all that Mr. Emerson writes concerning ancient Greek and Italian art, Egyptian art, Greek and Græco-Roman art, and art of a great many other nationalities and periods—passing over likewise many pages devoted to the phenomena of light—we come eventually to the technique and practice of photography. Here we find much to astonish and amuse, with a limited amount of solid instruction for the young photographic aspirant. In course of this department of his book the author says, "In our student days it was considered bad form to give a testimonial to a tradesman for publication. This is still bad form." Seeing that there is a good deal of testimonial-giving in the form of recommendation of certain manufacturers, and which is not very far removed from a mild form of touting, to be met with more than once in his pages, we might ask if our author would not have occupied higher ground had he adopted the considerations of his student days in this respect. And in the face of this, Mr. Emerson allows his publishers to utilise and publish such testimonials as he himself has received in the form of favourable notices of his productions.

An air redolent of the personal superiority of the writer to the vulgar herd of photographers pervades the book, and much that they do is offensive to him. In vignetting, for example—but we will quote: "Whoever introduced the practice of vignetting was no artist, and the dodge was evolved from a misconception of the aims of art or for commercial purposes. . . . The few photographic portraits that we have seen worth studying were certainly not vignetted. Mrs. Cameron did not vignette—she knew better. That people demand vignettes and pay for them is nothing to us; let photographers sell them if it please the childish and vulgar, but let them not be called works of art, for on the contrary they are certain indices of bad taste." In speaking of lenses and referring again to the lady just mentioned, our author says, "The only really artistic series of photographic portraits we have ever seen, namely, those by Mrs. Cameron, were taken with a rapid rectilinear. . . . Mrs. Cameron, though not an artist, had knowledge enough to see that the portrait lenses of the day were undesirable for her work." Mr. Emerson is imperfectly informed as to this, for Mrs. Cameron used for her portraits a French portrait combination, and one that was incomplete at that, for the back lenses had been laid aside or lost and the front only employed, and this without a stop. Previous to her death she had obtained a proper London-made lens, but not with that did she make the series of artistic portraits referred to.

In the chapter devoted to photographic exhibitions and the medal nuisance there is much with which some will be in accord. The author says, "The method of organizing these exhibitions is to get a list of patrons, generally a few of the 'classes'; a few photographers who are known, but whose fame more often than not is based on nothing solid and is ephemeral; and finally the names of a few artists may be used to conjure with. Numbers of medals are advertised, and all works must be sent carriage paid. The judges are then chosen, and in nearly all cases

they are utterly incompetent. No one can judge a work of art unless he be an artist." According to this, no one is competent to judge the quality of a beefsteak unless he be a butcher; of a glass of beer unless he be a brewer; or, to come nearer home, of a gelatine dry plate unless he be a plate manufacturer; in short, that "who drives fat oxen must himself be fat." But to continue: "The combined assurance and ignorance of those who accept what should be considered a serious office is laughable and lamentable. Is our exhibiting student, then, going to submit his work to men untrained in art? If he does, he will find it either unhung, skied, or passed over in the awards to make room for the pretty nothingness and false renderings of the craftsmen's ideal."

Mr. Emerson is a fluent and forcible writer, who shows considerable familiarity with the writings of artists; and we think it a pity he had not adopted in his book a tone that savoured somewhat less of grievance against his fellow "craftsmen," who are to be excused if they have failed to discover in his published pictorial works aught that would warrant the indulgence of any superiority over the mass of photographers. The price of the book is six shillings.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4693.—"A New Combination Lecturer's Reading Desk and Photographer's Tripod Stand." J. GREEN.—*Dated March 18, 1889.*

No. 4716.—"Improvements in Photographic Cameras." Communicated by H. PASSET. J. Y. JOHNSON.—*Dated March 18, 1889.*

No. 4818.—"Improvements in the Heads of Tripod Stands for Photographic Cameras, applicable also for other Purposes." Complete specification. H. DEAN.—*Dated March 19, 1889.*

No. 4890.—"An Improved Photographic Camera." A. HUDSON.—*Dated March 20, 1889.*

No. 4919.—"Improved Apparatus for Displaying Photographs or Cards." I. GARRSBURY.—*Dated March 21, 1889.*

No. 5067.—"Improvements in Photometric Apparatus." J. METHVEN.—*Dated March 23, 1889.*

PATENTS COMPLETED.

IMPROVEMENT IN THE HINGE OF SHUTTERS USED IN DARK SLIDES FOR PHOTOGRAPHIC PURPOSES.

No. 14,696. WILLIAM WATSON, 22A, Church-street, Islington, London.—*October 12, 1888.*

THESE improvements consist in forming the hinge or joint upon which the "back" of slide falls over in such a manner as to perfectly exclude all light when the back is closed.

I construct the joint with a rebate about alike in size on the abutting portions of the shutter. I place these together in such a manner as they form together a continuous groove (and not after the manner in which they are ordinarily put together so that the projection of the one part fits into the recess of the other part). Into this groove I fit a continuous piece of any suitable material such as hard wood, or vulcanite fibre, or such-like material; the joints are then covered with jane or similar material after the ordinary manner.

IMPROVEMENTS IN PHOTOGRAPHIC TRANSPARENCIES.

No. 1461. WILLIAM JOHN WILSON, 1, Chapel-road, Ealing, Middlesex.—*January 26, 1889.*

WHEN photographic transparencies upon clear glass are mounted for decorative purposes, it is usual to place behind the picture a piece of translucent, but not transparent, material, such as ground or imitation ground glass or opal glass, to form a background for the pictures which will permit the passage of sufficient light to render the details of the picture clearly visible, whilst preventing the effect of the picture being marred by objects situated behind the picture being visible through it. Such photographic transparencies have also been prepared directly upon ground or opal glass, which itself furnishes both the support for the picture as well as the necessary translucent but non-transparent background. Such ground or opal plates have, however, heretofore always been uniform over their whole surface, so that the margin (if any) beyond the edges of the picture has been perfectly plain.

The object of my invention is to provide such transparencies produced direct upon a ground glass, opal glass, or similar support and background, as last referred to, with an ornamental border or margin integral with the glass support, so that the transparency when "printed out," or printed and developed thereon, is set off and heightened in effect in a way not heretofore practised.

In carrying out my invention, the glass plate, instead of being uniformly ground or plain opal glass, has the desired margin or border already produced upon it in any of the ways hereafter referred to, that is to say, I use a piece of glass larger than the picture intended to be printed thereon, a portion of the surface of this glass at least as large as the picture being ground or otherwise rendered uniformly translucent but non-transparent, whilst the remaining portion of the surface is not uniform, but is occupied by an ornamental border or design, lettering, marginal lines, or other variation of the surface produced by alternations of translucent and transparent glass, or of coloured and uncoloured portions, or of designs in relief, &c. For example, by etching, embossing, grinding, sand-blasting, or similar process, or by the application of a matt varnish, the surface of the glass may be rendered translucent in some places and transparent in others. Or, a piece of flashed opal may have its opal surface etched off in places, leaving a clear marginal design or border. Again, a piece of white glass flashed with colour may have part of its coloured surface etched off and then ground for reception of the picture, the remaining portion

being either left uniformly coloured or etched in a clear design upon the coloured surface. In this way many variations of the general idea may be made.

I coat the sheet of glass previously ornamented in any of the ways above referred to, with a sensitive gelatine emulsion, the emulsion being applied over the whole surface of the glass or only over that portion intended to receive the picture, and upon this coated surface the picture is produced by printing out or by printing and development. The picture is then fixed in the usual way by dissolving out such portions of the sensitive salt, or salts, in the emulsion as have not been acted on by light, thus leaving the picture complete, with a translucent back and an ornamental margin or border.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—The manufacture and use of gelatine emulsion coated glass plates for the construction of photographic transparencies, the said plates having an ornamental border, design, lettering, lines, or other variation of appearance produced in any of the ways described upon the marginal portion of the plate before the same is coated, whilst the part of the plate to be occupied by the picture is uniformly translucent but not transparent, as specified.

IMPROVED APPARATUS FOR OPERATING THE SHUTTERS OF PHOTOGRAPHIC CAMERAS.

No. 1591. ROBERT EDWARD MATHER BAIN, 417, Olive-street, St. Louis, Missouri, United States of America.—January 29, 1889.

My invention relates to improved means for operating the shutters of photographic cameras, especially applicable to that class of shutters which swing past each other within a casing surrounding the camera tube, each shutter having a circular opening which coincides with that of the camera tube when the shutters are at half stroke.

Each shutter is formed with a curved slot through which passes the pivot pin of the other shutter, and with a short straight slot. Through the last-named combined slots of the shutters and through vertical slots formed through the front and back of the casing passes a pin, the whole operating so that on the full vertical movement of the pin in either direction the shutters are opened and closed to the camera tube.

My invention has for its object to vary the speed of the shutters when opening and closing the camera tube for instantaneous exposure, and consists in two (or more) springs having different and alterable tension or force, and applied separately or collectively, to the actuating pin of the shutters, whereby the speed of the latter when opening and closing the camera tube for instantaneous exposure may be varied at pleasure; combined with devices for holding and releasing the shutters and for checking their movement when at half stroke or with the camera tube fully open.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 1	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 2	North London	Myddelton Hall, Upper-st., Islington
" 2	Holmforth	
" 2	Sutton	Society's Rooms, Sutton, Surrey.
" 2	Shelfield	Masonic Hall.
" 2	Paisley	Paisley Museum.
" 2	Bolton Club	The Studio, Chancery-lane, Bolton.
" 3	Coventry and Midland	The Dispensary, Coventry.
" 3	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 3	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 4	Bolton Photographic Society	The Baths, Bridgman-street.
" 4	Leeds	Philosophical Hall, Leeds.
" 4	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 4	Glasgow Photo. Association	Religious Institute, 177, Buchanan-st.
" 4	London and Provincial	Mascons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MARCH 26.—Mr. Leon Warnerke in the chair.

Mr. E. FOCKING exhibited a print on albumenised paper on which white spots had appeared after the lapse of four weeks, and he wished to know the cause.

Mr. EDGAR CLIFTON thought that they were due to the paper.

Mr. ARNOLD SPILLER thought that they looked like bronze spots, but there was no bronze printing on the mounts.

Mr. W. E. DEBENHAM had known white spots to come on during the washing, and thought that he had perhaps traced them to particles of mortar falling on the prints.

Mr. WILLIAM BEDFORD said that coke dust would cause spots.

Mr. FRIESE GREENE said that he had a few experiments to bring before the meeting on "the electrical energy of different developers." He took a very sensitive needle galvanometer, and dipped the ends of its two fine-wire copper terminals in a solution sometimes of pyro and sometimes of quinol; when alkali was added to either, there was a momentary deflection of the needle.

Mr. DEBENHAM pointed out that when the alkali was poured over one terminal there was a deflection in one direction, and when he poured over the other there was a deflection in the reverse direction.

Mr. ARNOLD SPILLER remarked that it is well known that electrical action is always set up during chemical combination, and that as the pulsation set up before them was over in a moment, no proof was given of electrical action during development.

Mr. DEBENHAM remarked that if the developer were mixed first and then applied to the plate, the plate would develop, but no deflection could be obtained.

Mr. SPILLER thought the results to be outside photography.

Mr. CHAPMAN JONES said that until platinum electrodes were substituted for copper ones the experiments were not of scientific value, and even then they

would be outside photography unless it could be proved that photographic developers had some properties not possessed by solutions not developers.

Mr. GREENE said that when one terminal was touching a sensitive film in a developer, small deflections went on during the time of development. Extemporised gold and platinum electrodes were then tried, but with the means thus at command it was not certain that the copper wires also did not touch the liquid. Eventually Mr. T. Sebastian Davis agreed to carry on some experiments in the matter with Mr. Greene, and to report the results to a future meeting.

Mr. WILLIAM ENGLAND exhibited prints from negatives taken by the flash light at meetings of the Photographic Society of Great Britain and the London and Provincial Photographic Association. He thought the chief defect of the magnesium lamp to be that it did not work quickly enough; it gave the sitters time to move.

The CHAIRMAN had never found it to be too slow; with that apparatus he had brought from the Continent, and exhibited before the West London Society, he could take objects in motion.

Mr. FOX SHEW said that what was wanted was a large flame and a small quantity of magnesium.

Mr. DEBENHAM pointed out that in Schirm's lamp only three-quarters of a grain of magnesium was used, and that Dr. Eder had drawn attention to this remarkable fact.

Mr. JOHN SPILLER had pleasure in bringing before the meeting some remarkably interesting specimens of early photography, which had been given to him by the widow of the late Mr. Hunt, author of *Researches on Light*; several of them were dated 1844. He exhibited early calotypes, also foxy-coloured untinted prints taken on plain chloride of silver, still in excellent condition. Among some samples of chromotype was one taken by means of chromate of mercury, representing oak leaves, in which the image was about as good on one side of the paper as on the other. Many of the prints were by processes of which he could find no record, including one process called "the energiatype."

Mr. EDGAR CLIFTON interposed that the energiatype process was described in Bingham's *Photogenic Manipulation*. A sort of continuing action of light operated in the matter.

Mr. SPILLER continued that he had also a photograph consisting of letters on glass initiated "T. G.," which he supposed to be by Thomas Gaffield, who obtained such photographs by a year's exposure, allowing the light to discolour the glass itself. The print from this negative was taken in one minute. On the glass negative the letters were colourless on a purple background.

The CHAIRMAN had a plate-glass window in his house which had turned to an objectionable green. He believed that the glass was not so green originally.

Mr. SHEW exhibited a walking-stick stand of bamboo in which the two other legs of the tripod were of hickory and packed inside the cane portion.

Mr. ENGLAND said that it was remarkably firm for a stand of that class.

The CHAIRMAN, after measurement, said that its height in use was thirty-seven inches.

Mr. SHEW next exhibited a simple changing back in which no bag was necessary, nor any shields for the plates.

Mr. A. COWAN remarked that Mr. Wellington had invented one with the same motion, but his plates were backed.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 21.—Mr. A. Cowan in the chair.

Mr. J. R. GOTZ was elected a member of the Association.

The HON. SECRETARY read a letter from Herr Julius Mayer, of Breslau, about the magnesium flash-light apparatus of Herr C. C. Schirms.

A question from the box set forth that it having been stated to that Association that the best lantern condenser for the lime-light was not the best for the oil light, the questioner would like the why and wherefore to be explained by diagrams.

Mr. T. E. FRESHWATER, who had made the statement, said that the condenser for the oil light should be of longer focus than the other one to get the best result.

The CHAIRMAN said that then it would take in more of the light from the flame.

Question: "Is the use of a combined toning and fixing bath to be recommended?"

Mr. WILLIAM BEDFORD replied that with the mixed toning bath there was sometimes a tendency to liberate sulphur. Once upon a time the bath was highly popular, and many old prints which had been toned in it had proved permanent, although the majority toned in it had faded.

Question: "What is the best form of shutter for long and moderate exposures?"

Mr. H. M. HASTINGS had found the Guerry shutter to be the best; it was always ready for use and no preparation required; its drawback was that it was too cumbersome.

Mr. J. J. BRIGNSHAW stated that in his hands it was not quite trustworthy, for it would stick sometimes, but it answered the purposes mentioned in the question.

The HON. SECRETARY said that that was also his experience.

Mr. BEDFORD said that a word might be uttered in favour of the double drop shutter improved or invented by Mr. A. Cowan.

Mr. C. H. COOKE then read the following paper on *Lantern Slide Competitions*:—

I wish to make a few remarks with respect to the lantern competition that took place here last Thursday. Now I consider that such a competition is a very good thing indeed, because it stimulates the competitor to do the very best within his power. Indeed, I wish that competitions such as the one in question or others of a similar character were more frequent, as I strongly believe they would urge amateurs and others to do much better work. I know that I took pains to produce the best slides that I could, but I may mention that I was dissatisfied with my results before they were judged; in fact, I never do anything but what I think that I ought to have

* The Energiatype is described in all Hunt's early writings. Succinic acid plays a part in the preparation of the paper.—ED.

done better, and always end with a determination to try and beat all previous efforts. Now I heard one or two of the members demur at the introduction of clouds, but you must remember that the competitors were authorised to do whatever they liked with the negatives in order to produce the most pleasing results, so long as they removed all traces of dodging, &c. I certainly think this is as it should be, and that it would be quite wrong to place any restriction upon a competitor possessing the good taste to introduce satisfactory clouds or to do anything else he might think proper to create a pleasing and harmonious picture. Speaking for myself, I should like to see clouds in every slide worthy of the name; and, further, I am strongly of opinion that no landscape slide should be accepted for any competition without a cloud. Just imagine the absurdity of an exhibition of paintings without clouds. A painting without clouds is not, and never has been, considered complete; then why should a cloudless photograph be accepted as fulfiling any more than a painting? I feel assured that the time will come when no landscape photograph will be accepted at any of our exhibitions unless it is a finished production in this respect. It is not by any means an uncommon thing to see a good landscape picture utterly ruined by the white space where the clouds ought to be, and we know that it is often the practice of photographers to take the greatest care to stop out the sky when, perhaps, if they left it alone they would get a certain amount of tone, which would be much better than the crude white paper. I have often seen it stated that the clouds should be secured at the same time that the landscape is taken. I am not altogether of this opinion. It is sometimes impossible to get clouds for days together. No, I certainly think well-chosen clouds may be introduced into any picture without the keenest expert being able to tell whether they were taken simultaneously with the landscape or a year or two after. Unfortunately we often see clouds introduced into photographs where they could not be expected to appear; for instance, such as cumulus clouds, which are generally boldly defined but comparatively flat near the horizon. Clouds of this kind are often placed too low in the picture, but such mistakes might easily be avoided if the observer were to make notes of the clouds when taking the landscape, assuming there were any at the time. Artists make endless studies of skies accompanied with notes, and I consider this quite as important for the photographer as for the artist. Then, again, skies are frequently printed too dark, which gives spectators a notion that the photographer must take most of his views in stormy weather. I know it is very easy to talk about these things, but not so easy to carry them out, and I do not think much of the man who is continually telling you what you may or may not do; I have greater confidence in the executive who does the work and produces his results. Advice from such a person is generally worth listening to. Therefore I believe if we continue these competitions we shall find ourselves making greater progress every time. I very much feared my old friend, Mr. Wellington, and, as I expected, he was the successful competitor; but I may tell him that if these competitions are repeated I will strive very hard to beat him, and very proud I should be to do so, for I admit he wants some beating. With reference to mounting the slide, some people will mount most of their slides in a circular mask, ignoring entirely the composition. It is but few pictures that this style of mounting is suitable for beyond portraits. I have a preference for the rectangular-shaped mount for nearly all pictures, and I do not even see why the corners should not be square instead of the present practice of rounding them. I love pictures and take the greatest delight in trying to produce them, and I only wish that our photographic monochrome was more perfect, but perhaps improvements in this direction are not far distant. The object of my observations is with a view of inducing the members to continue these competitions from time to time, and if they do so I believe that those who may compete will find themselves trying their very hardest to produce work of the highest class, as I think there is nothing so conducive to put a man on his mettle as a trial of skill.

Mr. J. B. WELLINGTON moved that a small sub-committee be appointed to draw up some rules with regard to lantern-slide and other competitions.

This was seconded by Mr. HASTINGS and carried unanimously, after which Messrs. Wellington, Freshwater, Cooke, and Cox were appointed members of the committee.

Mr. WELLINGTON thought that some description of the process by which each successful competition slide was taken should be given, and that there should be a slide competition once every two months during the winter season.

The Hon. SECRETARY thought that the operator had more influence than the process in producing the best slides.

The CHAIRMAN thought that all slides of landscapes should contain clouds in the sky.

The Hon. SECRETARY said that Mr. Green, of Berwick-upon-Tweed, had turned out in carbon the best cloud negatives he had ever seen. They could be printed from either side.

Mr. WELLINGTON remarked that commercial cloud negatives were always taken against the sun to get a striking effect, which often was not appropriate in subsequent use.

Mr. H. D. ATKINSON asked if better clouds could be taken by the interpolation of a yellow screen.

Mr. WELLINGTON replied that sunset clouds came out decidedly better on orthochromatic plates, but in no case was a yellow screen necessary.

Mr. BEDFORD stated that there was little advantage in using a yellow screen with ordinary plates.

Mr. W. H. HARRISON said that in one of the photographic annuals some time ago Mr. George Davison had written a useful practical article about taking cloud negatives; he had stated that persons who live in towns, in places where they must point their cameras upwards to get clouds, could not there get so appropriate a series of cloud negatives as photographers with an open stretch of flat country before them.

Mr. BRIGHENAW asked the best way to cut out mats for lantern slides.

The CHAIRMAN responded that by the wheel was certainly the best method.

Question: "What is the amount of advantage of a broad top in place of a narrow top to the camera stand?"

Mr. COOKE replied that a stand top but three inches in diameter had better be thrown into the river; the advantage of a good broad camera head would soon be found out in windy weather.

The Hon. SECRETARY stated that it was best to have the head of the camera stand as big as the base of the camera; the advantage of having a large head to the stand was very great.

The CHAIRMAN said that the more the tops of the legs had to be spread out to fit upon the head of the stand the better.

Mr. HARRISON had been informed by the engineers at Trinity House that with their concentric two-wick paraffin lamps a flame one and one-eighth of an inch in diameter would give the light of fifty candles. He thought such lamps, which were used on lightships, might perhaps be of utility in the optical lantern.

CAMERA CLUB.

MARCH 21.—Sir G. R. Prescott presided.

Mr. H. C. BOND, M.A., read a paper on *Photographic Exposure*. The lecturer enumerated and treated of five considerations upon which variations in exposure should depend, and proceeded to a careful analysis of several of the published tables of exposure, their use, and reliability.

A discussion followed, in which cap *census* shutter as a means of exposing, methods of counting seconds, timing shutters, continuing action of light on the exposed plate, and other points came in for attention.

The subject on Thursday, April 4, will be *Universal Formula for Enlarging and Reducing*, when Sir David Salomon will read a paper.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 19.—Mr. J. Traill Taylor (President) in the chair.

Mr. W. T. Corenton exhibited some stereoscopic slides made by the albumen process.

Mr. J. G. Hilton showed an album by Marcus Ward; the leaves were fastened in with small catches and were readily detached.

Mr. A. C. COSSON asked for a good method of preparing bright brass for photographing, to avoid patches of light.

The CHAIRMAN replied that a good method was to bring it from a cold into a warm atmosphere, and so cause moisture to deposit on it; a bright silver vase had been successfully photographed by placing ice inside.

Mr. COVENTON said that this method had been used to photograph cups.

The CHAIRMAN described how a stereoscopic slide could be viewed stereoscopically by holding it up perpendicularly, an eye being opposite to each half of the slide, and looking away to infinity. He also stated that in a binocular camera it is not necessary to bring the dividing partition right to the front of the camera; if it extends a short distance in front of the plate it is generally sufficient. Referring to telescopic photography, he said that the best results in celestial bodies were obtained without an eyepiece, but the image was of course smaller. A telescope could advantageously be used for terrestrial photography for obtaining photographs of very distant objects, a camera being fitted on to the eyepiece.

Mr. W. BISHOP said that for this purpose it would be better to take out the erector, as the image being reversed would not matter, and a great deal of light would be gained.

The CHAIRMAN said that if it were necessary to keep paper for silver printing a long time it could be sensitised in the usual way and instead of printing rinsed in distilled water to remove the free nitrate of silver. In printing, a pad of blotting paper fumed with ammonia should be placed at the back of the paper when it would print with great vigour.

Mr. J. G. HILTON asked if lantern plates could be prepared to print out and tone like sensitised paper, the glass being first albumenised and sensitised like paper.

The CHAIRMAN answered in the affirmative.

The next meeting will be on Tuesday, April 2, when the Hon. Secretary will give a demonstration on *Platinotype*.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

MARCH 22.—Mr. Stuart in the chair.

A number of cameras and other apparatus were exhibited by various members.

Mr. WILLS introduced a material made of a preparation of electrical insulation of paper as a good material for making stops.

Mr. BAKER exhibited a vignetter attached to the printing frame in such a manner as to enable it to be moved to any part of the plate required to be vignetted.

Mr. TOLLETT showed a view under which when closed was no thicker than an ordinary dry plate and about three inches by two inches in length and width.

The SECRETARY called attention to the smoking concert which is to take place on April 3.

WEST LONDON PHOTOGRAPHIC SOCIETY.

MARCH 22.—Mr. William England (President) in the chair.

Mr. Broughton exhibited a camera with a revolving turntable, the lens of which folded down flat for packing; the shutters of the dark slides were fitted with a new form of spring clip. Also a detective camera.

Mr. MILES showed a detective camera for 5 × 4 plates, arranged to hold six slides. The outer case was fitted with a finder and also a spirit level, which he considered to be an indispensable adjunct to a detective camera. He used a Ross' portable symmetrical of five inches focus, the diaphragm of which had been opened out to f-11. Working in this way he found he got very fine results. He also exhibited Shew's Eclipse hand camera.

Mr. Gale showed his patent Cyclone camera.

Mr. BLACKMORE explained a device whereby several lenses might be used on a camera without adaptors. The cross front was made sufficiently long to take three lenses. By simply sliding the front along and clamping, either lens might be brought to bear on the focussing glass. He also exhibited for Mr. March an ingenious mode of using small slides in a large camera. His camera was a half-plate, and when he wanted to take quarter-plates he slid a frame with grooves to take the quarter-plates into the runners for the half-plate slides.

Mr. J. D. ENGLAND had used the same device for several years, working quarter-plates in a 7 × 5 camera.

The PRESIDENT exhibited a light travelling tent, in shape like a triangular bag, and constructed to hang beneath an ordinary tripod. He had used it for many years when travelling abroad; it was light and portable, and folded up

into small compass. He then took a flash-light photograph of the meeting by a lamp constructed by himself.

The next meeting will be held on April 12, when Mr. Charles Whiting will read a paper on *Lantern Slide Making*, and a series of transparencies of Windsor Castle and Buckingham Palace, by Mr. King, will be exhibited.

HOLBORN CAMERA CLUB.

MARCH 22. Messrs. G. J. Shepherd, C. A. Burgess, J. Woodward, A. Pitman, J. Cook, Thomas and Mrs. Aldares Dear, and Mr. E. J. Tomlin were elected members.

Seventy slides were exhibited by the lantern.

Early in June Mr. E. Clifton will give an address on some current topic in photography.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 22.—Mr. Dresser presided.

Mr. Hamilton and Mr. Edgar were elected members.

Mr. Dresser exhibited a new pattern box for holding lantern slides. It was fitted with wood grooves to hold twenty-four slides, and neatly covered in dark cloth. It was brought out by Messrs. Fry & Co. for the small sum of 8s., and it was considered that it would entirely supersede the metal boxes at present in use.

Mr. Hawkins showed negatives of himself taken by himself with the flash-light process and prints from the same. They were pronounced excellent examples of the process. The disagreeable shadows so often visible by this process were in these cases entirely obviated by the use of reflectors. He also showed a negative and two prints, one developed with iron the other with quinol. The decision was in favour of the latter, but it was pointed out that the negative was unsuitable for bromide printing, being too dense.

Mr. PICKEL then showed negatives which had had varying exposures. He had heard that quinol was a better developer than pyro and did not fog an over-exposed plate in the same way. He had thought to test this with these three negatives, so had put them all at the same time in one large dish and had taken them all out together; he was then surprised to find the negative which had been over exposed so much thinner than the others.

It was stated that that would be the natural result; he should either have modified his developer for each plate or have left the longer-exposed negatives a longer time in the developer. He had previously stated that the plates were old. It was advised to obtain new plates and try again with the above modifications.

Mr. DRESSER gave it as his opinion that quinol was not a suitable developer for negatives, pyro being better. With quinol too much clear glass was obtained, and, however desirable this might be in a transparency, it was out of place in a negative.

Mr. Rushton contributed prints to the album.

The SECRETARY then gave the members a short address upon *Warm Tones on Gelatine Lantern Slides*. He said he was aware that some held the opinion that it was impossible to obtain warm tones on gelatine, while others, not going quite so far, maintained it was very difficult, and the results were always uncertain. Speaking of the negative, he advocated a full exposure, for the purpose of securing all available detail, and advised that development should not be carried too far. After describing the qualities of the plates he was in the habit of using, the lecturer proceeded to give a demonstration of the process, which was acknowledged to be at once simple and efficient, the resulting tone being all that could be desired.

The next meeting will be on Friday, April 5, on which occasion Mr. Rushton will deliver an address upon *Entarging*.

DEVON AND CORNWALL CAMERA CLUB.

At the last meeting, Mr. J. Pote in the chair, Dr. F. Woore, R.N., and Mr. Arthur Browne were elected members.

A paper by Dr. Aldridge was read, entitled *Picture Making, not merely Taking Photographs*. The subject of photography was treated throughout in relation to art, frequent references being made to the works of great painters and the general rules of composition. It was shown how a picture might, although true to the facts, be most artistic, whilst another, taken from a point only a short distance from the first, might be in every respect the reverse; how that the varying effects of light and shade, landscape, sea, and sky should carefully be studied; that a figure, boat, rock, or tree suitably placed might make instead of mar the picture. The paper was especially valuable in that it called attention to many rules known to artists (and Dr. Aldridge's paintings are well known in Plymouth) but frequently ignored, to their cost, by photographers.

Regrets were expressed at Dr. Aldridge's absence, and a vote of thanks was passed for his paper.

The next meeting will be on April 3, when Major Barrington Baker will make a few remarks on *Ficht Cameras*.

MANCHESTER PHOTOGRAPHIC SOCIETY.

MARCH 14.—Mr. Abel Heywood, jun. (Vice-President), in the chair.

Question box: "Are Beechey plates collodion-emulsion coated? Do they keep long? Has any member tried them, and with what result?"

In reply: Mr. JOHN SCHOFIELD said they were prepared with an unwashed collodion emulsion, then washed, and a preservative used; he did not know what the particular preservative Messrs. Rouch & Co. used, but stated that tanning, ale, or coffee would do. The plates would keep fairly well for a few weeks, and the results, as transparencies, were very similar to those made by Brooke's washed collodion emulsion.

The HON. SECRETARY had used a few of the Beechey plates as supplied by Rouch; they were excellent plates for transparencies. They would not, of course, keep like gelatino-bromide plates; one great advantage with them was that they could be reduced or intensified after development and fixing.

Question box: "A cutting from THE BRITISH JOURNAL OF PHOTOGRAPHY, *How to Test the Register of Dark Slides with the Focusing Screen*, was not thoroughly understood by the querist.

The HON. SECRETARY replied: In the course of his remarks he said that for ordinary landscape work it was quite unnecessary to go to very much trouble in this matter. It was quite sufficient to measure the distance from the ground glass to the lens flange, then to insert a plate in the same slide, put the slide in the camera, and draw the shutter, now measure from the plate to the lens flange again; any difference could be seen at once, and this method was quite good enough for practical purposes in landscape work.

Mr. H. M. WHITEFIELD said that would only apply to the centre of the plate, the corners might not be the same.

The HON. SECRETARY said in such a case the plate must be bent or twisted or the camera back would not be true with the camera front; it would be a vile instrument if that were so, but even in that case, a sixty-fourth, or a thirty-second part of an inch or more than that would make no practical difference.

Mr. W. WATTS exhibited and described the explosive gas tester recently introduced by Mr. J. H. Stewart.

Mr. J. H. FURNIVAL exhibited a very simple gas tester he had made; it consisted of a piece of quarter-inch brass tube about four inches long, with a stopcock in the middle, at one end was a fine nipple, on the other end a small indiarubber balloon about three inches in diameter (obtained from a toy called a squeaker). This indiarubber balloon in its normal condition was closed (at any rate, all the air could be squeezed out), now connect it up with the gas to be tested, when full close the tap in the middle of the pipe. Mr. Furnival said it was now ready for testing; if pure hydrogen were present it would burn at the nipple, if oxygen it would simply consume much faster the lighted taper he used; if mixed gas were present it would burn at the nipple so long as the pressure was maintained at the nipple, by the tightness of the indiarubber balloon, but as soon as the pressure was reduced as not to support the flame at the nipple, then a small explosion took place inside the balloon, but which was quite harmless.

A discussion followed and some highly interesting experiments were mentioned.

The HON. SECRETARY exhibited a few negatives taken on Carbutt's flexible films with prints from same; these had been sent to him direct from Mr. Carbutt. Next he exhibited a few others which he had taken himself; in one case a film and a glass plate negative taken under exactly the same conditions, and treated in development, washing, and drying exactly the same. There was very little to choose between them, but, as the Hon. Secretary observed, it would be rather unfair to expect the same quality of negative from a film the first he had ever tried of this kind, and with which he was not so familiar as he was with the glass plate used.

In reply to many questions Mr. CHADWICK said there was no trouble and no bother at all with these films; they developed like a glass plate negative, no after treatment was required; they were as hard in the water as they were out, and in drying he simply laid them on a table; they curled slightly, but that was not worth mention; they did not cockle or buckle.

Mr. WATTS introduced some matters of stereoscopic interest, and, through the Chairman, asked the Hon. Secretary if he would exhibit his stereoscopic camera and appliances at the next meeting.

The HON. SECRETARY objected on the ground that this matter was to a certain extent commercial with himself now, and in the position he held in the Society it must be against his ideas and his conscience for himself to introduce anything that might be regarded as "shop." (If he accepted the invitation from any other Society that was quite a different matter.)

However, after some arguments of the Chairman and many others, and at the unanimous desire of the members, Mr. Chadwick consented on the following conditions: that the next meeting be a "stereoscopic evening," open to everybody else, professionals, tradesmen, and amateurs alike, in which case he would contribute to the interest of the evening.

The suggestion was adopted. Messrs. Pollett, Coote, Schofield, Atherton, Benson, and the Hon. Secretary were elected to form the Outdoor Meeting Committee for the coming season.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The last meeting, which was held on the 20th instant, took the form of an exhibition of photographic views.

Councillor MATHEWSON, who presided, said that one of the objects of this meeting was to commemorate the discovery of the process of making pictures by the action of light.

Mr. J. W. McCALL gave a descriptive lecture pertaining to upwards of one hundred views, exhibited by Messrs. Valentine & Son, of various parts of North Africa.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

MARCH 6.—Mr. Frederic Graff (President) in the chair.

The SECRETARY reported the death of Mr. Emile Cresson, an active member of the Society, which occurred suddenly on the 2nd instant.

The Executive Committee presented a report proposing a plan for the selection annually, by vote of the members, of four "honour pictures."

The Committee on Joint Exhibition reported that responses from the foreign edition of circulars were beginning to come in, and a series of yacht studies by Messrs. G. West & Sons, of England, and also some pictures from Russia and Germany, had already arrived. Other foreign exhibits from English photographers were in prospect. The interest displayed by photographers in all parts of this country, not members of either of the three societies, was quite gratifying, many having expressed their intention of exhibiting.

A letter was read from Mr. W. E. Barrows, a member of the Society, as follows:—"Having occasion to use hyposulphite of soda for precipitation where freedom of foreign matter was important, we filtered fifteen pounds of that article through the accompanying filter. The hyposulphite of soda was purchased for photographic purposes from a manufacturer of established reputation in Philadelphia. Query: How many good pictures have been spoiled by the dirt in hyposulphite of soda?"

Accompanying the letter was a piece of filtering paper containing a large amount of foreign matter which had been filtered out of the solution. The condition of the filter seemed to indicate that Schoylkill water, in its most natural state, had been used either in the original preparation of the hyposulphite of soda, or in the solution which had been filtered. How far such impurities could effect photographic operations was not discussed.

Mr. THEODORE H. LUDKES read the following paper on the treatment of windows in connexion with interior work, recommending the use of flash-light compounds for obtaining the view beyond the windows, as well as the interior itself:—Any one who has made photographs of interiors has doubtless taken more or less interest in the window question, and tried in various ways to overcome the great difference in time of exposure necessary for the windows and the interior part of the room. These ways include shading and closing windows, inside and out, the local use of restrainers in development, and of vignetting in printing, &c. Wishing to try an experiment in developing, and having no plate exposed, I set up a small camera opposite a window when it was almost dark, and left it for ten or fifteen minutes while I prepared my developer. When the plate was developed, I found an image of the window sash, curtains, and shutters, and also of the trees and houses on the opposite side of the street, but nothing of the inside of the room. This suggested the possibility of getting a picture of the interior with the view outside on the same plate, and the flash light seemed the thing to do it with. The exposure by flash light may be done at the same time as the other if the lens will permit, or if it is not desired to have the outside in focus, or if it can be done after dark with a different stop and so have the whole picture sharp. The mode I found successful was to focus with the stop I intended to use for the flash, bringing the interior sharp, then inserting a small stop, and giving a suitable exposure for the outside about the same as if I was working out of doors—rather a full than an under exposure—preferably late in the afternoon, even after sunset; then capping my lens I inserted the large stop and left the camera closed till it was quite dark, when I uncapped it and fired my flash powder. The usual development seemed all right, and the result may be judged by negatives and prints shown. In THE BRITISH JOURNAL OF PHOTOGRAPHIC ALMANAC, 1889, there is a somewhat similar method described by an Australian correspondent, who uses, instead of flash light, ordinary gas with long exposure. Much might be said about the desirability of having in and outside both in focus at the same time, but that is a matter for individual taste and circumstances to decide. I think any one who cares to try this experiment will find it quite interesting, and another pleasure added to the many that photography gives us.

A film carrier, designed for use with Carbutt films, was shown by Dr. Hollingsworth, a visitor, who had designed it.

Mr. Earle showed a flash light devised by Mr. Edward M. Pini, a member of the Society. The flame was produced by a coil of wick about two inches in diameter, which was saturated with alcohol. Tubes of glass about two inches long, corked at each end, were loaded with about ten grains of powdered magnesium. A tube of magnesium could readily be inserted in a brass tube beneath the wick, the corks being removed as it was inserted. Pressure on a rubber bulb with tube connection forced the magnesium powder through a slit in the centre of the wick, producing a very brilliant light, which, by means of a cardboard reflector attached to the lamp, could be directed as desired.

A device for setting the shutter of a Scovill detective camera, obviating the use of the usual string provided for the purpose, was described by Mr. Pettit.

Mr. Graff showed a portrait transparency made in 1845 by Mr. Langenheim, of Philadelphia. The precise process used was not shown, though at that time the paper prints known as Tallotypes were in vogue. The transparency was in a most excellent state of preservation, though, apparently, some detail in the whites was lacking. It had a peculiar, warm, purplish-brown tone, which, as far as known, was the original colour.

[The transparency alluded to in the last paragraph was doubtless printed by the albumen process.—Ed.]

Correspondence.

Correspondents should never write on both sides of the paper.

WHITE HYDROQUINONE AND PERMANENT HYDROQUINONE.

To the Editor.

SIR,—In No. 1505 of your JOURNAL, Mr. Adolphe M. Levy publishes an article *On the Valuation of Commercial Hydroquinone*, and summarises the results of his analysis in the following words:—"The white sample, therefore, would appear to be the better of the two." It is his analytical tests only, and not any practical trials, that have lent him the justification to make this statement.

I have gone over the same ground, repeating Mr. Levy's experiments, with a view of judging how far his results were accurate. Both the white and permanent crystals were oxidised, as Mr. Levy had done, with nitric acid—the oxalic acid, the product of oxidation, being determined volumetrically with permanganate of potash. Schoonbroek, in his *Repertoire de chimie pure et appliquée*, 1861, states that in oxidising quinone with concentrated nitric acid at a high temperature, oxalic acid and picric acid are produced—a statement which, according to Mr. Levy, is also made by Schorlemmer.

This attempt at oxidation did not give any definite results. Pure nitric acid of specific gravity 1.4 was employed. It was first boiled in a flask, then evaporated to dryness in a porcelain vessel on the water bath, the operation being repeated three times with nitric acid of the same strength.

I. *White hydroquinone*.—0.5 gramme was made up after oxidation to 100 c.c.—10 c.c. of the solution required, at boiling point, in the presence of excess of sulphuric acid, 11.3 c.c. solution of permanganate of potash (of which 2.1 c.c. = 0.0045 gramme anhydrous oxalic acid) to establish the permanent colouration.

As Mr. Levy has found with tolerable certainty that the molecule of hydroquinone gives the molecule of oxalic acid, it follows that 2.1 c.c. solution of permanganate of potash = 0.0055 gramme of hydroquinone. Therefore, 11.3 c.c. solution of permanganate represent 0.03 gramme of hydroquinone, or 0.3 gramme in 100 c.c. This result is less by forty per cent. than the hydroquinone actually employed. The quantity of oxalic acid $[(COOH)_2]$ obtained for one gramme hydroquinone therefore amounted to 0.481 gramme, while Mr. Levy found 0.6 gramme*.

II. *Permanent hydroquinone*.—With 0.5 gramme under the same conditions, 12.4 and 12.3 c.c. respectively of solution of permanganate were required in two volumetric tests. Hence 0.325 and 0.322 grammes of hydroquinone, instead of 0.5 gramme, were found, and the quantity of oxalic acid obtained for one gramme of hydroquinone was 0.532 gramme. These two oxidations with concentrated nitric acid were carried out simultaneously side by side, and the results differed by 1.7 per cent. of hydroquinone.

In a second test of white hydroquinone a quantity of 0.5 gramme was again oxidised with nitric acid, the result being 0.19 gramme of hydroquinone. In these circumstances a second trial with the permanent was not made.

It follows from all this that Mr. Levy's estimations of the hydroquinone by the same method are valueless. That he obtained in repeated oxidations of the white crystals the same results may be an accidental coincidence. In repeatedly oxidising the permanent he did not obtain the same results; but, unfortunately, he does not give the details of his tests. In my trials, as shown above, the white hydroquinone exhibits the same irregular behaviour; therefore no conclusions as to the inferior value of permanent hydroquinone can be arrived at, for with the same duration of oxidation and similar conditions generally, approximately the same results are obtained with white and "permanent" hydroquinone.

As regards the oxidation of the permanent, I must mention that after the boiling with nitric acid a little barium chloride was added, in order to destroy the action upon the oxalic acid of the sulphuric acid (derived from the sulphurous acid of the permanent hydroquinone). The making up of the oxidised substance was done with sulphuric acid and water. Perhaps the difference in the results of Mr. Levy's tests with permanent hydroquinone is to be found in that omission.

Mr. Levy found or suspected sulphuric acid in the yellow crystals, consequently he ought to have neutralised it in determining the oxalic acid, as the latter would be decomposed by sulphuric at a high temperature into carbonic anhydride and carbonic oxide, which would render it impossible to correctly estimate the oxalic acid with permanganate. According to the length of time occupied in oxidation, the quantity of oxalic acid decomposed would vary.

From Mr. Levy's elementary analysis he says he concludes that the white hydroquinone contains one molecule and the permanent two molecules of water of crystallisation, and he is further induced to state that the white contains 87 per cent. and the permanent only 72.7 per cent. of pure hydroquinone. But as all data are wanting as to how he determines the water of crystallisation his conclusions are unjustified.

In order to discover water of crystallisation, the following two methods were adopted—(1) drying over sulphuric acid in the exsiccator, and (2) sublimation.

1. After having stood for twenty-four hours over sulphuric acid, neither the permanent nor the white showed any loss in weight.

2. *Sublimation*.—One gramme of each preparation was treated separately as follows:—The material was placed in a glass retort of the capacity of 1000 c.c., after thoroughly drying the apparatus, which I will describe. Over the retort was placed a bullet-shaped glass funnel, 25 centimetres high, to which was attached a glass tube of the same length having a bulb blown in it, and this was led into a weighed U shaped chloride of calcium tube. To protect the latter from outside moisture the apparatus was fitted with a soda-lime tube, through which, by means of a tube leading from above to the bottom of the retort, a gentle current of air dried over sulphuric acid was drawn by means of the aspirator, and during the passing of this current the hydroquinone was melted and sublimed, the operation in each case lasting upwards of an hour.

The tube, filled with perfectly dry chloride of calcium, increased in weight with the white by 0.407 gramme and 0.0066 gramme, or 0.468 per cent. of water on the average; and with the permanent, 0.003 and 0.0032 gramme, or an average 0.31 per cent. of water on the two trials.

These quantities are altogether too minute to justify any conclusion as to the presence of water of crystallisation.

Mr. Levy did not succeed in proving the presence of sulphurous acid in the permanent hydroquinone, but found one quarter per cent. of sulphur, originating, he thinks, from sulphuric acid, which he considers an im-

* The quantity of oxalic acid calculated by Mr. Levy at the end of his article on the oxidation of white hydroquinone is unimpeachable. If the molecule hydroquinone (110) give the molecule oxalic acid (90), one gramme hydroquinone must yield 0.818 grammes oxalic acid, not 0.673 grammes. It, however, 0.673 is the result of a hypothetical calculation based upon 87 per cent. of hydroquinone in the white commercial article, then Mr. Levy's test has still yielded 8.9 per cent. too little oxalic acid.

purity of the preparation. As he finds sulphur Mr. Levy doubtless tested with chromate of lead, instead of oxide of copper, which necessary circumstance he omits to state, though, if my supposition be wrong, his results must be corrected. Even on boiling three to five grammes of the crystals with water, there is a distinct smell of sulphurous acid, which latter also manifests itself by reddening moist blue litmus paper held to the mouth of the vessel.

The quantity of sulphurous acid being very small, it was measured in the iodometric manner in Bunsen's apparatus. In performing this operation it must not be forgotten that hydroquinone volatilises in the presence of aqueous vapour raised to the temperature of steam, and is also oxidised by iodine. Hence comparative tests were made.

I.—Ten grammes of white hydroquinone, boiled for three minutes in Bunsen's apparatus, reduced 0.00952 gramme iodine. The same quantity of permanent reduced during that time 0.06069 gramme iodine. To arrive at the quantity of sulphurous acid deduct the quantity of iodine reduced by the white crystals, and the result is 0.13 gramme sulphurous acid in the permanent sample.

II.—Ten minutes' boiling resulted in 0.122 per cent. of sulphurous acid, or an average on the two determinations of 0.126 per cent.

As sulphuric acid does not evaporate or decompose at steam temperature, and as the permanent reduces more iodine than the white hydroquinone, it follows (apart from other preceding proofs) that sulphurous acid is contained in the former.

Even from his own results, which, as proved above, are for the greater part erroneous, Mr. Levy had no right to conclude "the white sample, therefore, would appear to be the better of the two." Only the practical photographer can decide that question by valuing a preparation according to whether it performs certain required effects or not. But this he does not attempt from purely scientific analytical data.—I am, yours, &c.,

Dr. ALFONS LANGER.

Dr. H. Byk's Laboratory, Berlin, March 27, 1889.

CARBUTT'S FILMS.

To the Editor,

SIR,—As no doubt many will be using Carbutt's new films when it becomes known how good they are, I venture to send a description of a contrivance I use to facilitate washing them, the only difficulty I have had with them. The films are not quite stiff enough to stand up in the ordinary washing rack. I have overcome the difficulty in the following way:—I obtained some strips of thin zinc half an inch wide, and three quarters of an inch longer than the width of the film. Place a strip under the middle of a glass plate the size of the film, and bend over the two ends of the strip on to the top side of the glass plate. Take the films from the fixing bath, bend it slightly and slip the edges under the bent-over ends of the zinc strip, being careful to put the celluloid side next the glass plate. The glass with the film on it may now be stood in the ordinary washing rack; when washed stand in a draining rack, or, better, against a wall, till dry.

I find it impossible to wash these films in a dish, they stick so close together, also the celluloid is so hard that the edges are liable to scratch the gelatine if more than one is put in a dish at a time.

I would add, no other film I have come across can compare with these, they differ in no way whatever from glass plates in treatment, and I believe the high price compared with glass is the only thing which will prevent their having a big sale.—I am, yours, &c.,

The Hut, Ingatstone, March 26, 1888.

H. G. M. CONYBEARE.

VALUATION OF HYDROQUINONE.

To the Editor,

SIR,—I have just read Mr. W. B. Bolton's remarks on my paper concerning the valuation of hydroquinone, and if I am not taking up too much of your valuable space, I would like to reply to some of the criticisms made by Mr. Bolton.

I must own that I was not aware that only one make of hydroquinone was sold as "permanent," else I should certainly not have used the term in designating the sample which had been specially submitted to me by the Photographic Club. It must almost be remembered that I did not intend the paper for publication, and that it was only by request of the members of the Club that it was published.

I do not think there is any harm in my mentioning the name of the maker of the white sample. It was given to me by a friend as coming from Messrs. Hopkin & Williams. I do not think that this firm would be much benefited by any commendation that I could give.

Now as to water of crystallisation. I must state that I have been unable to find in any work on organic chemistry, and I have consulted most of the best, any mention of hydroquinone crystallising with water of constitution.

Still the figures yielded by the analysis remain. When I obtained the result of a first experiment, I thought that the discrepancy in carbon must be due to some fault in manipulation, and it is only after obtaining identical results from three different combustions of the same sample

that I came to the conclusion that the analysis must be correct. It seems strange that on calculating the excess of hydrogen into water, one should obtain in both cases the theoretical percentage composition of hydroquinone, or very nearly so.

Mr. Bolton's observation of what takes place during the fusion quite agrees with mine. If, therefore, the discrepancy of carbon is not due to the presence of water of crystallisation, the analyses of both samples as obtained from the combustions—the oxygen being determined as usual by difference—would be:—

	Permanent hydroquinone.	White hydroquinone.
Carbon	47.755	57.300
Hydrogen	6.745	6.196
Oxygen	45.500	36.504
	100.000	100.000

These figures do not yield any formula approaching that of hydroquinone, and I repeat that it appears to me at least surprising that the hypothesis of the presence of water of crystallisation should give results so closely agreeing with the theoretical composition, if this hypothesis is unfounded.

The results of this investigation on hydroquinone having, I must confess, rather astonished me, I thought I would examine some pyrogallie acid, of which I had just bought an ounce to be used in gas analysis for the absorption of oxygen. I hasten to state that there was no maker's name on the bottle and that the label simply stated "Pyrogallie Acid Resublimed." I made two combustions, of which I give the results side by side with the theoretical composition corresponding to $C^6 H^3 (OH)^3$.

	A.	B.	$C^6 H^3 O^3$
Carbon	59.230	59.132	57.160
Hydrogen	7.281	7.255	4.450
Oxygen	33.482	33.613	38.390
	100.000	100.000	100.000

Here again we meet with a considerable difference from the theoretical composition, though not as great as with the samples of hydroquinone. It will also be noticed that the carbon is found in excess as well as the hydrogen.

It strikes one that the product under consideration must have been modified in resubliming, and I may state that the crystals obtained in subliming hydroquinone are very different to any of the commercial samples I have seen. I do not think that, supposing hydroquinone to contain water of crystallisation, it will necessarily part with it when kept over sulphuric acid, as Mr. Bolton proposes to do. The formula of hydroquinone is most certainly accurate as it stands. The question is, whether the products that we buy under the name of hydroquinone are really that compound.

I am afraid that Mr. Bolton misinterprets my meaning with reference to the sulphurous acid point. An analyst simply reports on the sample intrusted to him. Mine contained no sulphurous acid, but sulphuric acid corresponding to .25 per cent of sulphur. I do not at all say that this is an impurity, but only that "it may be a simple impurity." The sulphuric acid may certainly be formed by the oxidation of sulphurous acid originally put in the compound. When I said that the "sulphur must be due to sulphuric acid," I meant the sulphur in my sample, and the sulphuric acid present in that sample.

It would be extremely difficult to compare one sample of hydroquinone or of pyrogallie acid with another with a view of determining its photographic value. It had struck me that chemical analysis might at least help to form an idea of relative value. The results obtained are certainly not very conclusive, as in all cases they differ from the admitted constitution of the chemicals, and, on another hand, I am afraid that it would be very difficult to say what proportion of the reducer contained in a developer is really utilised in developing the image. In my opinion the greater part is wasted in the case of pyrogallie acid.

I have to thank Mr. Bolton for his flattering appreciation of the value of my paper, and I am well pleased that it should have been criticised, since this will serve to bring more forcibly an important subject before the photographic world. Apologising for the length of my communication—I remain, yours, &c.,

ADOLPHE M. LEVY, C.E.

37, Bassett-road, Ladbroke-grove-road, W., March 25, 1889.

QUINOL.

To the Editor,

SIR,—A controversy is going on between the agents of the two German chemists as to the relative purity of their products of this reducer.

Having no interest beyond seeking for the truth, I beg to offer the following observations and experiments, taking the last first:—Having made up a matrix of about ninety ounces, I took two measures of this, five ounces each, and added an equal quantity of quinol from each maker. I found no difference in developing power, although from a rough, former trial I was inclined to a very decided preference to the quinol produced by Dr. Byk. Strictly, as Dr. Byk's contains some other chemical, it is presumable that in an equal weight from both makers the one would not

contain so much quinol as the other, but I doubt if it makes any appreciable difference. Again, I found that Dr. Byk's crystals, before they became finally dissolved in the matrix, turn white, also, if a few grains are crushed, as I crushed them, by one direct pressure (with my metal pipe stopper on paper on a board), they become white under the one direct pressure, although if ground up small to powder, as can be done, the white and yellow mix again. I left some of each maker's crushed and exposed to the air all night, also an equal portion from each dissolved in two equal quantities of soft water, leaving them exposed all night in open measures. In no case did I find any visible deterioration. Now I believe in the identical purity and power of each, although I am told numerous complaints have reached the agents of Dr. Byk that his quinol does not keep; but what does that mean? I never found that which he at first produced (white) deteriorate, and I have made up over one thousand ounces, a large quantity of it with his quinol. The complaint is so vague. If, for instance, persons will leave their chemicals, of any kind, unstoppered or uncorked, they must expect change; even stoppered it is not always preventable, and not intended it should be. What is the history of chemistry but change?—not certainly permanency. Its a misleading term. If it is meant that when mixed with other chemicals for development the mixture does not stand, that is more likely to be the fault of the matrix, which does not sufficiently control the reducing agent, than the reducing agent itself. Now I suppose nobody doubts that the yellow colour of Dr. Byk's production is due to sulphur in some form, either produced by SO_2 , H_2SO_3 , or H_2SO_4 .

Is it possible the crystals could be formed or dried in a vapour of burning sulphur, or evaporated out after being dissolved in sulphurous acid, or—? Unfortunately I am no chemist, but appearances seem to point to Dr. Byk's "permanence" being obtained by the coating of the crystals, and that it is therefore not a chemical combination, but really a mechanical enclosure so to speak, which adds to the cost of production, as is evident; but the commercial question ought not to be touched on here probably. Anyway, I do not think there is any ground for a dispute as to purity, and doubt if either the one or the other will prove his case. As I said before, I question if there is any benefit in this extra case as bestowed by the one and not by the other on this reducer.—I am, yours, &c.,

W. T. F. M. INOALL.

Greenhithe, March 23, 1889.

DETECTIVE CAMERAS.

To the Editor.

SIR,—On reading the communication from "Pylas" (in last week's issue) my first inclination was to look for the description of Aird's camera referred to. Unfortunately I have not beside me any JOURNALS prior to 1878. However, that does not much matter, knowing that Haddow's detective camera, described in the JOURNAL of March 15, must essentially differ from any form brought into the market in 1876.

This camera is undoubtedly one of the latest of all detective cameras—not a thing of the past, even though, from my description of it, there might apparently seem to be a similarity. It would have been much more satisfactory if "Pylas" had carefully inspected this new camera before tendering his opinion and assertion that it is simply a copy of one invented seventeen years ago. Mr. Haddow has, I believe, been requested to show his camera at the next meeting of the Edinburgh Photographic Society, to be held on April 3, when "Pylas" will have an opportunity of inspecting it and making further comment. Undoubtedly it is a little larger than some of the miniature dwarfs now sold, but this is counter-balanced by numerous advantages which it otherwise possesses. As each plate is exposed and automatically removed, an ivory indicator moves into position with the number of the plate (then in position) engraved thereon, so that there can be no mistake regarding the number of plates left in the camera, ready for use. When the exposed plate is removed it is entirely separated from those which are still unexposed.—I am, yours, &c.,

GASKIN WOOD.

6, St. Bernard's-row, Edinburgh, March 23, 1889.

DOES QUINOL CONTAIN WATER OF CRYSTALLISATION?

To the Editor.

SIR,—The analyses of two samples of quinol given by Mr. Levy in your issue of the 8th instant are so remarkable that I trust you will allow me to draw attention to their suspicious-looking character. Like Mr. Levy, I have been engaged in examining various samples of quinol (including that sold as "permanent") for the firm with which I am connected. In no case have I found a sample to contain water of crystallisation. Mr. Levy's figures look very imposing, no doubt, to the uninitiated, especially as he has taken the trouble of calculating his results to the third place of decimals (!), thus implying an accuracy of more than seventeen thousand times (!) as great as that to which he seems capable of working, judging from his carbon determination in the case of "permanent" quinol. The most accurate workers are generally the most modest in their claims. The most amusing point in Mr. Levy's paper is the agreeable manner in which the author's hypothesis of the

presence of water of crystallisation fits in with his results; but to be candid, it appears to me as if the reverse operation had been effected.

It will possibly interest Mr. Levy to learn that quinol may be completely oxidised to carbonic acid and water with less trouble than he seems to have experienced, and with more perfect results than he obtained with the combustion method. Potassium permanganate, the agent which Mr. Levy tried and abandoned, is the one which I employed; but as I have already published the details of the method (*Journal of the Society of Chemical Industry*, Vol. VI., pp. 98 and 269) it is unnecessary to describe the process here. With this method I obtained, with two samples of quinol which are constantly kept in stock by our firm, a consumption of permanganate corresponding to 97.6 per cent. and 97.8 per cent. respectively of pure quinol.

I might also mention that I experimented upon the oxidation of quinol by direct titration with permanganate, as indicated by Mr. Levy, and with more satisfactory results. In fact, if the acidified solution is titrated near the boiling point, a rapid and fairly accurate estimation of the value of a sample of quinol may be made. The reaction should be considered complete when a drop of permanganate is not discoloured after waiting twenty seconds. The quantity of permanganate used when this stage has been reached I find to correspond closely to the following ratio:— $\text{C}_6\text{H}_6\text{O}_2 + \text{O}_{10}$.

Of course these tests should be supplemented by others of a qualitative nature to ensure the absence of other bodies which reduce permanganate.—I am, yours, &c.,

I. H. SMITH, PH.D., F.I.C.

Mawson & Swan's Laboratory, Love Fell, Gateshead, March 23, 1889.

FRAMING PRINTS IN OPTICAL CONTACT.

To the Editor.

SIR,—In a late issue I observe F. R. Fisher inquires for a special mount for silver prints placed in contact with glass. The mounts he requires are supplied by Messrs. Marion & Co., 22 & 23, Soho-square, London, and are known as patent opalocrysts. Trusting this may be of service,—I am, &c.,

H. HEATHEN, C.E.

9, Corporation-street, St. Helena, March 23, 1889.

Exchange Column.

*. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, good rolling machine in exchange for gas bags.—Address, G. H. BRADSHAW, Bowdon.

A cabinet portrait lens (focus, nine inches; diameter, three and a quarter inches), by Lerebour; exchange for sewing chair with two or more backs.—Address, HORTON, Photographer, Caroline-street, Carlisle.

Will exchange a half-plate portrait lens by Lerebour & Secretan for a view lens by good maker; and a small gold watch, worth about 8s., for quarter-plate camera and lens with shutter.—Address, R. H. THOMAS, Rite Studio, Youghal.

Answers to Correspondents.

*. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

WRIGHT.—We shall have an article upon the subject soon.

HENRY W. BENNETT.—Apply for permission to the Board of Works.

LEONARD BRIGGS asks for the best kind of acid for cleaning brass.—Oxalic acid.

Q.—Better hinge the ground glass to the camera, it is much handier than sliding it in or out.

DIAPHRAGM.—It is immaterial whether the calico be wetted or not, but had it been paper it would be necessary to do so.

WALTER.—But the print in optical contact with the glass so as to show a margin all round, then apply a suitable paint to the glass.

WATERHOUSE asks: "How can I make paper waterproof?"—Brush it over with a strong solution of castile soap, then when nearly dry paint it again with a solution of chrome alum.

TUNING BATH.—1. A toning bath made with acetate of soda requires to be kept twenty-four hours before using.—2. If you employ bicarbonate of soda instead of acetate it can be used as soon as made.

E. AUSTIN.—Seeing your lens worked well previous to it being scratched by the boy, we imagine that its imperfect performance is attributable to such scratching, but cannot definitely say unless we saw it.

H. H. WILLIAMS. Newman, 24, Soho-square, publishes a shilling work, *Reasons and Colouring as applied to Photography*, in which directions are given with great fullness, much more so than would be possible in this column.

A. H. B.—The transparencies are very nicely done. Subject to this one fault, that they show a lack of vigour, but this can easily be obviated in future by longer development. They have been handed to our publisher to await your instructions.

A. S.—To restore your printing bath, place it in a clear bottle, add kaolin, shake well, and place it in the sun; the colouring matter will be precipitated, leaving the solution clear. The best methods of preparing ready sensitised paper are held as trade secrets.

R. H. THOMAS inquires: "Can you tell me how blue opal pictures are made?"—In reply: Obtain from the Autotype Company samples of their blue pigmented tissues, and having selected the one that suits your requirement, print by the ordinary carbon process.

MECHANICAL PRO.—We know of no means by which the addresses of such a numerous body can be obtained other than by advertising in one of the daily papers. Even the *London Directory* fails to supply a complete list owing to so many conducting business in the suburbs.

H. JACKSON (Leeds).—No means can be adopted for hastening the drying of the gelatine other than heat and inserting the plate over a flat tray containing chloride of calcium. By screening or covering the drying box with one fold of calico there is scarcely much chance of dust entering.

T. E. G.—If the sulphite of soda is to follow previous treatment of the negative with bichloride of mercury the strength of the solution is immaterial. The article on intensification appeared in our issue of August 10, 1888. The number can be obtained on application to the publisher.

AS EDINBURGH FRIEND.—1. In connexion with the correspondence that took place relative to the camera mentioned by Mr. Gaskin Wool, Mr. A. Taylor has shown us one in which the plates are transferred from a reservoir above to a rack box below, these being moved in opposite directions by means of racks and a pinion.

R. J. COLEMAN says: "I have taken some stereoscopic pictures and send you two as a sample; can you tell me what is the matter with them? I cannot see them properly when viewed through a stereoscope."—In the samples before us the pictures are mounted wrongly; reverse the positions of the prints and they will appear with the desired effect.

HENRY SPINK. To silver copper without a battery, make a strong solution of cyanide of silver by adding cyanide of potassium in solution to nitrate of silver, also in solution; continue the addition until a dense precipitate at first thrown down is redissolved. The immersion of articles of brass or copper in this solution insures an instantaneous coating of silver; this the more especially if a slip of zinc be also inserted under such circumstances that it shall touch the article above, but not below, the surface of the solution.

C. WRAY PALLISER.—The markings in the plate appear to be caused by an impurity of the water. Try the following:—After taking them from the washing water remove all the surface moisture by means of blotting paper or by pressing in contact with a piece of clean muslin, then allow to dry spontaneously. Concerning the yellow stain on the transparency, it improved the effect so much that we were loth to attempt its discharge; however, we immersed it for a few seconds in a solution of bichloride of mercury to note the effect, when we found the stain was entirely removed.

T. McGUIRK (Tyron).—To take landscapes by a portrait lens remove the back combination altogether and screw the front one in its place, in this position a stop must be employed, the exact size of which can best be ascertained by direct experiment. By this arrangement portraits may also be taken in the studio, but the focus being now so much longer than that of the lens in its complete state a longer exposure is necessitated. A portrait lens to be employed for pure landscape work must be stopped down in a material degree, and this almost invariably entails the production of a flare spot in the picture.

CAPTAIN BARLOW asks for a formula for making emulsion for opal plates.—Let eighty grains of hard gelatine be dissolved in one ounce and a half of water, seventy-five grains of nitrate of silver being also dissolved in half an ounce of water, and in another half ounce of water twenty-one grains of dry chloride of sodium and a like quantity of citrate of potassium. To mix these, warm the silver solution and pour it into the gelatine, then add the soda and potash solution (warm), stirring all the time, and pour into a dish to set. Wash the emulsion by means of cold water. Next liquify it by heat and add two drachms of alcohol containing three grains of salicylic acid and one grain of chrome alum in a little warm water; filter, and coat the plates. This emulsion is very thin and will not keep, hence it must all be used at one time of coating. The plates are printed full out in the printing frame, no developing being necessary. After being printed, wash, and then tone in a borax bath; fix in hyposulphite of soda as usual.

L. D.—1. No alteration can be made in your lens that would confer in it the property you wish; both its construction and its focus are unfavourable to this end; you should exchange it for one of the so-called rapid class of doublets of smaller diameter and shorter focus.—2. A lens cell may often be removed from the tube by passing around it a belt of strong leather and holding the ends tightly in a vice, now grasp the tube and exert sufficient force to start the screw.

PHOTOGRAPHIC CLUB.—April 13.—Discussion on *Salted Paper*.

MANCHESTER PHOTOGRAPHIC SOCIETY.—At the last meeting it was resolved to invite matters of stereoscopic interest, both pictures and apparatus, for the next meeting, which is to be held on April 10.

THE first smoking social of the Liverpool Photographic Association took place on the 22nd instant, and was a great success. The programme, which was got up in a humorous style, being ornamented with photographic caricatures, comprised duetto for piano and violin, mandolin solos, and songs of various sentiments.

EXTENSION OF THE BURNLEY PHOTOGRAPHIC SOCIETY.—A meeting of this Society has been held, at which it was determined to include ladies, professional photographers, and all who take an interest in the science. Premises in Bank Chambers, Hargreaves-street, have been taken, and one of the rooms has been thoroughly fitted up as a dark room. It is hoped that the photographers of the district will avail themselves of the privileges thus offered.

NEW SOCIETY.—A photographic society has been formed at University College, the membership of which is open to all past and present teachers and students of the College. The annual subscription has been fixed at two shillings and sixpence, with an entrance-fee of the same amount. The meetings of the Society will be held on alternate Tuesdays during the session, and will commence at 5 p.m. Those members who desire it may have notice of the meetings sent to them by post on payment of one shilling in advance to the Secretary in addition to their subscription. R. T. Plimpton, Ph.D., Hon. Treasurer; W. North, M.A., Hon. Secretary.

A NEW form of sensitive flame has been introduced by Messrs. Thomas Fletcher, Warrington; it is produced by a special form of Argand Bunsen burner, which when lighted has inside of the ordinary flame a green ring of flame. When this burner is turned low the green portion of the flame disappears and the flame will then respond to ordinary conversation, and a loud clap or cough will cause it to go out. The flame emitted from this burner is of a very transparent character. We believe that this is the first time that an atmospheric burner has been used for the production of sensitive flames. It is neatly made of iron and brass and is sold for 1s. 9d.

A PHOTOGRAPHIC CLUB AT YONKERS, NEW YORK.—The Yonkers Photographic Club was organized on February 15, 1889, by the election of the following officers: G. Livingston Morse, President; Robert M. Reeves, Secretary and Treasurer; and the following Executive Committee: Salter S. Clark, R. Eickemeyer, jun., and F. W. R. Eschmann. The Club has forty members, and the roll is still growing. A very fine suite of rooms, overlooking the Hudson River and Palisades, has been secured in the Deyo-building, corner of Warburton and Wells Avenues, which are now being fitted up in the most approved style. Regular meetings are held on the first Friday of each month, and the annual meeting on the first Friday in April.

MR. G. J. CARTWRIGHT, writing from Buenos Ayres, remarks:—"Allow me to point out some errors contained in your list of photographic terms in Spanish, page 612 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1889. The language employed is Spanish, but the terms are anything but the technical ones employed by Spanish-speaking photographers and chemists. For instance, a photographic plate in Spanish, whether wet or dry, is 'chapa,' 'plancha,' or 'placa,' the latter being the word generally used, and never 'plato,' which means a plate to eat off, and which used in the other sense is ridiculous. 'Have you anything to declare?' ('Tiene v^d algo que pague derechos?'), contrabando is far too strong a word. Photographer is Fotógrafo, not Fotografiista. Dark room (Laboratorio). Nine (Nueve, not nueve). Focussing cloth (Paño negro). Focussing glass (Vidrio esmerilado ó mate). Stoppings (Diafragmas). Dish (Cubeta, and not fuente, which is used for eating). Chemicals (Drogas, and not químico, which means a chemist). Bromide of ammonium (Bromuro de amonía). Ferrous oxalate (Oxalato de hierro). Carbonate of ammonium (Carbonato de amonía). Bichromate of potash (Bichromato de potasa). Neutral oxalate of potash (Oxalato neutro de potasa). Soda is generally called by the same word in Spanish. Water is Agua, not agua. Glass measure—Medida de cristal para líquidos. Vaso means a tumbler.

ERRATUM.—We are sorry that, by a misapprehension, the article *Twenty Years of Amateur Photography*, published (p. 202) in our last, was made to bear the name of Mr. V. C. Baird as its author, instead of that of Dr. J. K. Tulloch, M.B., by whom it was written.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1509. VOL. XXXVI.—APRIL 5, 1889.

REDUCTION IN PRICE OF "THE BRITISH JOURNAL OF PHOTOGRAPHY."

IN view of the unprecedented success of THE BRITISH JOURNAL OF PHOTOGRAPHY since its foundation, thirty-five years ago, the proprietors believe the time has arrived for increased effort to meet the ever-growing popularity of the JOURNAL, and that this purpose will be attained most effectively, both for readers and advertisers, by the reduction of the price of the JOURNAL from 3*s.* to 2*d.*

This important reduction in price will doubtless still further increase the influence of the JOURNAL, and largely augment its already extensive circulation at home and abroad.

Subscribers who have already paid their subscriptions on the old scale will have the reduction placed to their credit or remitted, as they may desire, by the Publishers.

The Editor takes this opportunity of assuring the readers of the JOURNAL that the reduction of price above referred to will not in any way modify the general conduct and efficiency of the JOURNAL, which will be carried on, if possible, with increased energy in every branch of photographic research. The services of specialists in every department are secured as heretofore. This includes patent law as applied to photographic inventions; chemistry and optics; while in the departments of practical and theoretical photography, in all its branches, nothing will be left undone to ensure the continuation of the high position the JOURNAL has always maintained.

A commodious and well-appointed dark room has just been fitted up at the editorial and publishing offices, which will be at the service of any one who desires a suitable place for changing dry plates or for making experimental or tentative trials of developers. Friends passing through London to or from the provinces, India, the Continent, America, and elsewhere, will find this a source of great convenience.

The publishers desire us to announce that in accordance with the reduction in price, the subscription will be as follows:

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It also may be obtained from all booksellers, photographic dealers, and railway bookstalls, price 2*d.* Special terms to Photographic Societies.

DR. HILL NORRIS'S RAPID COLLODION PROCESS.

As announced last week, we are at length able to lay before our readers the full details of the rapid collodion process mentioned by its inventor at the last Convention at Birmingham, and of which the specification will be found in another column.

The name of Hill Norris was a household word on the lips of photographers of a previous generation, especially of amateurs, then almost the only users of dry plates; and five-and-twenty years ago the Hill Norris plates were practically, if not absolutely, the only commercial dry plates obtainable. It is needless to say that they were collodion plates, and, moreover, prepared with the bath, for they antedated collodion emulsions, which may, indeed, be said to have superseded them. The preservative employed was generally understood to consist of gelatine, and the resulting films when dry were thin, delicate, transparent, and extremely hard, while they developed easily and regularly with, for collodion dry plates, very short exposures.

It is scarcely surprising that the old users and lovers of collodion dry plates should sigh at times for the charms of their old favourite methods of bygone days; the rapidity of modern gelatine films has, however, hopelessly displaced the old style, though there are not a few, especially among the older workers, who would at once return to collodion if a rapidity at all approaching that of gelatine could be safely and practically attained.

To the more genuine workers of the old amateur type—the preparers of their own films and the makers of their own pictures—the question of trouble would form but a subsidiary matter, providing the rapidity combined with quality of result were obtainable. To the ordinary amateur, and for commercial purposes generally, however, it is absolutely necessary that the process of preparation be sufficiently simple to allow of the industrial production of the sensitive films on a vastly more extensive scale than was formerly the case. We may therefore consider Dr. Norris's process from these separate points of view, pending a thoroughly exhaustive trial of the actual working.

Looking at the early methods preferred by Dr. Norris, it is not surprising that on returning to his old love he should proceed on very similar lines. The method is, in fact, a "bath process," the film containing the silver haloids being entirely freed from soluble silver salts, and treated with an alkaline "accelerator," and either used wet or after the application of a preservative dried for future use. In carrying out this method the ordinary routine of the bath collodion process is varied inasmuch as the soluble silver salt—the nitrate, for instance—is combined with the collodion, while the bath consists of a solution of the different alkaline and metallic haloids required to

give the desired effect. In an alternative method, however, the collodion is prepared in the customary manner with iodides, bromides, and chlorides, possessing sufficient solubility in alcohol and ether, and the films so produced are sensitised in a bath differing from the ordinary silver bath on being saturated with certain double salts, namely, the iodo-bromo and chloro-nitrates of silver, and in containing an extraordinary proportion of free nitric acid.

The details of preparation present scarcely any further departure from the ordinary bath process, unless, indeed, it be in the length of time the film is to be immersed in the bath—"from fifteen to forty-five minutes;" and while we must confess to a feeling of disappointment at finding so little to encourage the hope for any exalted degree of sensitiveness, we feel convinced the general verdict will be that the process is not quite practicable for present-day commercial purposes. In expressing this opinion we need only compare the modern system of coating plates by machinery at the rate of several hundred dozens in the hour and the proposed revival of the old plan of individual coating, each plate requiring an immersion of from a quarter to three-quarters of an hour—not in one bath only, but in a succession of several separate ones.

It is clear, therefore, that, presuming the process to be capable of producing the rapidity and excellence of results claimed for it, it may perhaps be successfully and profitably worked by the more enthusiastic amateur or worker on a small scale, though the commercial plate maker would find himself at a loss to meet the demand created by the brief rush for the films as a novelty.

To briefly refer to the working details as set forth in the published specification, the first point that strikes us as worthy of comment is the composition of the collodion. This is directed to contain seven grains to each ounce of pyroxyline, made at a temperature "of about 200° Fahr." Now, speaking from an experience of many years in pyroxyline making for almost every possible purpose, we consider that such a temperature is impossible, and that, even if it were possible, the resulting pyroxyline would be useless for any photographic purpose. Those who have had any experience in the manufacture of "high temperature" pyroxyline for emulsion work, will know how delicate an operation it is at a temperature of only 170°—the highest, by the way, we have ever heard practically recommended—and there is a vast difference between that and the higher degree mentioned in the specification.

Then, again, the liquid contents of the collodion are abnormal in their relative proportions. Seven grains of pyroxyline are to be dissolved, we are told, in two drachms of ether and one drachm of alcohol, and the silver nitrate in eighty drops of glycerine and five drachms of alcohol, and the two solutions mixed. It is quite impossible, without actual trial, to say what will be the weight or volume in minims of "eighty drops" of a viscid liquid like glycerine, but we will assume that it is, at any rate, a drachm and a half, probably *very much* more. What, we will ask our old "collodion" readers, is likely to be the physical character of a film prepared from collodion containing seven grains pyroxyline, two drachms sulphuric ether, six drachms absolute alcohol, and *ninety minims of glycerine*? As ten minims of water would amply suffice to replace the above quantity of glycerine in dissolving the silver, the impracticable character of the formula is evident, but even then the proportion of three of alcohol to one of ether are prodigious.

So far as the substitution of a bath of haloids for that of silver is concerned we have nothing to say. Obermeyer,

amongst others, published only a few years back a process based on that principle, but it is doubtful whether any advantage was ever found to accrue.

Is not the partial conversion of silver chloride into bromide and iodide by means of the corresponding soluble haloids, and of bromide into iodide by similar means, calculated to give rise to a great deal of uncertainty, unless the bath employed contains a definite quantity of the halogen it is required to substitute, and *is allowed to exhaust itself*?

The employment of the alkaline accelerator, either with or without the addition of a preservative of gelatine, albumen, or similar substance, was at one time strongly recommended by the late Thomas Sutton, who in 1871 published it in pamphlet form.

Turning to the alternative or "acid" process, the employment of a silver bath, saturated with iodo and bromo nitrates, will appear to most of our old wet collodion readers a somewhat heterodox proceeding. The silver bath was always considered to be in its best condition as regards sensitiveness when new, becoming slower in action as it became charged with ether and alcohol and double salts derived from the films immersed. Yet here we have these same double salts added to promote sensitiveness!

Again, the nearer a bath approached neutrality, the more sensitive it was usually considered to be, the addition of acid promoting cleanliness of working, but reducing the rapidity. Mr. J. W. Black, of Boston, however, some fifteen or sixteen years ago, published a process in which a *very large* addition of nitric acid was made to yield rapidity. In Dr. Norris's process the same result is attained by the use of from forty to one hundred minims of dilute nitric acid of specific gravity 1.101 to each ounce of bath—equivalent to from eight to twenty minims of strong nitric acid of specific gravity 1.45 to the ounce.

For the present, space compels us to leave the subject, but we shall lose no time in practically testing the process, adhering, *as far as it is possible*, to the strict details laid down.

PRACTICAL CONSIDERATIONS IN STUDIO BUILDING.

III.

WE may now leave those structural considerations more essentially connected with outside influences, after dwelling for a short time upon a condition already dealt with—the existence of a lofty wall, or building, against which a studio may be erected. We have shown that when such a structure lies at the south end of the studio, it is of immense service in warding off the direct rays of the sun, and so avoiding excessive heat in summer, besides being free from midday sunbeams between lens and sitter; but a professional friend points out to us a still further benefit such a structure affords, which he has experienced to the full. Every photographer is aware of the evil effect upon the quality of his negatives through light from sky or clouds falling upon the lens, and the fastidious worker will not, until they are combated, attempt to obtain a negative where such conditions exist and are avoidable. Lens screens in plenty have been devised and are in use to prevent this access of light; but all require adjustment, according to circumstances, in places where more sizes of plate than one are used, and the lens power is not single. The gentleman we refer to points out that when there is a large building behind the sitter, it almost obviates the need of any screen of the kind, and any one who has worked under such conditions and then

builds a new studio without the advantage of a similar protection, although he use lens hoods, &c., may be excused for not discovering at once the cause of the occasional slightly foggy plates that he is almost sure to obtain at intervals. This is a point of great moment.

A lofty studio will of itself, but not entirely, unless of very extraordinary dimensions, tend to obviate the need for outdoor obstructions, and, from many points of view, a design which gives high walls will be very advantageous. Foremost in this way may be placed freedom from oppressive heat in summer time. A small studio is so quickly made hot that, unless a very complete outside protection from sun rays is devised, it frequently becomes insufferably close, while larger rooms, even with skylights of proportionately equal size, are far more pleasant. This question, however, touches so closely upon considerations of finance that we will not dwell further upon it than to point out one too frequently overlooked consideration, which is as follows:—The taking of groups, we may safely say, is now much more frequent than used to be the case, and the advantages of a lofty room are, for this work, of overpowering force. Thus, if any pretence whatever to selective illumination is attempted, and a completely "all round" lighting be not adopted, a dozen figures might easily be posed in a lofty studio without any striking inequality of illumination; but in one of lower proportions the illuminating aperture of the roof is of such varied proportions as regards the different individuals of the group, that while those on one side are in bright light, those at the further side may be in comparative darkness.

Following upon the height of the roof is the question of what its pitch is to be, and here practical experience tells that the mere question of shape of roof as regards its illuminating possibilities should not be the only consideration. Efficiency for purposes of portraiture must be the prime factor; but regard for it should not be allowed to obscure other matters of importance. Thus, though it is true that in winter time less photographing is called for than in the brighter days of summer, there yet is always in many studios a steady amount of work done in the depth of winter to which a heavy fall of snow may quickly put a stop. Other things equal, a steep roof will always be far more quickly rid of a snow covering than one of more gradual slope, and might at times be a matter of great importance. Of course all glass roofs should be so constructed that when a snowfall does lodge upon them it can be easily removed; but, as a matter of fact, we need scarcely tell our readers such facilities are the exception rather than the rule. "A man with a ladder" too frequently has to be sent for, and too frequently cannot be found; many a sitter has to remain unphotographed from this cause. This is, naturally, only exceptional, yet it should be provided against, if only for the possible chance of the frequent winter studio visitor, the sitter in "fancy dress," whose habiliments are usually only his for the brief space of two days.

We may here describe a plan for dealing with the difficulties of an inaccessible roof which we have seen, and that appeared to us eminently useful and practicable, not to say philanthropical. The glass roof was erected upon walls which went sheer down to the ground without a break for upwards of fifty feet, and to use ladders for roof work was difficult and costly, and workmen were rather chary of venturing upon this precipice, as they termed it. The difficulty was apt to become so troublesome, and the proprietor of the studio felt so great a responsibility for the safety of the workmen who had to clean, paint, or repair, that, with the consent of the neighbour whose

premises would be to this extent trespassed upon, he erected a narrow platform, protected by a handrail, outside the whole length of his studio, and from it there was no difficulty in getting upon the roof, and no trouble was in future experienced through unwilling workmen.

As an example, however, of the personal supervision which should be given to all work of importance, we may give our readers the personal experience of the gentleman who had this structure made. He entered into no contract, but gave instructions for a "neat and safe platform" and rails to be made. The platform was secured by bolts attached to large iron plates fixed on the inside of the wall, and the two lines of protecting rails were held by a series of iron uprights, which were further stayed to the sash-bars at intervals from their highest points. When all was finished, the proprietor himself went to test the safety and utility of the structure, and while talking to the workman who was engaged upon this "safeguard," leaned against the rails. "Do not do that, sir; it might give way!" Explanation being indignantly demanded why the money lavished on this means of protecting workmen should have been thrown away in the production of a worse than useless arrangement, it turned out that the rails, instead of being made of iron bars, were of brass gas-pipe, rendered still more fragile by being half cut through in tapping them for screwing the sections together! The brass piping made a larger bill to bring in, and so the original question of safety, and the whole purpose of the erection, was utterly ignored.

AN article by Mr. W. K. Burton on page 233, in which he treats of the elimination of hyposulphite of soda by alternate washes of hot and cold water, reminds us of the system adopted by the lately deceased veteran photographer, Mr. James G. Tunny, of Edinburgh. This experienced printer never considered that a print had been properly washed until it had received a thorough swishing with very hot water. Indeed, it stands to reason that, as a solvent, hot water must necessarily act with far greater rapidity and efficiency than water which is cold. Some photographers who are inexperienced remove their prints from the hypo bath before they are properly fixed, that is, before the double salt hyposulphite of silver has been dissolved by the hyposulphite of soda. A portion of the contents of a kettle of boiling water poured over such a print will apprise the photographer of his error, as it will immediately stain the print a dirty yellow, owing to the formation of silver sulphide.

AT the last meeting of the Photographic Society of Great Britain a print was exhibited with a number of white spots upon it, which had made their appearance within a few weeks of its production. The question was raised as to the cause. Various suggestions were made as to their origin, but they were all more or less inconclusive. This character of spot has been very prevalent during the past two or three years—far more so than we ever remember before. The particular kind of spot referred to is a small white one, though it may sometimes have a very slight yellow tint. It is quite distinct from the small yellow ones often produced by sulphuration. The edges also are more sharply defined. Some prints may only have one or two spots, while others in the same batch may have a dozen or more; and they are not seen while in the toning or the fixing bath. It is not until they are finished, or more generally a few weeks afterwards, that they make their appearance. A close examination with a magnifier shows that some of the spots have a nucleus, while others on the same print have not. Yet the trouble evidently has one common origin.

IF the spots in question were due to the paper, one would expect the effect would be seen before the picture is finished. If they were due

to anything in the manipulation—for example, while they are in either of the solutions or in the washing waters—it might well be imagined that they would not be so sharply defined at the edges, but more diffused, like those arising from sulphuration. It would rather appear that the injury has its origin after the print is finished, so far as the manipulations are concerned. Mr. W. Bedford mentioned that he had known dust from burning coke to produce similar spots. Every example of this particular spot which has been brought under our notice has been perfectly consistent with its proceeding from some such cause as this—that is, from particles of deleterious matter coming into contact with the picture while in a moist or semi-moist condition. It is easy to see that anything like dust from a coke stove falling on a damp print would be productive of injury.

THERE are many matters which at times are disseminated through the atmosphere of photographic workrooms—hyposulphite of soda, sulphate of iron, pyrogallie acid, bichloride of mercury, &c., for example, all of which might act injuriously on a moist photograph if they settled upon it. When a solution of these substances is spilt upon the floor, and dry, small crystals form as a matter of course. The finer of these become diffused through the air as dust, whenever the floor is swept, and ultimately subside again to be redisturbed on some future occasion. Now it is very manifest that if a batch of prints be drying, either before or after mounting, and any particles of the materials just alluded to, or many others to be met with in photographic workrooms, come in contact with them they will act the reverse of beneficial. The effect even of a very minute particle of the bichloride of mercury, for instance, would be especially baneful.

IF any evidence were necessary of the rapid spread of amateur photography it was certainly to be found at the Universities boat-race last Saturday. Cameras were to be seen here, there, and everywhere. "Detectives" were, undoubtedly, in the ascendant. The light at the time was not, perhaps, all that could be wished, but still some hundreds of negatives were taken. We have been shown some very successful detective shots of different groups of people surrounding those itinerant vendors of purses containing coin, and the gentlemen who perform "the three card trick." These were all very truthful, and characteristic pictures of the motley groups to be met with on the boat-race day.

WATER-COLOUR artists are always particularly careful with regard to the glass used in glazing their pictures, that it should be as free as possible from colour. This is a point upon which photographers bestow but little attention, even with their coloured work, beyond that the glass is tolerably free from air bubbles. It is manifest that if any tinted medium is placed in front of a picture, the colour of the latter, as well as that of the mount, must be to an extent modified. Now much of the glass at present used for picture frames has a pronounced green tinge, which, it is scarcely necessary to say, is highly objectionable. The influence of bad glass on a photograph was well exemplified in a picture we noticed at the Crystal Palace the other day. The glass had been broken and a portion had fallen out of the frame, leaving a part of the picture bare. That portion appeared of a different tone from the other, and was far more brilliant, while the tint of the mount was also different. In fact, the picture and its mount would have shown to far better advantage had it not been glazed at all, or at least with such glass as had been used.

In glazing show-cases, when plate glass is employed, care should be taken that it is as free as possible from colour. Some kinds of plate glass have a strong green tint, while others quickly acquire a yellowish brown tinge by exposure to light. Both these varieties should be avoided for photographic show-cases, as they materially degrade the brilliancy of the pictures.

ALTHOUGH the cold tones of platinum are now so much in public favour the taste in this direction does not seem to extend to lantern pictures when they are projected on the screen. Here cold tones do not seem to be so well appreciated, and why this should be it is difficult to conceive. In a lantern exhibition pictures of a cold tone, however good

they may be, seldom meet with the same approbation as those that are of a warmer colour. If an opinion may be formed from the applause with which a rich brown toned slide is usually greeted, that colour would seem to be the one most in favour with the public, so far as lantern slides are concerned.

BROWN tones were always most admired in the old stereoscopic transparencies, although purple and purple blacks were most sought for in paper pictures. By the way, we have recently seen some excellent stereoscopic slides on opal glass which could be viewed either by reflected or transmitted light. They were on glass thinner than that generally used for ordinary opal pictures, and it was well adapted to its purpose. With glass of the ordinary thickness these particular pictures would have looked too heavy when seen by transmitted light. If a demand for a thin opal glass, or one containing less opaque matter, were created it could easily be supplied. Stereoscopic portraits on "porcelain" are very effective, and might become very popular if introduced commercially.

IN the project of the Lord Mayor for enabling certain British craftsmen to visit the forthcoming exhibition in Paris, photographers and photo-mechanical workers have not been forgotten. This is very satisfactory, and those who go, especially the latter, can scarcely fail to profit by their visit.

DURING the discussion following Mr. Andrew Pringle's paper on *Photo-micrography*, at the Camera Club Conference, one of the speakers strongly advocated photogravure for illustrating pathological works, as a means for obtaining permanency coupled with accuracy. It was mentioned that many illustrations, though most carefully drawn, often conveyed a very different impression to the mind of the student from what a photograph would do, or would the object itself seen under the microscope. Photography has been extensively employed in connexion with pathology, but, unfortunately, many of the illustrations were printed in silver, and have now faded to such an extent as to be nearly as misleading as some of the hand-drawn ones. In future, there is little doubt but that one or other of the photo-mechanical processes will be employed for all such work.

MR. VALENTINE BLANCHARD on Tuesday last gave an exhibition, at Anderton's Hotel, of specimens by his new method of producing photographs in platinum black. The paper is printed in the ordinary way, and can be watched from time to time as the printing proceeds. Toning in a salt of platinum, and fixing in hyposulphite of soda follow, the result is a print which cannot be distinguished from one of those platinotypes with which the public are now so familiar. We shall probably have more to say concerning this process soon.

Our Portrait Gallery.

I.—FREDERICK YORK.

WE commence this series with the portrait of one whose name is well known all over the world, more especially in those parts of the world where photographic lantern slides have penetrated.

Mr. Frederick York has entered upon his jubilee year, it being just fifty years since he was apprenticed to a chemist. The subject of our sketch was born at Bridgwater in 1823. Intended for the law, a few months in the office convinced him that he had no vocation for the profession, and so the articles were not signed. He was apprenticed in 1839 to a chemist at Bristol. Hence this year, as above stated, is his jubilee of commercial life. At that time Fox Talbot's discovery attracted general notice, and Mr. West, of the Observatory at Clifton, made photogenic paper, and sold it to chemists to retail at one shilling a packet. It was used principally for printing fern leaves, lace, &c. This was his first introduction to photography.

In the winter of 1853, when residing at Bath, he had severe hemorrhage from the lungs, which confined him to the house for four months. The doctor advised his going to a warm climate, and he decided on going to the Cape of Good Hope, which he did the following year. He called on a friend, Mr. Cogan of Bath, to have his portrait taken, and having told him of his plans, he suggested his going in for photography, and kindly offered him every assistance

and the use of his studio. Although Daguerreotype was then the recognised process, his friend was working collodion—in fact, was one of the pioneers of that process.

On his arrival at the Cape, in January, 1855, he found there was an opening, and he decided on abandoning physic for photography. The things he took out were soon used up and could not be replaced for five months, as there were no steamers running to the Cape at that time, and collodion there was unknown. Iodide or bromide of ammonium could not be obtained. The Dutch ether turned blood-red when iodides were added, and the spirit of wine was so carelessly distilled that it was almost useless. He had to redistil both ether and spirit, to make gun-cotton and the iodides and bromides of ammonium; and nitrate of silver he made out of Mexican dollars. Contrast all this with the facilities of the present day! He mastered it all and may be considered the first who introduced the collodion process into South Africa. He became a large importer of photographic material, and taught photography to many who travelled through the country. The change of climate was most beneficial to his health, and he never had a return of the old complaint. He returned to England in 1861, and after twelve months' rest started on outdoor work. He took over one thousand views of London in four sizes. His stereoscopic, cabinet, and large sizes (8 × 6 and 12 × 10) of animals at the Zoological Gardens, taken by the collodion process, have not been excelled.

Having little to do in the winter, he turned his attention to making lantern slides, which has grown into a business, requiring fifteen thousand negatives. His printing works are at Bridgwater, his native town, and his warehouse at 87, Lancaster-road, Nottingham, London.

Mr. York used to be an active member of the various Photographic Societies. He was a member of the Council of the Parent Society, Vice-President of the South London, and Trustee to the Photographic Club. Increasing deafness has induced him to retire.

Mr. York is a man of a mild and genial disposition, and possesses a vast fund of photographic knowledge, which he has ever been ready to place at the disposal of his brethren in the art.

The portrait is engraved from a photograph by Mr. Abel Lewis.

A METHOD OF RAPIDLY ELIMINATING HYPO FROM SILVER PRINTS, AND OTHER NOTES ON SILVER PRINTING.

THE thorough elimination of hypo from silver prints is a thing that has always been a troublesome matter in connexion with the common printing method, and, even if it be granted that insufficient washing is not so entirely to blame for the want of permanency of prints on albumenised paper as has sometimes been thought, any method of facilitating the operation of getting rid of the objectionable salt will be welcomed by photographers. "Hypo-eliminators" seem to be looked upon with more or less suspicion, rightly or wrongly I will not venture to say. Against washing machines I have nothing to say, but they are generally somewhat expensive, and often cumbersome,

especially for large prints. I have found the following method of hand washing thoroughly efficient for moderate batches of prints, say two or three dozen 12 × 10 prints, or double as many cabinets. For large numbers the process would be tedious. For such numbers as I mention, the whole thing may be done in half an hour.

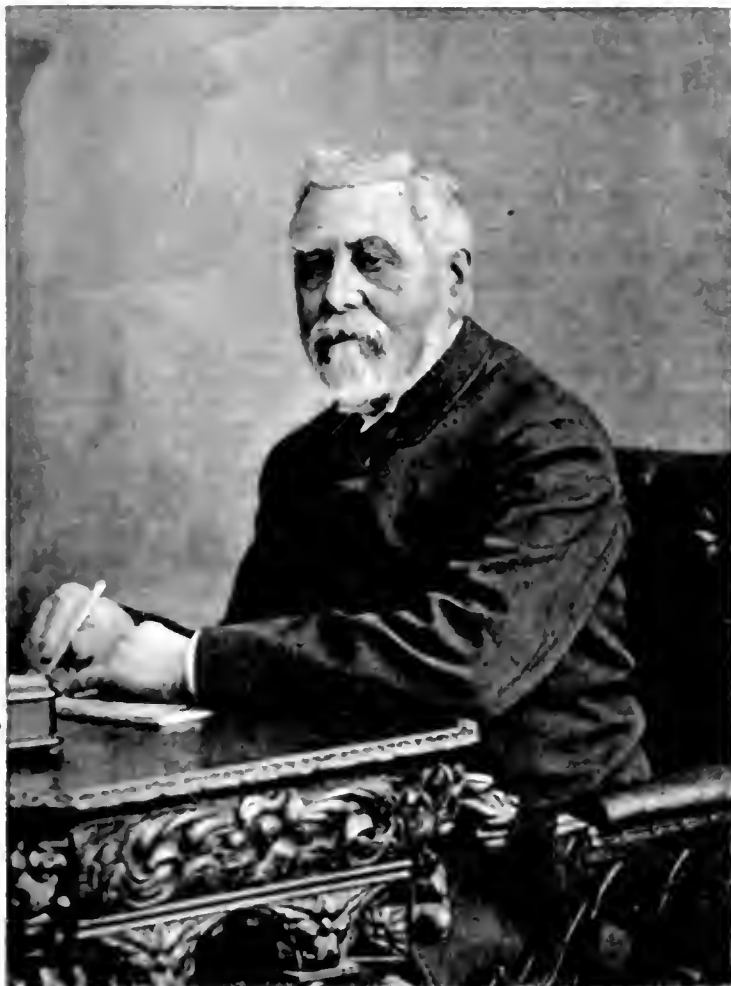
The prints are fixed as usual, but, instead of removing them from the dish of hypo, the hypo is poured off and the mass of prints is drained till the solution only drops from it. The dish is then filled up with warm water, and the prints are, one at a time, removed by hand from it to a second dish full of cold water; the cold water is poured off and is replaced by warm water; they are then removed to a third dish of cold water, this is poured off, warm water is added, the

prints go back to the second dish, again filled with cold water, the cold water is drained off, and warm water is added for the third and last time. The prints are now removed one at a time to a large tub full of cold water. They will float for about five minutes on the surface of this, but at about the end of that time the prints will sink singly and very slowly to the bottom of the tub. By the time that the last has sunk the prints may be taken out of the tub and dried. The most delicate test will fail to detect any trace of hypo in them.

Advantage is taken throughout this method, by the alternate use of hot and cold water, of getting rid of the hypo by virtue of the tendency to diffusion that there is between miscible fluids of different temperatures. As to the heat of the "warm" water to be used, so far as the efficiency of the elimination is concerned, the hotter it is the better. Water even nearly boiling does no harm to silver prints on either plain or albumenised paper, but, besides the natural difficulty of handling prints in very hot water, it will be found that the paper is rendered so soft that it is almost impossible to avoid tearing the paper, especially in the case of large prints. I have not taken the exact temperature of the water that I use, but I imagine that it is between 100° and 120° Fahr.

I have printed in another place a method of reducing prints on albumenised paper from the crumpled-up form that they assume on drying to a handleable form, but probably few of my present readers have seen the little book in which the method is given. I may therefore, perhaps, be forgiven for repeating it here. As to the plan of drawing the print under the blunt edge of a paper knife, I know that it works well enough in the hands of some, but I equally well know that it will not work in my own hands at all, except in the case of very small prints, and that there are many who have quite as much difficulty with the method as I have. As a rule, if I attempt to flatten prints in this way, I tear a most unconscionably large percentage of them, and do not get the rest flat after all.

Here is the plan that I recommend:—The prints on coming from the washing water are blotted off with blotting paper, and are laid face downwards on a clean cloth, or on any clean surface to which there is no danger that they will stick. A wooden roller about an inch thick and three or four inches longer than the width of the prints is needed. When the prints are all but dry, one is taken and is wrapped tightly round the roller with the albumenised side outwards, the end of the next print is caught for half an inch or so under that of the first, and so on, the roll being twisted up as tightly as possible after



each print has been added. At the end a piece of common paper is caught in by the end of the last print, it is rolled round the whole, and is secured by a little gum. The roll is laid by for a day or longer, and at the end of that time may be opened, when it will be found that the prints have a fine surface, and no longer show that irritating tendency to curl towards the albumenised side that they did at first.

Last, a hint communicated to me by Mr. F. W. Strange, which will, I think, be found of use to those who produce enamel prints, either by the use of the gelatine-citro-chloride paper now so popular, or on ordinary albumenised paper by the aid of gelatine or collodion, or both. All those who have produced such prints know that one of the greatest troubles is to mount them without spoiling the surface. It is necessary to attach the mount itself, or at least a tolerably thick piece of cardboard, to the back of the print, whilst this latter is still attached to the glass that is used to give the enamel glaze. In either case there is some trouble. If the cardboard is thick, the time taken for drying is excessive, and, moreover, the print is apt to be torn from the glass when it is still only half dry by the warping of the board, in which case it is ruined. If the cardboard is too thin, the water of the mountant used to attach it afterwards to a thicker board is liable to penetrate and destroy the glaze. There is a common quality of paper that is purchasable from all stationers; it is thin, and has one side covered with a black, glazed pigment that is quite insoluble in water. This paper is just so nearly impervious to water that if it is pasted on the back of a print drying on glass it will not prevent the drying, but will permit of the print being afterwards mounted with an ordinary mountant, without sufficient water penetrating to damage the glazed surface. The prints mounted on the glass, and ready for stripping when dry, are allowed to get nearly dry, a piece of the glazed paper of the size of the print is affixed to the back with any mountant in which water is the solvent, the white and unglazed side of the paper being, by preference, pasted to the print. The drying of the print is very little impeded, it will strip just as if no paper were attached to it, and it may afterwards be mounted in the ordinary way with thick glue. There is, of course, no advantage in the black colour of the glazed surface of the paper that intervenes between the print and the mount, but there is certainly no disadvantage in it, and I do not remember to have seen paper of the kind that I refer to of any colour but black.

W. K. BURTON.

CRYSTAL PALACE INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—III.

THE prizes awarded in the art department of this Exhibition have now been published. They are as follows:—

Gold Medal for Best Alcove.—E. Davey Lavender, Bromley.

Silver Medals.—F. de P. Cembrano, London; W. W. Winter, Derby; H. P. Robinson, Tunbridge Wells; Miss F. A. Harvey.

Bronze Medals.—Class A (Outdoor Photography): Green Brothers, Grasmere; F. M. Sutcliffe, Whitby; H. W. Gridley, New York; Richard Keene, Derby; Harry Symonds, Portsmouth; Lyddell Sawyer, Newcastle-on-Tyne.—Class B (Indoor Photography): W. J. Byrne, Richmond; W. Tavener, jun., Stamford-hill, N.; G. W. Wilson & Co., Aberdeen; Webster Brothers.—Class C (General): F. B. B. Wellington; F. H. Evans, Stamford-hill, N.; F. W. Edwards, Peckham, S.E.; J. G. Tunny, Edinburgh; Photophone Company, Old Kent-road, S.E.

Special Medals—Bronze.—Gambier Bolton (Animal Studies); The London Stereoscopic and Photographic Company, Limited (General Excellence); Thomas Julius Hurst, Muddersfield (Platinotypes); The Eastman Dry Plate and Film Company, Oxford-street; Morgan & Kidd, Richmond; R. Faulkner, Baker-street, London; G. Gillard, Glasgow; F. W. Hart, London.

Messrs. Sands & Hunter exhibit one of their 10×8 Exhibition cameras, a new light Imperial camera that has a long range, a variety of London street views taken by Mr. William Cobb, in which there is considerable depth of definition, stated to be largely due to their shutter of the form which commences its exposure at the centre of the lens, and to which has been added several improvements. A magnesium lamp is also exhibited, the peculiarity in which is that the magnesium powder is projected upwards through the flame, any unconsumed particles being caught by a plate a little distance above and prevented from being lost.

Messrs. George Houghton & Son have Hart's flash light erected upon a stand. They exhibit the Eclipse camera, which is fitted with Wray's new shutter; lenses, portable dark rooms, sinks, print washers, and studio accessories are included among the many things which this firm exhibits.

The Photographic Apparatus and Chemical Company show some very elegant things, amongst them being a convenient folding lamp for the dark room, shutters, and Victoria developers. They also have a fine exhibit of general photographic apparatus.

Among the exhibits on the stand of Walter Lawley is a form of iris diaphragm which has been fitted with a convenient spring stop on the outside. A very compact "Clipper Tourist's Set" is also shown by them. This set is packed in a suitable case, which also contains the stand for the camera, the space occupied by the

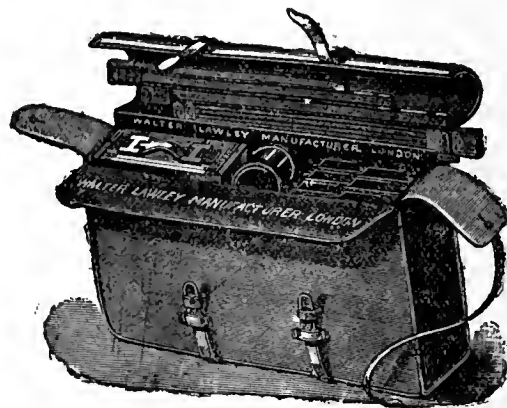


Fig. 8.

whole outfit being 18 × 10½ × 3½ inches. One of his cameras—"The Improved Long Focus"—is fitted with a rack to the swinging back. He also exhibits a convenient form of head-rest, in which the rests are tightened by means of a thumbscrew at the back.

One of William Ford Stanley's specialities is in the manufacture of cameras by machinery, the component parts of which are formed of small sections of wood braced together with wood, metal binding being avoided, he having found that they are better enabled to stand hot climates. A new form of magnesium lamp for enlarging is also shown. The magnesium ribbon is wound upon a reel at the

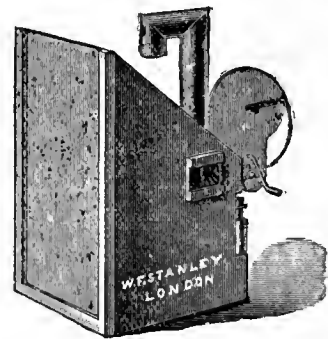


Fig. 9.

back, and fed into the interior of the lantern by means of a handle. In front of the lamp is placed a sheet of glass. A small shade protects the flame of the magnesium. The sides of the box, which is of a pyramidal form, are painted white on the inside and radiate the light equally upon the negative.

Ferrers's new patent film carrier is also shown. This is capable of carrying and changing fifty films in the space of two double dark slides. It is intended to modify this carrier to enable plates also to be used.

This firm also exhibits a convenient form of developing table furnished with a rocker for the developing tray. The light is so arranged that it is reflected up through the negative whilst it is being developed. This table is furnished with curtains which when closed form a compact dark room.

A large number of designs of mouldings are exhibited by Messrs. J. Eede, Butt, & Sons, such as undercut mouldings, frames formed of a combination of running and carved mouldings, and also of a combination of woods such as oak and walnut and mahogany, &c.

The space occupied by the exhibits of Robt. Abrahams is considerable. Not only does this firm show a great variety of apparatus, but have men working at gold-stamping, litho-printing, gold-edging, and other processes pertaining to photography. Their special form of detective camera is depicted in the cut on the following page.

The plates are placed in carriers and occupy the lower chamber.

After exposure they are, by means of a lever from the outside, transferred to a chamber above. The external appearance of this detective



Fig. 10.

camera resembles that of a leather dressing case. This firm has a varied exhibit of the different apparatus used in photography, consisting of tents, camera stands, shutters, frames, racks, cameras, lanterns, &c.

F. W. Hart has a number of flash-light lamps on exhibition, several being operated at once by means of a central reservoir of compressed air. Several fine photographs taken at night adorn the stand occupied by Mr. Hart.

The "American Brand" Manufacturing Company have a number of rockers on exhibition, the principal one being for a developing dish, with a clockwork motor. By this means negatives that are slow in development may be left for any length of time, the motor causing the developer to flow and reflow over the plate. It will be remembered that an apparatus of a similar character was exhibited by Mr. S. D. McKellen at the Derby Convention. We mention this because it is stated that a patent has been applied for in the interests of the American invention.

Rooke's simplex automatic print washer is exhibited by its inventor, Mr. W. Rooke. The working of it may be described in this way:—A tube is placed across the centre of a circular bath, to which is attached an indiarubber tube from a tap. Small holes are drilled in

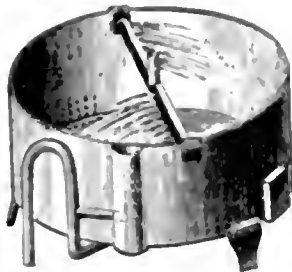


Fig. 11.

the tube at an angle to emit the water, and thus cause it to flow round, keeping the prints always moving. The amount of water from the inflow is less than the outflow, so that the syphon draws off about two-thirds of the water, when it is stopped by the air check. It fills again, and so the action goes on, taking five or six minutes for each change of water. By this means the water is rendered weaker of contamination at each change. About six changes of water is considered enough for one batch of prints. The bottom is conical, thus preventing the prints from dragging.

E. G. Platt has a small exhibit which he terms the "Amateur's Friend." This case consists of brass fittings, bellows, and other parts for cameras.

Among the exhibits in the stand of J. Mothersill we observe, *inter alia*, extremely low-priced photographic outfits, doubtless intended as an inducement for the tyro to have something better after he fleshes his sword.

J. H. Skinner & Co. are also exhibitors of low-priced outfits, intended for those whose purses are not plethoric.

Spicer Brothers exhibit cameras, tripods, and studio stands, a variety of lenses and backgrounds, and specimen photographs taken on their ready-sensitised paper.

J. Theobald & Co. have a considerable exhibit of lantern slides printed on paper for transferring to glass; they also show a portable electric light of 2½ c. p.

A. M. Zimmermann exhibits Schering's pyrogallie acid, collodion, iodide and bromide salts, neutral oxalate, and other chemicals, also albumenised and sensitised paper.

James Wood (Liverpool) exhibits his washer and adjustable rack for plates, of which a notice appeared in this JOURNAL a few weeks ago.

DISSOLVER FOR A SINGLE LANTERN.

DURING the past season I have used with great satisfaction, both with oil and limelight, a small square of ground glass that is mounted in a brass frame and fixed on the end of the object glass of the lantern, by means of a fall back rim and set screw. It gives just the appearance of the rolling curtain effect, and enables one to see at a glance if the slide is inserted the right way, and gives sufficient time to rectify any mistake that may occur without the audience being aware of it.

A drawing and full description may be seen in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, page 136, for the year 1885, by Mr. Antony Philbourne. It is a real good thing, and I trust that you will kindly insert this in justice to the gentleman who, I believe, first published this useful invention.

THOMAS GULLIVER.

CAMERA CLUB CONFERENCE PAPERS.

I.

We now give the first of the series of papers read at the Conference of the Camera Club last week, and shall continue them till finished, not preserving, however, their sequence in the order read.

THE RELATION OF PHOTOGRAPHY TO THE PICTORIAL ART.

By JOHN BRETT, A.R.A.

LET us first consider what are the pretensions of the painter's art, and what it sets out to do; then let us examine those of photography, so as to determine what capacity it has to become its rival; and, lastly, let us find out how far either of these two arts are or can be serviceable to the other. Both may be in a sense called pictorial, for they both set out with the same fundamental purpose, and at first their paths appear to lie parallel.

The basis of all good pictorial art consists of a reproduction of natural images or views, and the photographic art, no less than that of painting, aspires to get a true and honest representation of real things, and especially of transient appearances; but when the theory of the subject is examined the parallelism of their paths is soon found to cease, and farther on they diverge widely, never to meet again. It will be my endeavour to show the extent of their parallelism and the necessity of their divergence, and if the result of the inquiry should tend to curtail the aspirations of the photographer I shall regret that result; but we want, above all things, to get at a sound theory, and to set forth the plain, unvarnished truth. Assuming, as I do, that the painter's art is founded on correct representation of real things, it is obvious that the photographer starts with an advantage, but this advantage is limited to facts of form.

In respect of rapidity, also, he has the advantage; but the elasticity of the painter's art, on the other hand, gives him a clear lead, inasmuch as he can manipulate his image at pleasure, so as to produce on the spectator any desired effect. Here it is that the paths begin to diverge. One of the functions of the painter's art is to exalt natural appearances, but the misfortune of the camera is that it is liable to degrade them. We must be careful here to note that exaltation does not imply misrepresentation, and, the distinction being rather subtle, I must dwell upon this for a few minutes to explain the difference. Let us consider how it is possible to exalt natural images.

Taking an abstract point of view, is it not presumable that they are already sufficiently beautiful, and that any tampering with them is irreverent and injurious? In a few rare instances this is doubtless true, but, on the other hand, if we consider Nature from man's point of view, nearly all her performances have flaws and blemishes, and exhibit such blundering as cannot be overlooked.

The philosopher, of course, values what we call Nature's defects, and accepts the whole turn-out as the best of all possible worlds; but Art has to address herself to mankind as it exists, and allowance has to be made for preconceptions, both inherited and acquired. Art is not intended for gods, but men. The painter's art proposes so to set forth natural images as to develop their utmost capacity for charming mankind, and it proceeds on the assumption that the pleasure afforded by beauty is one that does not blunt our sensibilities, but improves and quickens them, and tends to disqualify them for unworthy entertainment; that beauty, in short, is an unalloyed good.

It is true that the photographer has some power to improve natural images by touching out or reducing their defects, but unfortunately he has not an equal facility for accentuating the beauties; and so it usually happens that whilst he is busily engaged in touching out the defects of the picture, he is in an equal degree depriving it of character and reducing it to insipidity. Artistic work is always to a great extent done from memory, often entirely so. Most of the choice and exquisite appearances of nature show themselves but rarely, and too often refuse to sit for their portraits. Even amongst the faces of our fellow-creatures we know that their gleams of consummate beauty are only revealed under peculiar circumstances, and these circumstances can very rarely, if ever, be available to the photographer; but the artistic memory can treasure them up and reproduce them, even after intervals of years, like the phonograph

does with sounds. Memory, therefore, is one of the chief of the artistic equipments. All the work done from memory is liable to be biased by the personal taste of the performer, also by his intellectual calibre, and by his experience of the range of natural variations; and when his admiration for his model is raised to the pitch of enthusiasm he unconsciously emphasises those elements of the scene which especially interest him. This is the reason why artistic representations often surpass in delightfulness the real images.

One of the strongest resources of the pictorial art is composition. Composition means such an arrangement of several images that they shall add lustre to one another. Composition depends partly on contrast—contrast of shape, or of mass, or of texture. I do not mention colour for obvious reasons. In some degree the photographer can compete with the painter in composition, though in this he is heavily handicapped, because he has to take the items of his picture as he finds them, whereas the painter can adapt them to his purposes by boldly altering them, although it should not be overlooked that he is limited in doing this by the necessity of keeping within the laws of nature and of congruity. Contrast is only one of the elements of composition. An equally important element is the arrangement of the lines, quantities, and intensities of the masses in a harmonious series, the purpose of which is to bind together in artistic unity a sequence of impressions, so that they may all be appreciated simultaneously in the completed picture. In a fine composition nothing could be omitted without compromising all the rest, just as in a closely reasoned argument the omission of even one word is enough to throw the whole train off the rails. This problem of composition in pictures is necessarily abstruse, and fine examples are only achieved intuitively by specially gifted persons.

There is another resource of the pictorial art available also to the photographer, though only to a limited extent, and that is sentiment. Let us examine this quality to see what it depends upon, and what is its value. Views of the external world produce upon intelligent spectators a large variety of impressions, some of which are sublime, and worthy of perpetuation (these are comparatively rare); others of them are indifferent or commonplace, and constitute a large majority; whilst some others are gloomy and distressing. Poets, romancers, and painters have found by experience that in one respect there is a strong family likeness amongst their audience. They are all most deeply moved by beautiful and sublime images, which are more or less adulterated or tinged by the gloomy and the distressing, the effect of which is to connect them with human experience. It is evident that this experience has for so many ages been developing under the shadow of adversity and conflict, that the tone of its inherited sentiment is dimmed with half tint; and so universal and persistent is this tone that I suppose no healthy nature ever completely shakes it off. When men have honestly and boldly lived out their little lives, the closing in of their day is symbolised by a sunset, the beauty of which depends on some bars of dark cloud. The strong and successful man, when surveying the retrospect, says, "I have fought a good fight;" but when Tennyson had to describe the insipid young lady, whom he called a "milk-white fawn," he disparagingly remarks that she had but "fed on the roses and lain in the lilies of life," thus pointing emphatically to the unartistic tendency of an unclouded experience. This I take to be the explanation of the undoubted fact that merely accurate representations of beautiful scenes flat upon experienced people, and fail to move them to enthusiasm.

The whole race of photographers doubtless exert themselves habitually to produce beautiful pictures, and when the best of their efforts are sifted out to form the annual exhibition the show is of very great interest on technical grounds; but it will not be denied that it wearies rather than enchants the non-professional spectators, and that few, if any, indelible impressions are carried away in their memories to form the subject of delightful reflection. Thus, I think we must admit that the direct artistic uses of photography are limited, and have none of that commanding influence over men's minds which is characteristic of the fine arts. Nevertheless, Photography is an invaluable servant, and, I may add, an invaluable teacher to the artist, and I shall presently show the nature of her lessons. The production of a painted picture is so much under the artist's control that he can have it turn out how he likes, if only he has a clear conception of how it ought to look when done, so that the operation is entirely delightful to him from beginning to end.

You may occasionally produce an artistic picture in photography; but so many circumstances have to conspire together to ensure such a result that successes are extremely rare, and they go to show that the photographer himself is a miracle of perseverance and cheerfulness. Any moderately gifted man embarking in such an enterprise should be warned against a lunatic asylum or an early grave. His hair must soon become white, for nothing wears away a man's vitals like repeated failure. It is obvious that in respect of form the camera can give far more accurate representations than the painter can pretend to; but it is disheartening to know that the taste for accuracy is not a plentiful endowment of human nature. People are rarely thankful for it, generally indifferent to it, and in some cases they are offended at and resent it. This leads us to consider the importance of photography as an educator—first, of the photographer, then of the painter, and, lastly, of the public.

Before a photograph can be taken, the operator has to observe his model attentively—and observation, I submit, is the major part of education. It is only after long training that the observing faculty becomes

so keen and active that a good photograph can be confidently expected. Most operators never outlive the fluking stage. The cultivation of this faculty is no simple matter; it involves a taste for analysis. Any observation that is not analytical is vague and useless. You have to consider your subject, first, as a group of masses of light and dark; then you think of the arrangement of line caused by the coincidence of the boundaries of these masses; then you have to study the distribution of the accent or emphasis in both elements; and until you have become in this way a trained analyst all your endeavours will be empirical, or shots in the dark.

Even if the photographer was at the outset a highly cultivated person, it is certain that his practice with the camera will inevitably improve him, whatever his natural calibre may be. It will compel him to learn composition and chiaroscuro with the utmost despatch. He will pose a group, say, a dozen times in a morning, and when in the afternoon he finds that each arrangement is more hideous than the others, and that his box of plates has been wasted, he begins to feel that he must take pains, and thus the most valuable part of education is developed.

In the practice of the painter's art you can deliberate and make alterations, so that the intolerable sense of disappointment is evaded, and you can be as idle as you choose at small expense.

Now let us consider photography as an educator of artists. Its direct use in this respect is much more limited than would be supposed; first, because of the great difficulty of copying a photograph on account of its small scale. All students of drawing are aware how much easier it is to reduce than to enlarge the scale of their model. The image in ordinary photographs being smaller than the real object, its intricacies are much more perplexing, and its details more difficult to follow, and the errors in the copy are amplified. When the natural object is inaccessible to the draughtsman, of course he is glad enough of the photograph, but the instances are rare in which its value is continuous, since artists seldom require the same model more than once. By the time that the student has become a skilled draughtsman he has had a large experience, and his memory has become so stored with images that it may be considered as a complete dictionary of natural phenomena, and the immense practice that has to be gone through in acquiring this knowledge develops such rapidity of execution that it is seldom worth his while to put up with a photograph as a model, still less to go to the trouble of enlarging one. In fact, when the real object is accessible he could do the drawing direct in less time than he would have to expend in taking and developing the negative, not to speak of printing.

The most frequent instances in which photographs have been copied by painters occur in the practice of portraiture, where the sitter's type is precious. Then it is sometimes of vital importance; but I am sorry to testify that most portrait photographs are so misleading, and so much uglier than the originals, that the trouble of the painter is immensely increased by their use. It is also obvious that one photograph can only exhibit one phase of the sitter's character, and far more than this is required in a successful portrait. The chief direct use of the camera to the artist lies in its power of securing images of rapidly moving animals. I think that painters owe a great debt of gratitude to Mr. Muybridge for his photographic investigation of this subject, and the splendid demonstrations he has given of the footfall of galloping, trotting, and walking horses; and we ought also to offer our hearty thanks to the University of Pennsylvania which has so handsomely forwarded his work.

In landscape, the misfortune of the camera is that it degrades the really fine scenes by expanding the scale of the foregrounds in relation to the other planes of the picture, where the more important features can be advantageously seen, so that the areas of the latter are dwarfed. Mountains, in fact, are made into molehills, and the photographer is driven to the device of cutting down his print so as to show nothing but the molehills. Landscape photography at present also suffers much from the fact that the horizontal rays are less actinic than the vertical ones. The clouds which generally govern the sentiment of a landscape are fatally affected by this misfortune, because all those that present beautiful forms and are valuable elements in a composition occur near the horizon, where the disadvantage is most apparent. The zenith clouds can be photographed very well, but unfortunately they are of no pictorial value.

Perhaps the chief practical use of photography in the painter's studio lies in its aptitude for the reproduction of drawings. My own collection of photographs from drawings, by Michael Angelo, Leonardo, Holbein, and others, contains examples that represent the masters nearly as well as the originals. These prints cost only a few shillings, whereas no sum could be mentioned that would purchase the originals. The educating influence of photography upon the average public is rather too large a subject to deal with in this paper, though it is certain that that influence is favourable to the fine arts. I think its first effect is to disenchant them with the world in which they live and move and have their being; but it is probable that in a wide sense the multitude of scenes presented to the desultory spectator are calculated to awaken in his progeny an interest in the visible world which might otherwise have remained latent. I think there is an off chance of this coming to pass by heredity. "Know thyself!" is a precept that is often effectually driven home by the raw photograph, whilst the cooked one affords still deeper lessons. The touching of portrait negatives by the trade I regard as an acute instance of moral depravity. It is either a poor unworthy attempt to disguise bad

work, or else it shows a deliberate purpose to demoralise sitters and filch their cash by a prostitution of the noble art of photography.

One more paragraph will now conclude my paper. I have only to point out what constitutes the high importance of the painter's art. It is the display of consummate handicraft. The French call it *tour de force*, but it means essentially a tribute of admiration on the part of the artist. To the spectator the enchantment of masterly manipulation is irresistible. Hardly any painter of modern times has exercised so great a charm over mankind as Rembrandt, and that charm is by no means dependent on the exaltation of the images, but chiefly upon his marvellous command of them, or his supreme manipulative skill. The same remark might be applied, though in less degree, to Landseer. We set out in this inquiry from an identical purpose. We saw where the paths of the two arts began to diverge. We have now arrived at a situation where photography and fine art are no longer in the same field of view—one being the handicraft of men, and the other an operation of chemistry more or less directed by taste.

LENSES—PHOTOGRAPHIC AND MICROSCOPIC.

THE scope of our inquiry to-night is restricted within matter-of-fact bounds by the limiting title of the paper, or I might have been tempted to speculate upon the discovery of the power of transparent sphere-like bodies to magnify objects. Solomon's oft-quoted saying, "There is nothing new under the sun," must apply in this case; and though the history of lenses and lens making is of comparatively modern date, and excursions into the domains of tradition rather the prerogative of the poet than within the province of a man of science, they cannot be altogether inappropriate to the amateur. Profit may accrue, and the pleasures of the imagination count for something. It is not wise to despise the bookworm or antiquarian, and even in this ultra-materialistic age our self-sufficiency is not armour enough if we do so. The man who speculates as to the future, and endeavours to penetrate into that vast and mysterious eternity which lies before us all, is applauded for his daring; if glancing but a few years ahead he predict some coming change or invention, his forethought is marvelled at, and he can remain quiet for the rest of his life convinced that he has proved himself a "dressed clever fellow." It is too often overlooked that behind us, as before us, is an eternity—a veritable ocean whose shore is the present day, whose surface is troubled by the winds of time, and whose ships are men. Our antiquarians and bookworms are the lifeboat and salvage men, whose labours are to save for present and future generations the reputations of great men and the wreckage of their works. Some of these salvage men are practical people, others, day dreamers, and again others unite both capacities. I believe I belong to the class of idle day dreamers, and would rather indulge my fancies in the present instance in speculations as to whether some lozenge-eyed Chinese or dusty Brahmin first became aware of the properties of lenses, and by what happy chance so important a discovery was made, than trouble about dry, scientific affairs. Many of you have no doubt read the story of "The first lucifer match," in which it is recounted how a packman travelling in the Highlands called at a cottage, and after an adroit speech suddenly struck a lucifer match, and almost drove the good country folk out of their wits with terror and amazement. This might serve as an illustration, though I fancy that the discovery of the power of magnifying glasses must have been attended with something of the delight and astonishment attributed to the savage, who for the first time becomes acquainted with a mirror, a glass bead, or a top hat. It is time to remember that this is a paper upon lenses—photographic and microscopic; but when I contemplate the scientific Sahara into which I am going to lead you and reflect that this is a total establishment, my conscience prickles a little, and a vision of the members disappearing in twos to see a friend rises up before my eyes.

A little reflection has convinced me that the title of this paper is scarcely in order, for although it is intended for the members of a photographic association, microscopic lenses have the first claim to our consideration, both from historical and scientific points of view. Still earlier, I believe, comes the telescope, which, like the microscope, unites with the camera in the work of photography, and also claims consideration from us this evening. The selection of lenses as the subject of a paper is due to our worthy Vice-President, Mr. J. P. Gibson, and as at the present moment the interest in lenses has received a great impetus by the introduction of new forms of glass and improved constructions, perhaps no better subject can be chosen.

Within the last few weeks a number of valuable articles have been contributed to the photographic journals, and these without a doubt the most of you will have seen. They have more than covered the ground I should traverse, and perhaps the best thing to be done after dealing with microscopic lenses is to draw attention to some of the salient points in these articles and add a few of the mental memoranda that I have made at various times.

The double convex magnifying glass was probably known both to the Greeks and the Romans, and five centuries B.C. a "burning sphere" was spoken of by Aristophanes. Zacharias Jansen is stated to have manufactured microscopes previous to 1590, the date when the telescope is supposed to have come into existence. As with other important inven-

tions, various persons are credited with being the real original inventors, and John Baptista Porta, Jansen, and Galileo divide the honours of the telescope, whilst for the microscope Drebell (1621), Fontana, and Jansen compete for priority. Fontana did not make any microscopes previous to 1618.

Microscopes are of two descriptions, simple and compound, and either of these may be achromatic or non-achromatic, but the non-achromatic compound microscope has been relegated to the repository of toys. Such ignominy has not fallen to the lot of the non-achromatic simple microscope, and for dissecting purposes it still retains its position as a scientific instrument. I have here a microscope made about 1742, and described by Mr. Henry Baker, F.R.S., in his treatise published in that year, as a new invention. It is a pocket microscope with a speculum, and an engraving of it, as mounted upon a handsome scroll stand, graces the title-page of Hogg's admirable work on the microscope. I had the top of the original scroll, but it was intrusted to a friend who kindly undertook to make me a stand after the model of the original. Must I add that the top of the scroll has been lost and the stand is still unmade. This microscope is furnished with a complete set of beautiful lenses of the following foci, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$, $1\frac{1}{2}$, $2\frac{1}{2}$, 4 , 6 . Of the seven, five are original, and two, the $\frac{2}{3}$ and $1\frac{1}{2}$ -inch lenses, are additions, and these two, it will be noted, are furnished with Lieberkuhn's, an invention which came into use in 1710. Two years previous to this, Lieberkuhn invented the solar microscope, and if you examine my instrument you will observe that it is arranged to be used as such. I also show you a wooden microscope which unfortunately was almost destroyed by the furniture dealer from whom I got it. He pulled the pasteboard tubes out, glued the sliding part together, and gave it to his wife to use as a candlestick! The construction of this microscope was peculiar; it consisted of three lenses, the first being of very short focus in proportion to its diameter. The focus of the combination was altered by varying the distance of the back lens from the others. I put it together in a temporary fashion and found it worked fairly well.

I had also intended to show you a compound non-achromatic microscope of English manufacture which I have, as it has several features of interest, but it has been mislaid, and I must content myself with describing it. The objective is of peculiar construction, and as I have an achromatic objective by Hartnack very similar, it will be worth consideration, the more so as I do not remember seeing it described in the leading books dealing with the subject. The objective is a doublet. The first glass is of short focus (half inch), and the second of one and a half inch, and of large diameter, the separation of the two being nearly the focal distance of the larger lens. Both the lenses are double convex and of crown glass. The Hartnack lens consists of two plain convex lenses. The first is of half inch focus and the second is of one and a half inch focus, and larger diameter as in the former instance, but the separation of the lenses is less, being only about an inch. The resemblance of the two is striking, and in each case the characteristics of their performance are alike, allowing for the superiority of the achromatic combination. These characteristics are—a large flat field and great penetrating power or depth of focus. I drew the attention of a practical optician to the peculiarity of the old lens, and, like myself, he was quite unaware that such a construction was in use, much less that so distinguished an optician as Hartnack had adopted it.

The eyepiece of the old microscope was also of interest, as it is compensating in its action. It consists of three plano-convex lenses, two of which work together as the eye lens, and the third forms the field lens. A sliding tube allows the eye lens to be separated from the field lens, and admits of an adjustment to suit the length of tube employed, which is, as in the Hartnack and other instruments, of a sliding form. It is well known that an objective constructed for a short tube does not work so well with a long one. It is also understood that eyepieces, to work to a nicety, should be adjusted for the length of tube, so that something in the way of precise information should be engraved by the opticians upon their eyepieces and objectives. An Austrian optician sets a good example by engraving upon some of his objectives the length of tube required and the angular aperture of the lens. He also constructs compensatory eyepieces, but of their nature I do not know anything. As an example of how things are managed on the Continent, I might mention that the catalogue of the Viennese maker contains descriptions of instruments capable of being used vertically only, and is innocent of anything so sensible as a binocular microscope, yet he uses the Jena glass, and in other respects does not seem behind the age. After this digression I had better return to the old microscope, of which I must now take leave, with a compliment to its unknown maker, for a better non-achromatic instrument was probably never constructed. Before considering the achromatic microscope, it will be as well to speak of the eyepiece. The most usual form is the Huygens, an example of which you see. It consists of two plano-convex single lenses placed at a distance of half their focal length; a stop is placed about half way, and upon the correct placing of this stop depends the correction of the chromatic aberration. Another good form of eyepiece is the Ramsden, or positive eyepiece. With this the image is formed outside the combination, and it is thus available for micrometer purposes. The correction for colour is not very good, but the difficulty is obviated in the example by Smith and Beck, which I now show you, as it has the eye lens achromatised.

According to Andrew Ross, if both lenses were achromatised it would

the by far the best eyepiece of all, but, as every defect in the field lens is seen, opticians prefer to make it a single lens, which costs little to manufacture, and can be sacrificed if at all defective. Eyepieces of various powers are employed, but, as a general rule, the lower the power the more accurate and pleasing the performance. I have seen it advised to use high eyepieces and low powers, but this is contrary to the accepted rule. The first achromatic object glass for microscope was constructed, at the suggestion and expense of Dr. Goring, by Mr. W. Tully in 1824. In its earliest form it consisted of a double concave of flint placed between two convex lenses of crown and Dutch plate glass. As will be seen by-and-by, the triplet form of lens plays a most important part in our modern instruments. The first lens, consisting of a double and equally convex lens of plate glass and a plano-concave of flint was constructed by M. Chevalier upon the principles laid down by the mathematician, Euler. These lenses were combined in the doublet form, and excessively stopped down, but Dr. Goring, who discovered the principle which governs the penetrating power of lenses, removed the stop, and was then enabled to show the ordinary test objects with them. Since then three and four sets of lenses have been combined, but the principle is now accepted of having as few lenses, and consequently reflecting surfaces, as possible.

The greatest improvement ever introduced into achromatic object glasses is the invention of the single front by Mr. Wenham in 1850. His first attempt was upon an $\frac{1}{2}$ object glass, in which he endeavoured to replace a triple front with a single one. In the same year Mr. Lister, experimenting on high powers, introduced the triple back, which allowed perfect correction to be obtained with the most extreme apertures. Mr. Wenham soon after this invented an object glass ($\frac{1}{4}$) with triple back and single front, which, notwithstanding the advances made, is still esteemed an excellent lens.

The first attempts with single fronts were comparative failures, owing to the front lens being too thin, the correction for spherical aberration depending upon the thickness of the front lens. The magnifying power is almost entirely obtained from the front lens, the middle and back combinations having merely corrective influences. It is important that the separation of the combinations should be such that all the lenses come to a focus at the same point, otherwise the image will not be hard and clear. It is for this reason that the longest focus lens is placed at the back.

The usual forms of object glasses are as follows:—Low powers, 3, 2, and $\frac{1}{2}$ inch, consist of two pairs of lenses, usual form, double convex and plano-concave flint, with the convex uppermost for back lens. Mr. Martin, of South Shields, deviates from the general practice, and employs, with great success, a form of construction similar to that adopted in rectilinear photographic lenses. He employs a light flint, .364, and thus avoids the tendency to rust which exists in heavy flints and many forms of Jena glasses. It is this tendency to rust which makes the most desirable samples of the Jena glass unreliable, sometimes even when encased between two pieces of crown glass.

For the one and two-thirds of an inch objectives the front is of the same form as in the lower powers, but the triple combination is best for the back lens.

The construction of the half inch and all higher powers are the same. The best form is the single front, middle pair, and back triple. The front triple is not often made now, but I have seen very good lenses of this form. There is not much difference in practice of opticians, so far as general lines are concerned, the difference in excellence being rather one of skill than of principle. I should have added that from the half inch power upwards the correction collar, by which the aberration introduced by the cover glass is corrected, becomes a necessity. It would be clearer to understand if I say that opticians correct their lenses for use with cover glasses of about one one-hundredth of an inch thickness, and a correction collar is necessary when other thicknesses of glass are employed, or a cover is dispensed with. There are two forms of constructing these correction collars—one where the front lens is separated from the two other pairs, and another where the front lens is fixed and the rest of the combination moves. The latter should be the best construction, as the object is not thrown out of focus.

It may be worth while to mention that some opticians understate the focus of their lenses, so as to lead the public to believe that their performance for the focal length is better than it really is. The practice is not an honest one, because, other things being equal, the lower the power of the object glass the better. The lenses, of which I show you some minute examples, are rough ground with emery powder, of which that known as Naros is the best. The polishing is done by means of putty powder, or oxide of tin, and crocus, or peroxide of iron, also with jewellers' rouge, which is extensively used. Here are some specimens of glass employed, and an example of extra dense flint which has rusted, as you see. Mr. Martin, who has been good enough to supply me with these and also the grinding tools which I shall show you, recommends flint .364, and French plate crown, which he finds works even better than Chance's white crown. With these materials he obtained in a three-inch telescope perfect correction, with definition hard and most satisfactory. He also employs the French plate crown in his microscopic objectives. I may mention, in passing, that the usual construction of a telescope objective is a double concave of light flint united to an equi-convex crown. The lighter the flint the deeper the curve to obtain correction. In small telescopes the Herschel form of objectives is best.

I have had no practical experience in the employment of the microscope or telescope for photographic purposes, and I trust you will kindly make good the deficiency of my paper in this and other respects. I shall, however, venture upon a few words more before turning to photographic lenses proper.

In the employment of the microscope in conjunction with the camera, the eyepiece is generally discarded, but this is not necessary. The best form of eyepiece is the orthoscopic, which gives a larger field than Huygen. Projecting eyepieces are also constructed for photographic work. Many opticians correct their object glasses for photographic use, and Messrs. Beck state that theirs may be used, as the chemical and visual focus almost coincide.

I find my paper running rather long for the time at our disposal, so, if you will allow me, I will conclude the microscopic section by showing you a double reflecting prism, as used in the binocular microscope to throw the image into the second tube. It is made of white crown glass. With regard to photographic lenses, I shall, with your kind permission, postpone their consideration to a future evening, when they may, perhaps, have the advantage of being treated by an abler and more experienced hand than myself.

I wish, however, to show you Dallmeyer's new landscape rectilinear, also a single stereo lens by Lerebour & Sécretan, constructed about thirty years ago, which is made to work at $f/8$, an aperture which a year or two ago was regarded as outside the capacity of single lenses, and when introduced was looked upon as an advance in lens making. I have also here a stereo doublet by Ross, which was formerly the property of the late Prince Imperial. Speaking as an amateur, I venture to say that a doublet constructed as this is, to cover with a large stop a quarter-plate, is the best and most useful small lens for the amateur. Although it has six reflecting surfaces, its performance is almost, if not quite, equal to the rapid rectilinear, and it has an aperture equal to the extra rapid portrait lenses.

I will now show you two lenses by Grubb. The first is an example of his patent aplanatic view lens, in which the flint and crown elements are reversed in position to that ordinarily given. The second lens is a 2 A portrait lens, which, as you see, has been very badly used, and if you examine the surface with this Coddington lens you will observe that the surface is eaten in patches by rust, the result of the instrument being left in a damp place for a long time. As a deviation from the spherical surface of $\frac{1}{8}$ of an inch interferes with the formation of the image, you readily understand that the Grubb lens, which costs about five pounds, is not now worth five shillings. As the hour is late I must now conclude, thanking you for your patient attention to my paper and the interest you have shown in the subject.

H. C. HENRY.

LORD RAYLEIGH ON EXPERIMENTAL OPTICS.

V.

LAST Saturday Lord Rayleigh stated that Newton tried to explain the colours of all objects as due to phenomena presented by thin plates, but that, nevertheless, the colours of ordinary bodies are not analogous to those produced by thin films; the colours produced by such films are far from being the pure colours of the spectrum, whereas in nature colours are often seen in pigments, and otherwise, not inferior to those of the spectrum itself. That is one reason opposed to Newton's idea, and, perhaps, a still better reason is that, if colours are due to interference, the light missing in the reflected beam ought to be seen in the transmitted beam. This leads to the subject of the absorption of light, and the conversion of coloured rays into heat; a subject which even now is not well understood. Perhaps the nearest approach to an explanation may be given by selecting in illustration the action of coloured gases upon light; let blue light, for instance, fall upon the yellow gas, chlorine, the blue rays are neither reflected nor transmitted, but it can be proved that in proportion to the action of the blue light the gas rises in temperature, so that the energy of the blue rays is transformed into the energy of molecular vibration. It is supposed that the molecules thus have their vibrations increased, but the absorption goes on as long as the light falls on the gas, so we must suppose that the molecular motion is in some way disturbed; one molecule perhaps strikes against another, and the result becomes sensible as heat. In this way the loss of energy by the light may be explained.

A coloured liquid, according to its thickness, gradually attenuates the light passing through it. Absorption takes place also in other ways; the colours, for instance, of metals, such as gold and copper, are not due to absorption acting in the ordinary way, but they are due to absorption nevertheless; after the light reaches a certain depth, the metal begins to reflect in a more strenuous manner. Something analogous takes place with sound when it falls upon a haystack; the sound-waves meet with resistance increasing with the depth, and are then reflected by the hay. Aniline dyes show in thin layers a high degree of colour. Lord Rayleigh here passed light from the electric lamp through a plate which had been coated with a pinkish-red aniline dye—name not mentioned—which had been dissolved in collodion and applied to the plate thereby; this film reflected green light in an abnormal way, that being chiefly the light which could not get through the plate; by the suitable interposition of a

polarising prism, the light to which the dye was most intensely opaque was more particularly isolated upon the screen. Permanganate of potash solution intercepts green rays strongly, and gives a spectrum containing a prominent series of bands; the reflected light when spectroscopically examined also reveals the presence of these bands, and it is rich in green light.

As light will pass through a vacuum, it becomes necessary to assume a medium by which it does so; this medium is called "ether," a name which in this case means nothing in particular. When light passes through glass or water it might be supposed that the glass would take up the motions from the ether on one face and give them out again to the ether on the other, but then it is found that the velocity in glass is much quicker than would have in such case been expected; the velocity of light is reduced in the glass in the ratio but of three to two; the ether must be regarded as taking a leading part in the conveyance of light through glass, and colour considerations lead to the same conclusion. In a vacuum, so far as is yet known, all kinds of light move with the same velocity, and observations of different variable stars have furnished evidence pointing to the same conclusion; take the case of a variable star which disappears and reappears at known intervals; if red light, for instance, travels faster than blue, the star should look red for a short time after its moment of reappearance; no change in the colour of their light is shown by such stars, either when they reappear or disappear, and it has been calculated that an exceedingly small difference in the rate of propagation of lights of different colours would be detected did it exist. Sound-waves of all kinds are transmitted through air with the same velocity, and there is no mechanical reason why it should be otherwise. The vibrations which take place in a rigid body, such as a board, bear most resemblance to those of light.

To show a certain amount of parallelism between the phenomena of sound and those of light, Lord Rayleigh then proceeded to produce some sound-shadows. His sounding instrument was made on the bird-whistle principle, but so high and shrill as to be inaudible by means of human ears; it was actuated by a steady supply of air from a bellows. The indicator was a sensitive flame about a foot long, which shortened itself to about six inches in length when suitably acted upon by the sound. He then proceeded to prove that some of the waves of sound from the whistle neutralised each other, or produced sound-shadows; by the use of suitable discs and rings of zinc, to cut off some of the waves producing the neutralisation, the flame was more vigorously influenced than when nothing at all was placed between it and the whistle. In one experiment he placed a circular disc of glass, over a foot in diameter, between the whistle and flame, and proved that opposite the centre of disc plenty of sound reached the flame, but half an inch or so away from this acute central position was a broad sound-shadow, in which the flame was uninfluenced. The whistle was three or four feet in front of the glass plate, and the sensitive flame three or four feet behind it in this experiment. A French philosopher once brought what he supposed to be a crushing argument against the wave theory of light; he said that if that theory were true, in the centre of certain circular shadows there should be a spot of light; Fresnel, seeing the force of the argument, tried the experiment, and discovered the spot of light to be actually there. By suitably experimenting in an otherwise darkened room, with a beam of light and a threepenny piece, this spot may be seen in the centre of the shadow thrown by the coin. The wave theory, in fact, explains all the known phenomena of light, and made known the existence of some before they were first seen experimentally.

Lord Rayleigh next produced Newton's rings in an unusual way. Light from the lamp was passed through a small hole, then received by a glass concave mirror silvered on the back, and so placed as to send the beam of light back through the hole from which it had issued in the front of the lamp; the face of the mirror had a little dried milk upon it; Newton found that dust would answer the purpose. On the white cardboard surrounding the hole Newton's rings were brilliantly visible.

PSYCHIC PHOTOGRAPHY.

THERE seems to be for the present a lull in the interest displayed in this department of photography, if department it may be termed.

A Birmingham friend, Mr. Edwin C. Middleton, who in our interests kindly undertook to interview the high priestess of psychic photography in that city, has sent as a graphic account of his visit, from which we shall make extracts. Having in course of the interview asked to see some of the negatives produced under Miss Power's supervision, "A dozen or more," he says, "were placed in my hands; they were free from retouching, and very varied; in some, the manifestation was a mere dab or patch, without the faintest aspect of a face or form; in others, a face was certainly discernible, and one at least was a three-quarter-length figure about half an inch long, and appearing above the head of the medium. One showed a head very much reminding me of a well-known engraving. And in the case of another medium, the one spirit had apparently visited us twice—looking to the left in one instance, and to the right in another, but wearing the same spectacles on each occasion. Noticing that in all the cases where a form could be traced that Miss Power herself was the medium, I inquired as to the exact method of procedure, and who made the exposure. The proceedings are as follows: A plate is placed in the dark slide; the sitter,

or medium, takes her place and sits for *forty minutes* in absolute darkness; during this period the 'spirit' impresses the plate; a few inches of magnesium ribbon are now burned, that the living sitter may be included, and development ensues. Sometimes results are satisfactory, sometimes not; there is great uncertainty. 'And who makes the exposure, Miss Power?' I inquired. 'Oh, an artist of my acquaintance.' 'Does he remain present during the period of darkness?' 'Oh, yes, all the time.' 'You have never had any result in which you could recognise a "spirit" except when he has been present?' 'No,' replied Miss Power.

"How did you become acquainted with this artist?" This question brings forth a long explanation as follows:—Miss Power wished to have lessons in photography, appealing in vain to one or two professionals. Miss Power proceeds: 'We formed a circle, Mrs. E. being the medium. We received a communication from the spirits advising me to appeal to Mr. P., an artist. I called upon him and he seemed almost to expect me. He undertook to instruct me, and arranged to come on the following Tuesday. I had a number of friends present and he disappointed us. However, on the following Tuesday he came most unexpectedly; no one was here. He would not permit me to send for any one, and proceeded at once and obtained results.' 'Where does Mr. P. reside?' I inquired. 'Park-road, Hockley.' 'And where does Mrs. E. reside?' 'Lodge-road, Hockley,' replied Miss Power. For the information of those unacquainted with Birmingham I may say Park-road runs out of Lodge-road, while Miss Power resides at Ashted on another side of the town. 'Are you willing to make any demonstrations this evening?' 'No,' replied the lady. 'On what grounds?' 'My spirit friends have advised me not to; they tell me I have made a mistake in rushing into print. That while the matter is so uncertain in results it would be better that I should not attempt demonstrations before strangers and sceptics.' 'When will you attempt a sitting?' I inquired. 'This month (March) is an unfortunate one for me, and I do not think of attempting anything before strangers.' 'When shall you be disposed to do so?' 'Well, not before June, I think.' And finding entreaty of no avail, the interview came to a somewhat abrupt termination.

"I next made my way to Park-road, and visited Mr. P., the 'artist' operator; my feelings experienced somewhat of a shock to find he described himself as a 'sign writer.' 'You take spirit photographs, I believe?' 'Yes,' replied the artist, who, probably to show his contempt for the east winds, had boldly dispensed with collar and necktie, and whose love of fresh air was further exemplified by the quantity of stocking to be seen fitfully gazing through the somewhat numerous ventilators in the toes of his boots. 'Have you any examples?' 'No.' 'Could you produce some in my presence?' 'Yes.' 'Will you do so?' 'All my apparatus is at Miss Power's.' 'If I will provide all requisites and conditions will you produce "spirit photographs"?' 'I will try.' 'You do not always succeed?' 'No; I have tried for five weeks at a time and not been successful.' 'You might do so again?' 'Yes, certainly.' 'When will you try?' 'Next Wednesday, if you like; but I have wasted a deal of time already.' 'I will pay you for any time you may lose.' This offer, I may say, was scornfully rejected; although at the close of the interview there was an oblique reference to a large family.

"I do not purpose wasting further time on what I am firmly convinced is a fraud—and to which I believe Miss Power herself is a victim. Since my interview she has written suggesting I join the 'Spiritual Evidence Conference,' to which a subscription is payable. And the practical bent of Miss Power's mind is further illustrated in the suggestion, most delicately thrown out, that she has 'apartments to let,' and if, Mr. Editor, you do know a young man who in addition to other comforts would like a nice spiritual home, don't forget 92, Ashted-row. The name to inquire for is Miss Power.

"As a matter of history, I believe the first spirit photographs in this country were produced by either F. Parkes or Fred A. Hudson, who is, or was, a photographer at Notting-hill. The latter gave no guarantee as to the origin of the photographs, and Mr. Maskelyne says that he made every person sign a book agreeing to ask no questions. It may be well to mention that in 1875 three persons were sent to prison in France for taking and, I suppose, charging for spirit photographs."

Editorial Table.

PROCESSES OF PURE PHOTOGRAPHY. By W. K. BURTON, C.E., AND ANDREW PRINGLE.

New York: The Scovill and Adams Company, 423, Broome-street.

It has been known to us for some time that the two capable men who are named above, Messrs. Burton and Pringle, have been engaged in writing a work on photography, and we are at length gratified by a perusal of it, a perusal which has afforded us high satisfaction, as, indeed, anything emanating from such a source could scarcely fail to do. There is but little history, no attempts at "fine writing," and only a modicum, if any, of theorising; but there is a perfect wealth of solid, practical information of just the very nature in which photographers delight, and which, with certain tables, including those relating to weights, measures, thermometric values, enlargements, and so forth, reach 200 pages. From the preface we learn that at first the authors' MSS. ex-

tended to a very considerable length, and treated photography completely as theoretical, practical, and artistic; but circumstances caused them to abridge their work and produce "a book less complete and, perhaps, less interesting, but, as we hope, more generally useful, not only to amateurs and beginners, but also to those who desire authentic instructions and formulae for everyday work."

We are so nearly at one accord with the authors in all they say as to afford no opportunity for offering any critical remarks on their work beyond an expression of unqualified praise; we may, however, give our readers a rough synopsis of its contents. Apparatus of course, and this largely from the American point of view, seeing the book was doubtless primarily intended for American readers; the dark room and its fittings; wet and dry collodion processes, both by bath and emulsion; gelatinobromide emulsion, in every degree of rapidity from slow to extra rapid; the development, intensification, or reduction of negatives; printing paper of every nature, whether for printing-out or developing, including platina and carbon paper; toning, enlarging, lantern transparencies, and the treatment of residues, complete a volume of sound information, and noticeable for its abnegation of anything appertaining to "shop."

We now give an extract to indicate the practical style adopted, and we select one from chapter xii., *The Camera in the Field*. After speaking of setting up the camera to take a landscape, the selection of a stop, and the adjustment of the focus, our authors go on to say:—

"If the subject includes parallel, vertical, or horizontal lines, as in architecture, some further considerations require notice, and the following remarks apply particularly to cases where the architecture either fills a large portion of the plate or falls near the edge of the picture. In such a case the first necessity is that the camera shall be dead level. But, possibly, the whole of the building will now not 'come into' the plate. The first expedient is to go as far away from the building as possible. Failing that, if the top of the building will not come into the field, the front of the camera must be raised as far as it will go without letting light into the camera. Failing that, the vertical position of the plate may be tried by reversing the back or turning the camera on its side. If this is not satisfactory the camera must be tilted upwards, always supposing we have only one lens. A shorter-focus lens might, of course, remove the difficulty; but tilting the camera upwards will at once cause the straight lines of the building to be 'distorted,' and in that case we must use the swing back. The lower part of the swing back must be drawn out or the upper part pushed forward till the ground glass hangs vertical—parallel, that is, with the lines of the building, and in this case a very small stop is required, for reasons into which we cannot enter here.

"The swing back is very frequently totally misunderstood and shamefully abused, the reason being that photographers do not know, or at least fail to realise, that the swing back has two uses totally distinct from each other. The uses of the swing back are: (1st), that suggested a few lines higher, viz., to prevent distortion when the camera is tilted; and (2nd), to aid in getting into simultaneous focus a near object and a distant one. On (1) we have said all that seems necessary; on (2) a few words may not be wasted. The focus for an object close to the lens is, as everybody must have observed, further back or farther from the lens than the focus for an object at a considerable distance away; so that with the ground glass hanging vertical when a distant object is in focus the image of a near object is in front of the focus and blurred. If we focus on the middle distance, or on an object (say) fifty times the focus of the lens distant from the camera, both the distance and the foreground are out of focus, the distance on the ground glass being behind the best focus and the foreground in front of its best focus. Plainly, therefore, if our swing back works on its centre, as every swing back ought to do, and if we pull the top of the swing back backwards we shall also push the bottom of it forward, so that the middle distance will remain in focus and the foreground and far distance will each find its proper focus. With a central swing this is plain enough, but with a swing back working from the top on a pivot at the foot we are very apt to make the general focus far worse than it was. With such a swing back, which is usually a swinging of the whole back of the camera, we must either focus on the distance and then pull back the upper part till the foreground is focussed, or we must pull the top towards us first and try to focus thereafter, a very awkward and uncertain proceeding at the best. The first use of the swing back—to prevent distortion—necessitates the use of a small stop; the second use, to a great extent, obviates the necessity for a stop, or, at any rate, permits of the use of a larger stop. In all cases the focus should be examined after the use of the swing back."

The volume forms No. 29 of *Scovill's Photographic Series*, and is admirably printed in that fine style so characteristic of the best American books. Its intrinsic merits, not less than the reputation of its authors, will ensure it a large circulation. It sells at two dollars.

SUTER'S NEW SERIES OF PORTRAIT APLANATS.

J. R. Gutz, 19, Buckingham-street, Strand, Agent.

We have already and recently spoken of these aplanatic lenses. Since doing so we have had a considerable experience with one of them for which special features have been claimed.

By comparison with a lens of similar dimensions and focus, of the class that was made by M. Suter over a year ago, we find a considerable difference, and, we may add, a great improvement in the more modern one. This is attributable to the employment of the new Jena glass, which in this instance is entirely free from colour, whereas in those of previous manufacture the glass was seen to possess a tinge of colour when laid down upon a sheet of white paper; not much it is true, but still perceptible. The elimination of this from the new portrait aplanats causes them to work much quicker with the same aperture. It was, we suppose, difficult to obtain flint glass possessing a density sufficient to enable a lens of large angular aperture to be made in which there was not a little colour, or, if colourless, which would remain so; but thanks to recent advances this may now be considered a thing of the past. Mr. Gutz informs us that the glass in this class of lens, so far from possessing the density of that of yore, is very light, that is, in its specific gravity. But the present has another advantage over the past one; the oblique pencils are by it projected farther than the other, so that the flatness of field with a large aperture is considerably extended.

That special production which calls forth these remarks is the *D. Rapid* /*planat* of ten inches focus, which with its full aperture, equalling *f-5.5*, gives a degree of definition susceptible of being magnified several times without showing any falling off in the enlargement. Comparing this with the previous production already referred to, we find that M. Suter has made a decided advance, and, as in the former one, it is free alike from distortion and from a flare spot when used with a stop.

The flange and diaphragms are made on the system recommended by the Photographic Society of Great Britain as a standard.

RECENT PATENTS.

PATENT COMPLETED.

IMPROVEMENTS IN THE PRODUCTION OF COLLODION PHOTOGRAPHIC FILMS OR SURFACES OF EXALTED SENSITIVENESS.

No. 7044. RICHARD NORRIS, 3, Birchfield-road, Aston, near Birmingham, Warwickshire.—May 11, 1888.

THE photographic process, commonly called the collodion process, has of late fallen largely into disuse in consequence of the higher degree of sensitiveness possessed by the dry gelatine plates or films now commonly used in the practice of photography. Collodion possesses some advantages over gelatine as a photographic vehicle, which advantages have hitherto been more than counterbalanced by its inferior sensitiveness.

The object of my invention is to increase the sensitiveness of collodion photographic films or surfaces, and consists in the methods hereinafter described of preparing the said films or surfaces, whereby they are made equal or superior to dry gelatine plates in their sensitiveness to light. These methods may be designated the alkaline and acid bath and emulsion processes.

I will describe first the alkaline bath process. In this process I add the silver salt to the collodion instead of impregnating the collodion, as is usual, with a soluble iodide, or bromide, or other haloid salt or salts, because by this method of procedure a greater range in the selection of the haloid salt or salts to be used as a bath is secured, for many of these salts are insoluble in a mixture of ether and alcohol, which is the menstruum in which guaiacolin (pyroxyline) is dissolved to make collodion. To make one ounce of such a collodion I dissolve seven grains of pyroxyline, made at a temperature of about 200° Fahr., in a mixture of two drachms of ether and one drachm of alcohol. I then take twenty-six grains of very finely powdered silver nitrate and mix it in a test tube of suitable capacity with eighty drops of glycerine, and stir it continuously with a glass rod till most or all of the silver nitrate is dissolved. I then add gradually to this solution five drachms of absolute alcohol, and finally add by degrees the whole of this to the solution of pyroxyline. By the use of glycerine instead of alcohol for dissolving the silver salt the said salt is most conveniently introduced into the collodion; alcohol may, however, be used for that purpose.

Glass plates, paper, or other surfaces may be coated with the prepared collodion described and then submerged in or floated upon a solution of the soluble haloid salt or salts to form a film containing iodide, bromide, or chloride of silver, or mixtures of these.

I will describe my process in connexion with a photographic film on a glass plate.

Having coated the plate with collodion charged with a salt of silver, nitrate of silver, for example (which collodion may be called "argentic collodion"), I submerge the coated plate in a bath of iodide, bromide, chloride, or other compound haloid salt of potassium, sodium, ammonium, or the like, for a period varying from five to forty-five minutes. Films produced in such baths are much more sensitive after the bath has become charged with ether and alcohol, hence, in preparing the said films, I add ether and alcohol to the bath of haloid salts.

A bath of the following composition answers well in practice:—

Potassium bromide, from thirty-five to seventy grains; distilled water, half an ounce; methylated alcohol of specific gravity .830, half an ounce; methylated ether of specific gravity .717, thirty-six minims. The longer the plate or film remains in such a bath (within the limits I have given, namely, from five to forty-five minutes) the more transparent and sensitive it will become. It will also undergo those well-known molecular changes which modify the tint of the silver haloid salt to transmitted light from ruby to blue and green. The temperature of the bath should be about 76° Fahr. The plate having remained

a suitable time in the bath (according to the sensitiveness desired) it is withdrawn and washed with water, and submitted to the action of a dilute alkaline solution, such as a solution of potash, soda, ammonia, or the alkaline salts of these and allied bases. The method I usually adopt is to dissolve two hundred and forty grains of caustic potash (hydrate) in eight ounces of distilled water as a stock solution; of this I take forty minims and add it to eight ounces of water to make the alkaline bath. The plate is allowed to remain in this bath from ten to fifteen minutes and is then transferred to a solution of gelatine containing, preferably, forty grains of dry gelatine to a pint of water, in which it may remain from fifteen to forty-five minutes; it is next passed into a dilute solution of a soluble iodide or bromide, such as iodide or bromide of potassium, ammonium, sodium, or the like, in which it may remain from ten to fifteen minutes. The iodide bath, which is preferable, may be thus prepared:—Iodide of potassium, eight grains; water, eight ounces; half a drachm of this solution is added to eight ounces of water to make the bath.

The object of this last-described treatment is to convert the silver bromide, chloride, or chloro-bromide into corresponding compounds of iodo-bromide, iodo-chloride, and iodo-bromo-chloride of silver. These iodine compounds can only be successfully produced by this method of displacement, for if a soluble iodide is added to the bath resensitising with silver nitrate becomes necessary. The employment of the iodide, on the other hand, confers great advantages, both as to sensitiveness, freedom from fog, and susceptibility of development. The plate after the treatment described may be washed in water. Having at this stage acquired its full sensitiveness, it may either be used at once as a wet plate or be saturated with any of the well-known preservatives, such as gum, gelatine, dextrine sugar, or analogous substances, and either be dried spontaneously or by the suitable application of heat. The preservation does not either exalt or diminish the sensitiveness.

It is scarcely necessary to remark that all the processes described, as well as those hereinafter described, excepting the preparation of the collodion and solutions, must be conducted in a low non-actinic light.

In another of my improvements, which I have referred to as the acid bath process, I make collodion after the customary method, that is, I charge it with iodides, bromides, or chlorides, or mixtures of these salts, soluble in alcohol and ether. I submerge the plate or surface coated with such prepared collodion for periods varying from five to forty-five minutes in a nitrate of silver bath charged with salts which are compounds of haloid silver salts with silver nitrate; that is, iodo-nitrate of silver, bromo-nitrate of silver, chloro-nitrate of silver, or compounds of these, such as iodo-bromo-nitrate of silver, iodo-chloro-nitrate of silver, and iodo-bromo-chloro-nitrate of silver. I form these salts in their crystalline state and add them in quantities sufficient to saturate the silver solution used as a bath. The full sensitiveness conferred by baths of the kind last described is only obtained by the use of unusual proportions of nitric acid. From forty to one hundred minims of dilute nitric acid of specific gravity 1.101 to each ounce of bath solution. A larger proportion confers higher sensitiveness but it produces rottenness of the film. A bath of the kind referred to may have the composition and may be prepared as follows:—Silver nitrate, five hundred and sixty grains; dilute nitric acid, six hundred and forty minims; distilled water, eight ounces; add the acid to the water and dissolve in it the silver nitrate, lastly add iodo-bromo-silver nitrate or allied compound silver salts to saturation.

These compound salts of silver haloid and silver nitrate are prepared by adding silver iodide, bromide, or chloride, or silver iodo-bromide, or silver iodo-bromo-chloride to concentrated but solutions of silver nitrate to saturation. When the solutions become quite cold the compound salts will be deposited and may be collected and transferred to the silver solution prepared for the bath. This solution should then be kept in a warm place for several days and shaken or stirred at intervals to insure saturation. The film or plate on removal from the bath is washed with distilled water and, as in the former process, passed through the gelatine and iodide baths, after which it may be washed in water and used as a wet plate or preserved, as in the manner hereinbefore described, dried, and used as a dry plate. In this process the alkaline bath is omitted.

The ultimate sensitiveness of the photographic surface obtained will be related both to the length of time the film is in the bath and to the temperature of the latter, which may be used from 84° to 150° Fahr. These films progressively undergo the well-known molecular changes from ruby to blue by transmitted light while in the silver bath.

My invention further consists in the preparation of photographic plates or films by means of collodion emulsion, inasmuch as these emulsions, whether prepared with the soluble bromide or the silver nitrate in excess, may have exalted sensitiveness conferred upon them by the methods described in the foregoing bath processes. In an emulsion with soluble bromide in excess the emulsion or film is treated, after washing, with the alkaline bath or wash, and subsequently with the solutions of gelatine and alkaline iodide, and finally preserved and dried, as in the previously described processes.

In the case of an emulsion in which the silver nitrate is to remain in excess, the emulsion must be prepared in the first instance with a solution of silver nitrate saturated as in the acid bath process with iodo-nitrate of silver, iodo-bromide or chloride of silver, or mixtures or compounds of these salts.

After washing the emulsion the film must be treated with solutions of gelatine and iodide and washed, dried, and preserved as in the preceding cases.

In the preparation of an alkaline emulsion, that is, one with the soluble bromide in excess, the greatest sensitiveness is obtained by the use of the bromides of the alkalies rather than those of the earths and heavy metals.

Plates or films prepared by any of the processes hereinbefore described, are equal, if not superior, to gelatine plates in their sensitiveness to light. They may be readily developed with the ordinary chemical developers, such as ferrous oxalate of potash, or alkaline pyrogallie acid, or hydroquinone, and fixed either with solutions of hyposulphite of soda or cyanide of potassium.

The exposing of plates treated according to my invention in the camera obscures, their development, fixing and drying, and complete preparation for printing from may be effected in about a quarter of an hour.

In the description of my invention hereinbefore given I have indicated the particular materials which I prefer to employ, and the proportions which I

have found to answer well in practice. I have also described the best methods with which I am acquainted of conducting the processes involved in the practice of my invention. But I wish it to be understood that I do not limit myself to the use of any particular materials, as materials chemically analogous to those I have described may be employed, neither do I limit myself to the strengths indicated of the solutions employed, nor to the precise order of their application, nor to the temperatures at which the processes are conducted.

Having now particularly described and ascertained the nature of my invention, and the manner in which the same is to be performed, I declare that I claim as my invention of "Improvements in the production of collodion photographic films or surfaces of exalted sensitiveness:"—1. The method herein described of producing a silvered or argentised collodion containing such an amount of silver nitrate as will form, when treated with an aqueous solution of iodide, bromide, or other analogous salts of potassium, sodium, or ammonium, or other base, a film or surface of sufficient thickness and density to give intense images and insure freedom from halation substantially as described. 2. The improvement of the sensitiveness of such films or surfaces by the addition of alcohol and ether to the before-mentioned aqueous solutions of iodide, bromide, or other analogous salts of potassium, sodium, or ammonium, or other base substantially as described. 3. The use of alkalies, alkaline carbonates, or allied salts as sensitizers of films or surfaces or emulsions which have been produced in an excess of soluble haloids substantially as described. 4. The use of a weak solution of gelatine, not as a vehicle or preservative, but as a direct sensitizer of the haloid silver salts substantially as described. 5. Treating the film or surface with very dilute solutions of iodides and bromides to convert the bromides or chlorides of silver in the film or surface, or in the emulsion into compound salts of iodo-bromide, or iodo-chloride or iodo-bromo-chloride of silver possessing more exalted sensitiveness, and finishing the film or surface substantially as described. 6. The employment of collodion charged in the usual way with haloid salts of potassium, sodium, ammonium, and the like, and treating the film or surface obtained by the use of the said collodion with a solution of silver nitrate charged preferably to saturation with iodo- or bromo-nitrate of silver or compounds of these and other analogous salts or salts of silver and containing free nitric acid substantially as described. 7. The employment of the materials and processes referred to in the preceding claims to the production of emulsions for the formation of photographic films or surfaces substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 8	North Middlesex Club	The Iron Room, Stroud Green.
" 9	Great Britain	54, Pall Mall East.
" 9	Bradford	55, North Parade.
" 9	Derby	Society's Rooms, 3, Derwent-street.
" 9	Manchester Amateur	Manchester Athenæum.
" 9	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
" 9	Bolton Club	The Studio, Chancery-lane, Bolton.
" 10	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 11	Birkenhead	Free Public Library, Hamilton-st.
" 11	Cheltenham	
" 11	Manchester Photo. Society	55, George-street.
" 11	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 12	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 28.—Mr. C. H. Cooke in the chair.

Mr. A. Cowan exhibited some carbon film cloud negatives sent to him by Mr. Nisbet and taken by Mr. W. Green, of Berwick-upon-Tweed.

The CHAIRMAN said that the cloud negatives were good ones, but a disadvantage in commercial cloud negatives is that it is awkward to see pictures by different persons in exhibitions having the same clouds.

The HON. SECRETARY exhibited some photographs, also by Mr. W. Green, of ornithological and natural history subjects; he said that the one representing sea birds on the Bass Rock was particularly good.

Mr. W. H. HARRISON said that having been asked by the previous meeting to obtain some information about the concentric two-wick paraffin lamp used in light vessels, he had seen its inventor, Sir James Douglass, chief engineer to Trinity House, who had kindly shown him the lamp in action. The vital feature of the lamp is that it causes three air currents to impinge upon the outer flame a little above the burner, at three different but closely adjacent levels, the effect of which is to compress the two flames, so as to give increased light in a smaller space; the base of the glass chimney of the lamp is therefore not bulbous, as in the instance of those of ordinary paraffin lamps. Another feature of the lamp is that the level of the oil is always at a fixed distance below the top of the burner, and Sir James says that this level should vary with the flashing point of the paraffin used; with oil having a flashing point of 256° Fahr., as used by Trinity House, the level of the oil is close upon half an inch below the top of the brass burner; when the oil falls a little below this there is a loss of light; when it rises a little above it, the flame is more unsteady, and at a still higher level the oil catches fire. With concentric ring gas lamps, made upon the same principle, exactly twice as much light is obtained from a given quantity of gas, as with the standard London Argand burner. Trinity House uses such oil and gas burners of different sizes; the largest have ten rings. It might be well to see whether a three-ring lamp will give too large a flame for the optical lantern. The lamps of all sizes are specially constructed to keep the brightest part of the flame constantly in the centre of the optical system or parabolic mirror used for the distribution of the light. Several firms manufacture the lamps and burners by contract for Trinity House, and he (the

speaker; afterwards called upon one of them, who told him that the burners are not on sale to the public, but that if they could be utilised for the optical lantern or other purposes, he had no doubt that Sir James would allow them to be issued, adding that the two-ring gas flame gives only about twenty per cent. less light than the two-ring paraffin flame, and that the oil should not vary for practical purposes more than a quarter of an inch from its proper level, although with the delicate photometrical instruments used at Trinity House, degradation is seen to begin with variations of about half that amount. Sir James told him (Mr. Harrison) that his only reason for patenting the lamp was, that if he had not done so some other person might have taken out a patent later on, and then charged Trinity House a royalty for the use thereof. The oil is kept at its proper level by being stored in a separate reservoir inverted, and open only below on the principle of the "inexhaustible" water bottle used sometimes for birds; a valve in the opening prevents the spilling of the oil when the vessel is carried about. Would lamps of this type, said the speaker, be of use for the optical lantern, especially when furnished with a meniscus lens on the plan devised by Mr. Traill Taylor, to throw more of the light upon the lantern condenser proper? Would a reflector, properly curved to throw rays falling upon it back to nearly the centre of the flame, be of more advantage than usual in the optical lantern? It seemed to him that experiment only could solve these points. He illustrated his remarks by diagrams upon the black board.

Mr. W. E. DEBENHAM thought the brass rims conducting the air to the flame would also warm that air.

Mr. HARRISON doubted it; the draught was so swift, that Sir James Douglass said that it performed the useful function of keeping the glass chimney clean for a very long time.

Mr. T. E. FRESHWATER said that the level of the paraffin in the present four-wick optical lantern lamps does not alter much.

Mr. DEBENHAM doubted if a reflector behind the light would be much good for picture projection, but it was good for illumination of other kinds.

Mr. A. HALDON stated that in many of the search lights of the service, reflectors and refractors of the same focus are used together.

Mr. FRESHWATER presented a map which was issued by the Royal Geographical Society on March 25, giving the latest and most accurate information about the Caucasus and the route taken by the late Mr. Donkin. He said that at the time of the loss of Mr. Donkin, a gentleman was travelling in the neighbourhood with photographic apparatus, and started in search of him, tracking the footsteps of the party through the snow, until he came to a glacier where the ground was so rough that he could not cross it, to take up the trail on the other side. In a portion of Mr. Donkin's baggage photographic items were found, including some exposed roller slide negatives, which were brought to England and developed; some of the exposures had been spoilt by subsequent access of light, and some of the negatives obtained were spotted; others produced excellent pictures. His diary, made up to the time of starting on the fatal ascent, was also found. It is supposed that the explorers were destroyed by rolling or falling stones, the dangers on the southern slopes of the Caucasus not being chiefly from snow avalanches; the conditions are not the same as in the Alps. Mr. Freshwater concluded by saying that all the highest peaks in the Caucasus had been first climbed by Englishmen.

Mr. DEBENHAM remarked that of late photography had been largely used for determining the height of mountains from below; a fresh field had been opened in that direction; Dr. Eder had published the details of the experiments.

Mr. HARRISON said that he had suggested to Sir James Douglass that photography would register the height and appearance of waves breaking over light-houses better than the present painstaking drawings, and that should it be necessary to point the camera considerably upwards or downwards in the operation, the distortion thereby produced in the negative could be corrected by optical methods in the copying.

Mr. F. KELLOWS stated that for some time they have been measuring the height of clouds by photography at Kew Observatory.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

MARCH 29.—Mr. Stuart in the chair.

After songs, music, and recitations, the SECRETARY read a summary of the Club's doings during the last six months, the cash balance proving very encouraging.

The first outing of the Club for this season will be to Epping Forest.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

MARCH 27.—Mr. George Bankart (President) in the chair.

Mr. J. B. COOK delivered a lecture entitled *Through Australia and New Zealand*, illustrated with upwards of forty lantern slides reproduced from negatives taken by him *en route*. Mr. Cook's personal experiences and descriptions of the various slides as they appeared on the screen were full of interest and maintained the attention of the audience until the close.

Afterwards the slides which obtained the silver and bronze medals of the Society at the late competition were passed through the lantern and the proceedings brought to a close.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 1.—The President (Mr. Henry Blandy, L.D.S. Edin.) in the chair.

The minutes having been read, Mr. S. BOURNE read a paper on *Hydroquinone as a Developer*. Mr. Bourne said when, at the Secretary's request, he promised to give a paper on hydroquinone as a developer, he hoped to have been in a better position to deal with the subject than he found himself, as his engagements and the unsuitability of the weather for outdoor photography had left him little opportunity for making experiments with this last addition to our developing agents. The lecturer then gave his experiences with this developer, giving formulae, exposures, &c., exhibiting negatives, transparencies, and prints, fifty magnificent lantern slides being thrown on the screen.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

MARCH 20.—Colonel Playfair in the chair.

Colonel SENIOR delivered a lecture on one of his trips to India, illustrated with lantern slides, taken by himself, of some of the fair and stately palaces and shrines with which that wonderful land is overspread. The lecture took the form of progressive stages, from the large cities in the hot and thickly populated plains to the exquisite scenery of the hill stations, and, further still, to the bleak snows of the Himalayas. The slides illustrating the great temples of Lucknow, Benares, Agra—an index of the laborious patience and great ability of the lecturer—were well received, and the exquisite details of the inlaid and pierced walls calling forth much praise. Colonel Senior showed many views deserving of special comment, from which we would single out, from its remarkable character, a view in the vast, dark, cavern-like interior of that greatest of mausoleums—the Taj Mahal. This view, showing the rich screen fronting the founder's tomb, was taken by him in the days of wet collodion plates by the aid of 5*l.* worth of magnesium wire, which had to be kept burning for a great length of time, as its light was lost in the profound gloom. Another view, showing the interior of a zenana, with a zenana lady attended by two English missionary ladies, was very curious. The opportunity for taking this subject, which possibly has occurred to no one before Colonel Senior, came about through the wish of the noble lord of the zenana to possess a picture of his wife.

Messrs. M. Lavington, H. A. Hutchinson, and J. W. Evens were elected members.

At the next meeting, April 17, Dr. H. Brown will read a paper entitled *The Eye considered as a Camera*.

BATH PHOTOGRAPHIC SOCIETY.

MARCH 27.—Mr. William Pumphrey (President) in the chair.

The CHAIRMAN announced that the first outdoor meeting would take place on Thursday, April 25, Farleigh Castle being the destination.

Mr. A. G. BRISTOW exhibited a shutter he had made to work in the diaphragm slot. The action was that of opening from and closing towards the centre.

Mr. W. M. ASHMAN thought that the provision for opening and closing an exposing shutter in the centre of the diaphragm plate of a rectilinear lens was correct in principle as well as very convenient in practice.

Captain HARRISON drew attention to Sands & Hunter's shutter, which fulfilled these conditions, and was readily adjustable for slow or rapid exposures. He next alluded to the steadiness of the Ashford tripod, especially when used on board ship, and explained to the meeting how, by the use of a view finder to his camera, a fixed focus at seventy yards, and placing one leg of the tripod behind the camera instead of in front, he was able to steer for a wave cloud or other passing object, and so secure any desired subject.

Mr. WALTER PITT exhibited some large prints of mechanical drawings made by means of the salts of iron. This process is largely practised by his firm, and the results were of great excellence.

Mr. GEORGE F. POWELL drew attention to silver prints of the same subject, from two different negatives, one having received a brief exposure in sunlight and the other two hours in moonlight. He thought more attention might be given to photographing landscape in moonlight.

Mr. Ernest Pitman passed round some photographs of snow scenes, 15×12, which he had enlarged from small negatives taken in the locality.

The room was then darkened, and a series of about sixty transparencies of well-known places in the Highlands of Scotland were exhibited by Mr. John Dugdale. These were by the wet collodion process and coloured. The lecture, explanatory of each slide, was read by Mr. Sutton.

At the close about thirty transparencies were exhibited and explained by Captain HARRISON, which were developed with hydroquinone.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

MARCH 28.—The President (Mr. A. W. Beer) in the chair.

The following were elected members of the Association:—Miss Rose Collier, Rev. C. Contenay, Messrs. F. Anyon, Holbrook Gaskell, jun., Henry J. Houghton, Robert Jardine, W. O. Pearson, George B. Prescott, and R. Richardson.

The HON. SECRETARY read letters from Messrs. H. R. Atkins, J. Stanley Riley, and the Hon. Secretary of the Chester Society of Natural Science, offering the use of their dark room to members of the Liverpool Association; and from the Treasurer of the Boston Camera Club, announcing that the set of slides, *Illustrated Boston*, had been dispatched, and stating terms of the trust on which they were to be held.

The PRESIDENT announced that the first excursion of the season would take place on Easter Monday to Ludlow, and that a full card of excursion arrangements was being printed, and would shortly be distributed. He then gave a short account of his visit to the Camera Club Conference, describing the meetings as being very interesting and successful. He also mentioned that Mr. Walker Hughes had been appointed Assistant Hon. Secretary.

The question of supplying refreshments in the Club-room then came before the meeting. After some discussion a resolution was passed that the House Committee be requested to arrange for the supply, on ordinary occasions and within reasonable hours, of simple non-intoxicating refreshments, such as tea and coffee.

Mr. A. G. HARRISON DEARLE then gave his reading on *English River Scenery*, illustrated with a number of slides by York and others. He took his audience along the Thames from its source to London Bridge; then, in succession, visited the River Falls at Truro, Dart Lyn, Avon (Bristol), Avon (Warwick), Derwent, Dove, Nidd, Ure, Brathay, Yare, and Wye, concluding with some views taken by a picnic basket camera, introduced by himself and Mr. Ashcroft.

Mr. Paul Lange followed by showing a set of two hundred slides sent by the Birmingham Society, as the *Illustrated Boston*, which had been announced, had

not arrived as was expected. They were largely of the neighbourhood of Birmingham and Warwickshire, and proved very interesting, although the large number to be got through permitted only a hurried view.

The President announced that an extra meeting would be held on Thursday, April 4, at which *Illustrated Boston* would be exhibited, at seven p.m.

At the close of the ordinary business the meeting was made a special one, as announced by the circular, to consider the question of raising the entrance fee. A resolution was carried by a large majority that all candidates nominated after April 15, the latest date for election at the April meeting, should pay an entrance fee of 21s., instead of 10s. 6d.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

MARCH 28.—Mr. B. Karleese (Vice-President) in the chair.

Messrs. H. S. Gent, C. F. King, J. C. Newry, F. P. Osborne, J. B. Stone, J. P. W. Shakespeare, and T. Taylor, were elected members.

The Hon. SECRETARY read a letter from Mr. J. B. Stone, J.P., suggesting a meeting of the Vesey Club and the Birmingham Photographic Society to promote the interests of advanced and historical photography. This was referred to the Council. Also a letter from Mr. F. Hoskins offering prizes for the best enlargement, 12 x 10, of an instantaneous picture of moving objects taken with the camera held in the hand.

Prizes were also offered by the Lantern Committee for the best six slides illustrating the city of Birmingham, and by Mr. J. H. Pickard for the best three plates to be taken on the Dove Dale excursion.

Mr. WALTER GRIFFITHS then gave a paper on *Various Printing Processes*. During the discussion which followed, Mr. E. C. MIDDLETON said that Aristotype paper was practically the same as Oberetter paper. He asked if any one present knew how the blue process paper could be made to keep; he had known of some that would keep two years.

Mr. HAROLD BAKER mentioned the continuing action of carbon prints after exposure; they would go on printing even in the dark. The best plan was to place them in a calcium tube after exposure if required to keep them for development.

Mr. MIDDLETON: A warm, damp atmosphere is conducive to the continuing action. There is a peculiar action of this carbon tissue. If an exposed carbon print is pressed against an unexposed strip of carbon tissue an image will be formed as if it were placed under a negative, and by the continuing action a picture can be obtained. The calotype process is a very rapid process; a printer can begin to pull off prints in twenty minutes from receiving the negative, and can get them at the rate of 500 prints a day. Line drawings can be made by printing with blue process; then going over the outlines, &c., with pen and ink, and washing off the blue print, leaving in appearance a line drawing.

Correspondence.

Correspondents should never write on both sides of the paper.

PERMANENT HYDROQUINONE.

To the Editor.

SIR.—Mr. Levy, in his elementary analysis (see page 163 of THE BRITISH JOURNAL OF PHOTOGRAPHY), ignited two different preparations, namely, the ordinary white, and the so-called "permanent hydroquinone," and has found that the white contained 57.3 per cent. of carbon, and 6.19 per cent. of hydrogen; the permanent, 47.75 per cent. carbon, and 6.74 per cent. hydrogen; whilst, theoretically, pure hydroquinone— $C_6H_4O_2$ —requires 65.45, and 5.45 per cent. respectively.

So striking a result should have induced a conscientious experimentalist to repeat the trials, in order to see if the second test would give identical figures, though Mr. Levy has apparently not thought this necessary, but hit upon another very practical (?) idea. He assumes, without further reflection, that his two tests are correct, and ascribes the difference between the theoretical quantities of carbon and hydrogen and those found to the presence of water of crystallisation in the two samples examined. According to his theory the white crystals contain 12.8, and the permanent 27.27 per cent. of water.

Now, even those possessing a merely superficial knowledge of analytical chemistry are aware that water, whether only mechanically combined or as water of crystallisation, may be determined quantitatively with the greatest ease. As already stated, the ordinary white hydroquinone was supposed by Mr. Levy to contain 12.8 per cent. of water, but for a compound of the formula $C_6H_4O_2 + H_2O$ —i.e., containing one molecule of water—the proportion would be 14.06 per cent. As hydroquinone has, however, been examined by a large number of chemists, including the celebrated Woehler, we must, *a priori*, reject the possibility that all of them can have overlooked the presence of one molecule of water.

With "permanent" hydroquinone the case might possibly be slightly different. This had so far only been alleged to contain sulphur only, or rather sulphurous acid, and it was possible water might also be present in the crystals; so to test the accuracy of Mr. Levy's allegation, it was necessary to repeat his analysis. This I have done with results very different from his. The sample operated upon exhibited the same properties as those mentioned by Mr. Levy, and melted at 171°–172°.

The hydroquinone reduced to fine powder was first dried for several hours over sulphuric acid in the exsiccator until the weight was con-

stant, the loss, however, being extremely minute. It was then heated for some time in an air-bath of 110° to 115° Celsius, which produced a decrease in weight of .5 per cent., attributable partly to some mechanically combined moisture, but partly also to the sulphurous acid contained by the permanent hydroquinone, which escapes to some extent at that temperature. The substance thus dried was ignited with chromate of lead in two separate tests.

I. 0.2105 grs. gave 0.502 grs. carbonic acid, and 0.1107 grs. water.
II. 0.2140 " 0.511 " " 0.1110 "

Or compared with the theoretical constituents of pure hydroquinone—

	Calculated for $C_6H_4O_2$	I.	II.
Carbon	65.45	65.01	65.12
Hydrogen	5.45	5.81	5.76

From this it follows that permanent hydroquinone may be said to be, practically speaking, chemically pure.

I am of opinion that the small quantity of sulphurous acid to which the preparation owes its permanency is not chemically but only mechanically combined.—I am, yours, &c.,

DR. MARTIN FREUND,
Professor at the University of Berlin.

VALUATION OF HYDROQUINONE.

To the Editor.

SIR.—There appears to be a slight mistake with reference to the question of water of crystallisation presumed to be present in commercial hydroquinone. I have simply pointed out that this hypothesis gives results closely agreeing with the actual constitution of the pure compound. In point of fact, I have employed very similar methods to those used by Dr. Langer, and have not been able to detect any water. As Mr. Bolton puts it, the discrepancy in the carbon must be looked for elsewhere.

I have not been able for the past week or so to continue my investigation, but hope to be able soon to find some explanation of the anomalous results given by the combustion. That the figures yielded by the elementary analysis be correct, I believe there can be no doubt, as a number of combustions give identical results.

The analysis of pyrogallous acid published last week will show how close the figures of two trials are one to another.

Dr. Langer may rest assured that every precaution was taken to ensure accuracy.

This terminates all I shall have to say for the present on this subject. Now as to Mr. Smith's letter.

I do not think it is usual for scientific men to indulge in insinuations such as those embodied in the last sentence of the first paragraph of Mr. Smith's letter. If I read him rightly, he infers that I am not conscientious in recording the results afforded by the analysis. I do not think that the remarks referring to the number of decimal places are of a character to justify their being in a letter emanating from a gentleman, who, no doubt, is an experienced man, but who has not been able to deny himself the pleasure of a mild joke at the expense of a brother chemist who has not the good fortune of meeting with his approval.—I am, yours, &c.,

ADOLPH M. LEVY, C.E.

37, Bassett-road, W., April 2, 1889.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange a new Optimus nickel-plated chair head-rest for a polished steel plate, 11 x 14.—Address, R. W. SIMMONS, Galway.

Will exchange Rosa No. 11, 12 x 15 symmetrical, for No. 8, 10 x 8 symmetrical. Difference adjusted.—Address, J. H., 10, Victoria-road, Penrith.

Two sets of lantern slides or slides coloured to value in exchange for an oxygen gas bag in good condition.—Address, THOMAS GILLIVER, Branawick-street, Swansea.

Will exchange threefold tripod, half-plate, Lancaster's folding ruby lamp, Burton's book on *Printing Processes*, Marion's Guide, and thirty-six numbers of the *Photographic News* from June 1, 1888, for a good half-plate burnisher.—Address, W. H. SIMPSON, c/o Mrs. Watson, Wenden-street, Wakefield.

RECEIVED.—*Republique de Uruguay; Un Voyage à Paris*; Jarrold's *Norwich and Eastern Counties Handbook*; Asiatic Society of Bengal; and The Address of Mr. William Crooks, F.R.S., at the annual meeting of the Chemical Society.

MR. E. KELLEY, of Old Town-street, Plymouth, from whom we had a call the other day, informs us that carbon opals are in much favour in his part of the world. He left with us some specimens of his work (he prints for the profession), and they are really charming.

Answers to Correspondents.

••• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

AMBROSE BARR, Ayr, N.B.—Two photographs of the meet of Lord Eglinton's hounds at Auchan Cruise. One photograph of Lord Eglinton's hounds with master and whip.

VOLVO.—On the first Friday in each year.

INQUIRER.—We are making inquiry respecting the book.

PAPER.—Yes, the engraving can be photographed and a good lantern slide made from the negative.

T. P.—There is a decided nucleus in the centre of the white spots. See leaderette in present number.

J. G.—Your mistake consists in the employment of bicarbonate (or baking) soda instead of the mono-carbonate (or washing) soda.

T. B.—Either of the lenses will give the distance correctly defined. The landscape lens is the better of the two for landscapes.

A. FOSTER.—You will find particulars for an emulsion for opal plates in last week's "Answers to Correspondents," under the name of "Captain Barlow."

L. MARTIN.—If you cannot obtain dark tones in a transparency with the ferrous-oxalate developer try the pyro-sulphite or the hydroquinone developer.

CARDON TISSUE.—The following are particulars of the sensitising solution you require:—Bichromate of potash, one ounce; water, twenty ounces; liquid ammonia, six drops.

H. SPINK.—There are single lenses now made which work with an aperture of $f/8$. For a head two and a half inches, the focus of the lens should be from sixteen to twenty inches.

J. D. WEBSTER.—Much better to have the illustrations made by a collotype process, such as that by which the Convention groups in this JOURNAL of the past three years have been produced.

LCMEN.—There is no restriction in photographing either in Mexico, Texas, or any part of the United States of America. We do not vouch for non-interference by Indians in some quarters.

W. T. L.—The lighting of your studio could be improved by increasing the side light as well as the sky light, especially the former. We advise you to make both lights the same, namely, to the full extent you propose for the roof.

CHEMICALS writes: "I am fitting up a dark room; would you advise the ruby light or lamp to be in a box fastened in the wall or a gas-jet with flexible tale, so as to move it in any position as required?"—Reply: We prefer the latter plan.

A. G. FIELD would like if any reader would refer him to any articles that may have been published relative to the transforming an ordinary camera into a detective. He believes that he has seen such an article either in ALMANAC or JOURNAL.

A. A.—We have proved by the experience of many years that a silver image bleached by bichloride of mercury possesses the property of permanence in a singular degree; but it must be kept dry and free from sulphuretted hydrogen and like gases.

A. Z.—Several articles on the Woodbury process appeared in our volume for 1883 and in 1884. In the latter it is found under the heading, *The Stannotype Process*. Information may also be obtained in the last edition of Hardwich's *Manual of Photographic Chemistry*.

T. C. A.—As you have never tried retouching a negative, it is hardly possible that you will be able to make a "good job" of the negative about which you wrote. Better have it finished by a professional. You somewhat remind us of the man who, on being asked if he played the violin, said he did not know, as he had never tried.

JAMES SIMS.—The mealiness of your prints is not due to the toning bath. Possibly the silver bath is too weak; or, maybe, the negatives are at fault. If deep purple or black tones are desired, they can only be obtained from very vigorous negatives, and then the paper must be strongly salted, and correspondingly strongly sensitised.

WATER.—1. Rain water will do quite well for making silver solutions, provided it be pure; but rain water caught in the neighbourhood of large towns or from roofs of houses is, as a rule, far worse than ordinary tap water for photographic purposes.—2. The mere fact of the water being "hard" will not unfit it for washing prints and negatives.

R. S. W.—The alcohol may be strengthened to a sufficient degree by drying some carbonate of potash over a heated plate of iron (a shovel will do) and adding this. Shake up the bottle well and allow the surplus carbonate to subside, when a layer of aqueous solution will be found above this deposit. The rationale of this is that the water has an affinity for the potash, but the alcohol has not.

J. ROBERTS.—Having made the transparency on a thin collodion, float it from off the glass by placing it in water acidulated with sulphuric acid. Then float it on the surface of the wood, on which it must then be allowed to dry. But precautions must be taken not to allow water to be absorbed by the wood, else it may interfere with its suitability for engraving.

ANXIOUS writes: "Can I make dry plates for my own use cheaper than I can buy them? if so, kindly give the full particulars, as I am quite ignorant of the *modus operandi*: in fact, I have only just taken up photography."—Space in this column will not admit of such particulars as would be required in your case. We recommend you to purchase plates ready made; any dealer will supply you.

E. ANSCOMBE.—Paper prepared in the way you mention would necessarily be very slow. Possibly your failure has arisen from under exposure. Try daylight instead of artificial. Your best plan would be to begin with one or other of the commercial bromide papers; they are very sensitive and well adapted for artificial light. When you are proficient with these papers, you might then begin preparing your own paper.

TRIPEAL MONOPTICON.—If you require to include a wide angle you cannot do so with a rapid lens. Therefore, we advise you to have two lenses—one of the "rapid" and one of the "wide angle" type. The former may be from five to six inches, and the latter from three to three and half inches focus. It is against our rule to recommend any particular maker's goods. All the makers mentioned on your list are in good repute.

E. W. M. writes: "I shall be obliged if you will inform me whether I am free to photograph in Normandy and Brittany without being regarded as a spy by the authorities; also whether these provinces contain much that is of antiquarian as well as photographic interest. If one is debarred from photographing in any part of France, will you kindly name two or three places where I may find food for the camera as well as something to gratify an antiquarian taste, if possible combining the two?"—Will some reader kindly reply?

R. WATKINS sends us a cabinet portrait of a lady ascending a staircase, and says, "What do you think of it?"—The chemical part of the picture is very good, with the exception that there are several scratches on the surface of the print; this, however, can be obviated in future by cleaning the burnisher. Respecting the artistic portion, you appear to have taken great pains in the arrangement of the dress of the sitter, but, unfortunately, it detracts from the beauty of the picture. Had the figure been standing on level ground everything would have been correct, but, seeing the figure is represented as ascending a stair, the drapery should have been so arranged that the idea of motion is conveyed to the eye. Had the lady ascended the two steps and been thus photographed without the "arranging" you speak of, the effect would have been more natural and more artistic. Study some photographs by high-class artists and you will acquire better ideas of the art of posing.

CAMERA CLUB.—On Thursday, April 11, Mr. Valentine Blanchard will give a demonstration of his platinum block printing process.

LIVERPOOL AMATEUR PHOTOGRAPHIC CLUB.—The last day of nomination of new members under the old fee is April 15, 1889; afterwards the entrance fee will be 21s.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.—On April 8 Mr. Clifton will give a demonstration on Carbutt's films at the Iron Room, Stroud Green, to commence at a quarter past eight. Visitors are especially invited to attend.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting, Tuesday, April 9, at eight p.m., at the Gallery, 5A, Pall Mall East. Mr. Friesse Greene will read a paper—*Some Effects probably due to Phosphorescence, Electricity, and Colour Sensitiveness*.

MANCHESTER PHOTOGRAPHIC SOCIETY.—The last meeting of the lantern section of this Society was held in the large room of the Manchester Athenaeum, on Wednesday, March 27, 1889. The evening was entirely devoted to photographs by the Hon. Secretary (Mr. W. I. Chadwick). The first series shown on the screen were views in Canada and the United States of America. Mr. Chadwick, who described his pictures as well as manipulating the lantern, said it would be impossible to exhibit in one evening all the photographs he had taken on a tour of fifteen thousand miles in Canada and the United States. He had, therefore, selected from his stock and arranged the present series, as forming a short pleasure trip for those who felt inclined for a spin across the Atlantic; the series consisted of about two hundred pictures. The second series consisted of about a hundred and thirty photographs of the Manchester Jubilee Exhibition, 1887, taken by himself for the Executive Committee. These came as a surprise to the audience, who showed their appreciation by frequent applause. It concluded by an exhibition of the Fairy Fountain in all its fairy-like beauty, magnificence, and change of colour. The effect was produced by an ingenious contrivance of the exhibitor, and excited the audience to enthusiasm.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1510. VOL. XXXVI.—APRIL 12, 1889.

[The following appeared in our issue of last week.]

REDUCTION IN PRICE OF "THE BRITISH JOURNAL OF PHOTOGRAPHY."

IN view of the unprecedented success of THE BRITISH JOURNAL OF PHOTOGRAPHY since its foundation, thirty-five years ago, the proprietors believe the time has arrived for increased effort to meet the ever-growing popularity of the JOURNAL, and that this purpose will be attained most effectively, both for readers and advertisers, by the reduction of the price of the JOURNAL from 3d. to 2d.

This important reduction in price will doubtless still further increase the influence of the JOURNAL, and largely augment its already extensive circulation at home and abroad.

Subscribers who have already paid their subscriptions on the old scale will have the reduction placed to their credit or remitted, as they may desire, by the Publishers.

The Editor takes this opportunity of assuring the readers of the JOURNAL that the reduction of price above referred to will not in any way modify the general conduct and efficiency of the JOURNAL, which will be carried on, if possible, with increased energy in every branch of photographic research. The services of specialists in every department are secured as heretofore. This includes patent law as applied to photographic inventions; chemistry and optics; while in the departments of practical and theoretical photography, in all its branches, nothing will be left undone to ensure the continuation of the high position the JOURNAL has always maintained.

A commodious and well-appointed dark room has just been fitted up at the editorial and publishing offices, which will be at the service of any one who desires a suitable place for changing dry plates or for making experimental or tentative trials of developers. Friends passing through London to or from the provinces, India, the Continent, America, and elsewhere, will find this a source of great convenience.

The publishers desire us to announce that in accordance with the reduction in price, the subscription will be as follows:

ANNUAL SUBSCRIPTION.

(Post free, payable in advance.)

	s.	d.
United Kingdom and Channel Isles ...	10	10
France, Belgium, United States, Canada, Australia, New Zealand, Africa, Newfoundland, Germany, Portugal, Spain, Italy, Egypt, &c. ...	13	0
India, China, Japan, &c. ...	15	2

It also may be obtained from all booksellers, photographic dealers, and railway bookstalls, price 2d. Special terms to Photographic Societies.

APPLIANCES FOR FACILITATING FOCUSING.

THE Exhibition at present open in the Crystal Palace affords us an opportunity of noticing peculiarities in the construction of apparatus and of special features which form idiosyncrasies of makers of various nationalities. One of these forms the topic of the present brief article.

How to focus a large camera? That is not the sole question, but a portion of it, which may be expanded to this—By what means can the ordinary sliding body of a large camera be made subservient to quick adjustment coupled with the most delicate regulation of focus?

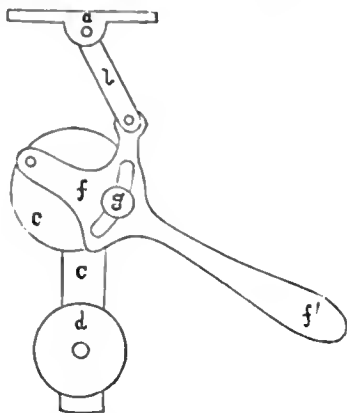
This, we think, can be best effected by an ingenious lever adjustment invented by M. Flammang, of the American Optical Company, and which, although our then American correspondent described and spoke highly of it soon after its introduction, is so excellent that we have every excuse for here giving a full account of it, especially as—if we correctly apprehend the matter—it is not secured by patent, but is open to all. And it is with much satisfaction we observe that, at the Crystal Palace Show, at least one eminent English firm manufacture some of their large studio cameras on the principle and with the appendage alluded to, and which we recommend for general adoption by all who make large cameras.

Premising that the quick extension of the body is made to take place by means of two A-shaped laths of rails, one at each side, over which the body slides smoothly owing to little wheels being "let in" having grooves on the edges to correspond with the tops of the rails, the rough adjustment having been effected by this. We now direct attention to the lever fine adjustment, as shown in the diagram on next page, and in which *a* is a small plate screwed to the back of the camera.

The circle *d* represents an ordinary milled-headed screw, which travels through a slot in the tailboard of the camera, and which is loosened when a quick adjustment is being made. It is then pinched and clamps *e* to the baseboard.

At one end of *e* is an eccentrically placed flat, circular plate, *e*, which forms part of the same casting as *e*, but is raised up a little higher. Pivoted by means of a strong pin near the margin of *e* is a lever, *f*, by moving the handle of which backwards or forwards (*e* being now supposed to be clamped) the end of the camera, *a*, is acted upon through the intermediation of the link *b*, and an extremely smooth adjustment made—not

only with great delicacy, but also with rapidity. When the final focussing has been adjusted by means of the fingers of the right hand, which grasp the handle f^1 , the point of the thumb



is pressed with a rotary motion against the milled head of a screw, g , by which it is firmly clamped with the plate underneath, and everything thus made rigid. For all large studio cameras this system of focussing is to be most strongly recommended.

For cameras of the hand, or detective class, the same idea may be usefully employed, but in a greatly simplified form. In one which we had constructed, the lever, f , consists of a straight strip of brass, one end of which works on a screw, as a fulcrum, placed in the side of the camera; the link, b , being affixed to the centre of the lever by a loose rivet, and the end, f^1 , travelling over a scale graduated to represent the various distances of objects from the camera. A considerable movement of this outer index end represents only a very small motion of the adjusting portion of the camera.

ILLUSTRATIVE PHOTOGRAPHY.

MANY who are even old and experienced photographers have, apparently, but little idea of the extent to which photography is employed for illustrative purposes. All, of course, are familiar with such processes as photogravure, Woodburytype, photo-lithography, colotype, and analogous processes, but they do not seem to be aware that many of the illustrations in the better class of periodicals and books, which pass as woodcuts, are perfectly innocent of the wood-engraver's art. These blocks are in reality produced by photochemical means. We are not here alluding to the half-tone "process" blocks often met with, and which a photographer would at once recognise, but to line subjects, such as are usually looked upon as being wood engravings.

It is not our intention in this article to enter into the manipulatory details of the different processes by which the blocks themselves are made, but rather to indicate how photography is being utilised in this particular direction. This we do in the hope that some of our readers may possibly see some fresh channel, in their own immediate sphere, in which the art-science may be applied that may not have occurred to them before.

Let us consider how a typographic block—say, for example, for such a work as the *Illustrated London News*, the *Graphic*, or *Punch*—is produced. Indeed, the last-named periodical was ~~one of~~ the first, we believe, of the better-class journals to utilise phototype blocks. In the first place the artist makes a drawing

of the subject in line, generally on a somewhat larger scale than that required for the block. The drawing may be made in pencil or crayon, but pen-and-ink is preferable, particularly when the drawing is on a small scale. The lines are always made bold and well defined. From this drawing a negative is taken of the size desired, and from this the block is made by one or other of the well-known zinc etching methods. A little consideration will show that this way of producing illustrations possesses many advantages over wood engraving. For example, the original drawing and touch of the artist are strictly preserved, as they have not to be transcribed by a draughtsman or by the engraver. If the drawing be finely and cleanly executed—which, by the way, is seldom the case—the block will be quite as good as a very high-class woodcut. The work is also more expeditiously and cheaply done. A block which would take many days to engrave may be produced by the photochemical process and made ready for the press in a very few hours.

When illustrations are taken from photographs, it is very common to make a sketch, in line, from the picture, and then proceed in the way just indicated. Frequently in the sketch considerable alterations are made from the original—figures introduced in the case of landscapes, or the dress metamorphosed in the case of portraits—occasionally, we regret to say, not with the view of improving the picture so much as evading the copyright in it. Sometimes, however, a tracing is made from the photograph, of course in line, and this is copied. Some of the large portraits used as "posters" are obtained in this way, from an enlargement on bromide paper made from the original negative.

There is another, and perhaps a neater plan than tracing, of transforming a photograph into a line picture, though it is less frequently practiced, probably because it is less generally known. It consists in making the line drawing, or tracing, direct on the photograph itself with pen and ink, and, after it is dry, destroying the photographic image, leaving only the drawing lines on a white ground. This is done by immersing the picture in a solution of bichloride of mercury. When working in this way it is scarcely necessary to say that the photograph must not be toned with gold—only fixed in the hypo bath. Enlargements on bromide paper are well adapted for this system of working, as the image is easily bleached with the bichloride of mercury. Of course, working in this way, the picture can be modified just as readily as in the case of a tracing, because after the mercurial treatment no trace of the photograph remains. Furthermore, the drawing being obtained on a large scale, the result, when reduced, is more satisfactory than when the drawing is, in the first instance, made the size of the block required; unless, indeed, the work is more delicately executed than is generally the case.

Before concluding this subject it may be well to refer to a very ingenious method of modifying photographs which is practised at the Ordnance Survey office, which, in the result, becomes very similar to that just described. Here, however, the original image is not destroyed. It is produced in the first instance in a very faint and highly actinic colour, so that its photographic value is about the same as that of the paper upon which it is printed.

It may be explained that all the Ordnance maps are first drawn on a large scale—ten feet to the mile—and, from these originals, reductions to the different scales are made in the camera. Now, it is very clear that if this large scale be reduced to, say, one inch to the mile, the roads, paths,

names of places, and other fine details would be too small to be readily distinguishable. Hence they have to be made proportionally larger in the smaller scales. This is done as follows:—

An impression is taken from the zinc plate of one of the medium scale, in a very pale blue ink. Then this print is gone all over with a ruling pen charged with strong black ink, keeping on the outside of the original lines, so as to make the roads, lanes, &c., wider. The same is done with the other fine details, so as to make them bolder. The names are also put in with large type. When finished—that is the map redrawn, or rather traced—it is copied in the camera to the smaller scales. Although the original image still remains, the pale blue ink in which it is printed has the same actinic value as the paper, hence it does not show in the copy. By this simple means the accuracy of the map is retained, and the finer details are secured on a larger scale.

As the experiment of last year, of withholding medal awards in connexion with the Annual Exhibition of the Photographic Society of Great Britain, is conceived to have had a detrimental effect upon the success of the Exhibition of 1888, it was decided on Tuesday evening last that medals shall be awarded as formerly. In accordance with the recently adopted rules, the election of judges will be made by the members of the Society, instead of by the Council as formerly. Of this, and other details, due notice will hereafter be given.

We spoke last week of a new or modified method of obtaining prints in platinum which was about to be introduced by Mr. Blanchard. Our issue of to-day contains a very important letter from Mr. Lyonel Clark, in which he describes a process for effecting the same end, and the reasoning by which he was led to adopt it. We bespeak for Mr. Clark's communication the careful attention of our readers.

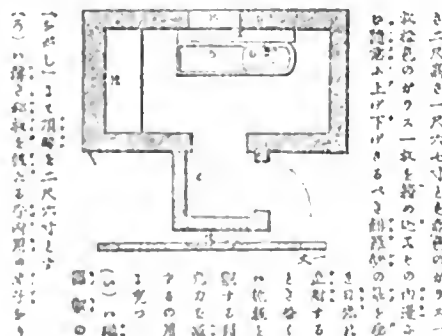
The employment of citric acid in various operations of photography is so general that a ready means of detecting the presence of tartaric acid in any suspected sample will be of value. M. Salzer, in a foreign journal devoted to this class of subjects, describes what appears to be a very simple method, one not involving the use of any chemicals beyond those to be found in any ordinarily furnished photographic laboratory. The method of testing consists simply in adding to a solution of the suspected crystals a drop of solution of yellow chromate of potassium. If the acid be purely citric, the yellow colouration thus produced remains unchanged for some days at ordinary temperatures, even if a few drops of sulphuric acid be added. If, however, tartaric acid be present, the yellow chromate is converted into a violet salt of chromic oxide. M. Salzer states that the presence of so small a quantity as one half per cent. will be shown by this reaction after the liquid has stood for a few hours.

In a work of very considerable value which *Nature* reviews, under the title *The New Traveller's Guide to Scientific Inquiry*, photography holds a position of importance. The work is published with the intention of providing "the numerous German travellers and dwellers in foreign lands with a simple introduction to scientific investigation in the various departments of natural science." Some men of science of the highest standing have contributed to this work, which is really a series of articles upon various subjects, each written by a specialist of eminence. Dr. Gustav Fritsch is the writer upon the microscope and photography. "This latter has, owing to the perfection of the dry plate methods, become so easy of practice that no scientific expedition is completely furnished without a photographic outfit, and it is satisfactory to see its various uses brought prominently forward in a work of this kind," says *Nature*. "Special attention may be called to the mode of recording the topographical features of a country by means

of panoramic photographs taken from properly selected points of view and to its peculiar advantages for the collection of anthropological data

THERE is no doubt that photography deserves all that is here and more, and its value will be still greater when it is customary bring before the public, or even the mass of scientific observers, actual photographic results, and not the engraver's transcripts (more correctly phrased, perhaps, as "translations") of imperfect prints brought out as exquisite and delicate bits of engraving of what some one might think the photograph was like. There are processes, and to spare now, which enable results of considerable value to be printed along with letterpress, while, if some of the collographic processes employed, the results are little inferior to silver prints.

Our friend, Mr. W. K. Burton, has forwarded the first copy of a Japanese photographic journal with which he is connected. The journal is of the size termed Demy 8vo., and to external appearance is got up in the English style; but on opening it a difficulty arises, and it is somewhat doubtful whether the reader has to commence at (what appears to us) the end of the book, or *vice versa*. Another difficulty is whether one has to read upwards, downwards, or sideways. Relative to the matter contained in the journal we rest content that it is all right, seeing such an able writer as Mr. Burton is connected with it. However, for the satisfaction of those who are curious we reproduce a portion of a page of this new journal.



We are pleased to observe that a new photographic society—East Dulwich and Peckham Photographic Society—has been formed. It is intended to hold meetings fortnightly during the winter months and once a month during the summer. We wish the Society every success.

THE cause of the blue colour of the sky often used to be a subject of dispute among scientific men, until Professor Tyndall appeared to have set it at rest by propounding the theory of its being the product of selective reflection of the blue rays of white light by reason of one presence of particles in the air of such minute size as only to be able to reflect rays of short wave length. Professor Hartley has recently propounded a new theory, which really seems to be a more probable one. After raising objections to Tyndall's theory *per se*, he presents his own arguments and the results of experiments to show that the blue colour arises from the action of ozone upon the rays of light. They showed that the results of his examinations of ozonised air proved that it was impossible for rays of light to pass through so little as five miles of air without the rays being coloured sky-blue by the ozone commonly present, and "that the blue of objects viewed on a clear day at greater distances, up to thirty-five or fifty miles, must be almost entirely the blueness of ozone in the air." In his laboratory experiments he observed that the quantity of ozone giving a full sky-blue in a tube only two feet in length is two and a half milligrammes in each square centimetre of sectional area in the tube.

MR. ISAAC ROBERTS, whose wonderful nebulae photographs have lately excited so much interest in the astronomical world, does not confine his gifts to the science to the mere, what we may term

operative part of observational astronomical photography, for we learn that he has lately presented a photographic reflecting telescope to Dunsink Observatory, and, further, completed his generous gift by erecting the instrument at his own cost.

THE above instrument has a mirror, by With, of fifteen inches diameter, a size which will enable a great amount of useful work to be done, but which, so far as size alone is concerned, reads as very insignificant by the side of Mr. Common's new telescope. This is also a reflector (silver on glass), and has the enormous diameter of five feet. The reflector has already been tried, and we believe with perfect satisfaction, photographs of the moon and of nebulae having been taken with the purpose of testing its curves.

It is idle at the present time to speculate how optics or photography will be influenced by these discoveries, but we may be sure that the services of the latter will be in request. Dr. Oliver Lodge writes of these marvellous discoveries: "In 1865 Maxwell stated his theory of light. Before the close of 1888 it is utterly and completely verified. Its full development is only a question of time and labour and skill. The whole domain of optics is now annexed to electricity, which has thus become an imperial science."

ON Wednesday forenoon, and for one or two hours after midday, London was plunged into a darkness of a phenomenal nature. It did not quite partake of the character of a November fog, as the gas lamps could be seen at a distance of many yards. It was simply a midnight darkness, accompanied during a portion of its continuance by a rather heavy fall of rain. The poor metropolitan photographer has evils to contend against of which his more fortunate provincial brother is unaware.

ECHOES.

It is possible to question one of the deductions arrived at by "W.H.D." in his article on *Mercurial Intensification* a fortnight ago. He speaks of the gradually improving character of a series of gelatino-bromide negatives taken during a period extending over six years, and, as I understand him, attributes the result entirely to the increased knowledge of the process and consequent greater skill in development. This may be true to a certain extent, to be sure, but I scarcely think it can be set down as the only reason. Are we to take no count of the improvements in the *manufacture* of the plates? I am pretty certain that at least as much of the progressive improvement is to be traced to the plates rather than the manipulator. Some time since I "rummaged" out a half packet of plates dating from the earlier—not earliest—days of commercial gelatine plates, and exposed them out of curiosity, to see if they had retained their good qualities, they being then about six years old—perhaps a little more or less. Compared with negatives taken upon plates by the same maker at about that distance of time back, they were quite indistinguishable, the same peculiarities, the same good and bad qualities being present in both, though the more modern plates from the same source, while exhibiting similar general characteristics, presented fewer of the bad and more of the good points. Granting I myself had improved in my developing powers, the old plates should have given better results than formerly, since they retained their original properties apparently undeteriorated; but such was not the case.

I cannot help alluding to the disappointment contained in last week's JOURNAL in the publication of the long-expected specification of Dr. Hill Norris's promised "rapid" collodion process. Like all old collodion workers I have a strong feeling in favour of the "old love," not only for the quality of its results, but on account of the comparative independence of plate makers it offers. I was therefore gratified at the announcement made by the veteran at the last Conference, but from the description then given I feared the process would not come up to the ideal of what such a process should be. But I was not prepared for such an "*eclaircissement*." Fancy going

back to preparing your own plates, when each one would occupy at least an hour of time!

A remark made at the last meeting of the London and Provincial Association with respect to the difficulty experienced by dwellers in towns in taking cloud negatives, from having to point the camera up to the sky, may be interpreted too strongly by some of the younger readers. Of course, in the streets of London or any large city the chances of cloud negatives are not plentiful, but even there from the roof of an elevated building the task is not impossible. But half an hour or an hour's ride into the surrounding country, or even suburbs, will afford many opportunities. Once get somewhat clear of the "chimney pots," even elevated ground is not absolutely necessary, though it is an advantage. What is required is a tolerably unbroken horizon, i.e., without any serious irregularities in the shape of individual trees, buildings, or church spires, and a moderately open space in front of the camera. It is surprising at how low an angle the camera may be pointed under such conditions. No further afield than Hampstead Heath, Highgate, Streatham, or even Clapham Common, or round the neighbourhood of the Crystal Palace, any number of spots may be selected from which cloud negatives may be produced when—most important point—there are any clouds worth taking. If the camera can be planted in the upper window or on the roof of a house so much the better, but my pet position in the London neighbourhood would be, if it were attainable, the top gallery of one of the towers at the Crystal Palace; there, I think, the standpoint could scarcely be improved if the outlook were over the ocean; but I am afraid "vested interests" and "monopolies" would stand in the way of even the amateur, for the wonderful and newly developed interest taken by the Palace authorities in photography is closely connected with its money side.

Apropos of Mr. W. K. Burton's method of eliminating pyro from prints by alternate washings in hot and cold water, I may just mention a plan I saw at work in a large professional establishment some years ago, when the prints were required to be finished quickly. I have myself adopted the same plan with manifest advantage in the case of gelatine negatives. It consists simply in giving the prints or negatives a moderately good washing in the ordinary way and then drying. This is followed by another immersion in fresh water for a few minutes, when any trace of hypo remaining in the dry film is rapidly and apparently completely removed. It presents but little trouble when a few prints are required to be mounted quickly.

JUNUS.

CRYSTAL PALACE INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—IV.

MAINTAINING the position of having an exceedingly large, varied, and attractive display at the last Crystal Palace Exhibition, Messrs. Marion & Co. this year make a show in no wise inferior to it in any respect, but still more attractive, inasmuch as it contains the novelties of the year—at any rate, such novelties as have been inaugurated by themselves, or by the increasingly large fraternity of inventors for whom they are agents, or whose goods they handle. But the fact of a thing being new and good at a previous period must not be held as conceding that it is not still excellent. Nevertheless, bearing in mind that some of their exhibits have already been described with considerable fulness in these pages, we shall, at present, give a first place in our description to those of the past twelve months.

First of all, we notice that in their large Middlemiss Studio Cameras (which are here in every size, from half-plate to 15×12) they have adopted a system of lever fine adjustment for focussing, of which we have previously had occasion to speak in terms of the highest commendation when describing the focussing system adopted in some of the large American portrait cameras, and of which we give a detailed account in another page.

Passing over a very great variety of other cameras, we notice their "Dolce," specially intended for taking children's portraits. This has a false front that fits before a studio camera, and within it is a shutter and a bird. By pressing a pneumatic ball, the bird springs out and gives a cuckoo's cry, and, when the child's attention is thus secured, the turning of a tap opens the shutter and the exposure is effected.

Among cameras of the hand or detective class, Messrs. Marion have several possessing different characteristics. Of these, the McKellen

Detective and Krugener's Book Camera have already (pages 693-4 of our last volume) been fully described. The plates in the latter having been so small, $1\frac{1}{2}$ inch square, we are glad to observe that a new edition of the book camera is now prepared, in which plates $3\frac{1}{2}$ inches are used; this will expand its sphere of usefulness. Academy and Parcel Cameras also range in this class. The display of Voigtlander lenses (for which Marion & Co. are sole agents) is exceptionally large, and includes those of every form made by this manufacturer; stands for studio and field, shutters, chemical cabinets, sets, and, in short, every requirement for the photographer. Their "vignetting serrator" is an ingenious little instrument in form of a

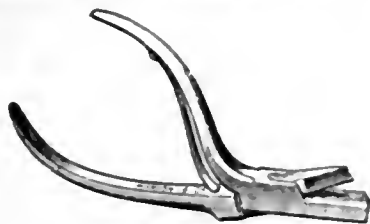


Fig. 12.

pair of pliers, for serrating the interior edge of a vignetting mark. This is quite new.

The magnesium flash light of this firm is shown in the following



Fig. 13.

diagrams, one of which represents the lantern erected on a stand. It is faced with paper so as to give a soft light, a person being torn



Fig. 14.

away in the cut to show the position of the lamp, of which a larger representation is here given, A being the circular flame through the

centre of which the magnesium powder, fed in at the hopper, B, is projected.

David Noakes & Son have a large display of lantern appliances, similar to that of last year. Among their novelties is a patent dis-

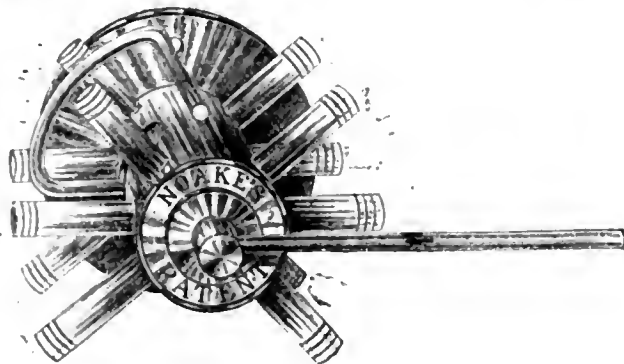


Fig. 15.

solver for triple lanterns, which is worked by means of a coupler and handle, as shown in the figure.

The name *Invicta* is a trade term applied to their cameras, lenses, instantaneous and time shutters, enlarging apparatus, &c., all of which are well represented in their exhibit.

Jonathan Fallowfield's exhibit includes cameras of every conceivable style, from those of a large size down to a small one of a detective character, mounts, sunk and plain, complete photographic outfits, tripod and table stands, lenses, shutters, trays, chemicals, rolling presses, sinks, backgrounds, and dark room lamps, fitted for either oil or gas.

The display of this old and well-known caterer for the photographic public is of a highly representative character, and proves quite educational to those who elect to study its several components.

Negretti & Zambra have a display of dry plates, lenses, paper, and prints. These are such as keep up the well-earned reputation of this old-established firm.

The Blair "Compact" Reversible-back Camera, an American production, is exhibited by Samuel Fry & Co., Limited. It claims to possess all the desirable facilities, combining lightness with rigidity. It is provided with a patent actuated focussing screen,

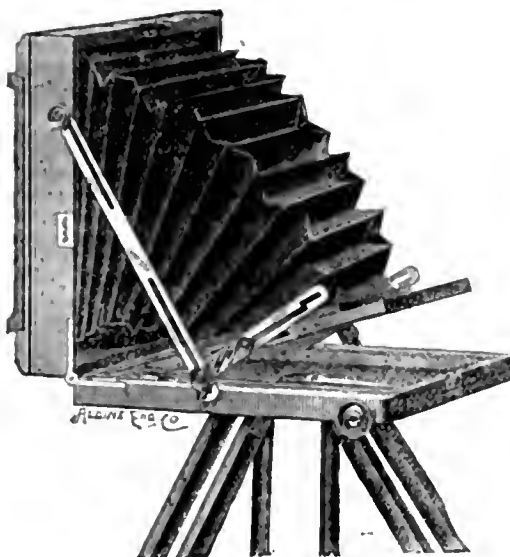


Fig. 16.



Fig. 17.

protected with a mahogany sliding piece, so that when folded it may be carried without a case with little fear of breakage of the ground glass. It will be observed from the cut that it occupies little space when folded.

These dark slides are fitted with shutters similar to those introduced

some time ago by the Scovill Manufacturing Company, of New York. No hinges are employed. In order to fill the holder the shutter is drawn out, and the plate is then dropped into the slide at the front and held in position by a spring and blocks. The shutter, which is entirely withdrawn from the holder during exposure, has one of its sides roughened, on which may be written all particulars relative to



Fig. 18.

the exposure of any negative, as is shown in the above cut. Chemicals, grooved boxes, paper, dry plates, &c., form a large element in the exhibit of this firm.

A new patent detective camera is shown among the exhibits of W. W. Rouch & Co. It is made in two sizes ($3\frac{1}{4} \times 3\frac{1}{4}$ and $4\frac{1}{4} \times 3\frac{1}{4}$),



Fig. 19.

and is furnished with a doublet lens, which is used with full aperture. The mode of holding the camera, when being used, is shown in the cut.

Rouch & Co. also show portable chemical laboratories; a changing box for a camera, which can be made to hold any number of plates, the number being determined by the weight; and a pocket camera.



Fig. 20.

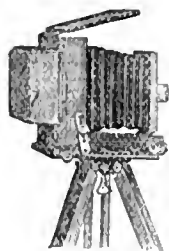


Fig. 21.



Fig. 22.

The above figures represent respectively the objects just spoken of.

This firm also exhibit their well-known studio and field cameras and other appliances, together with a magnificent display of photographic chemicals of every nature.

Kawson & Swan have an attractive stand with a varied exhibit, consisting of chemicals and preparations pertaining to photography, cameras, stands, washers, Bracher's new metal dark slides, Bracher's distilling apparatus, instantaneous shutters, a series of cloud negatives, bouquets of artificial flowers and grasses for studio use. An important feature with this firm is the introduction of bamboo and

other light studio fittings. Winter's automatic hand camera is also among the exhibits, a full description of which will shortly appear in our columns. Templeton's oxyhydrogen lamp is also shown, a cut of which appears below.

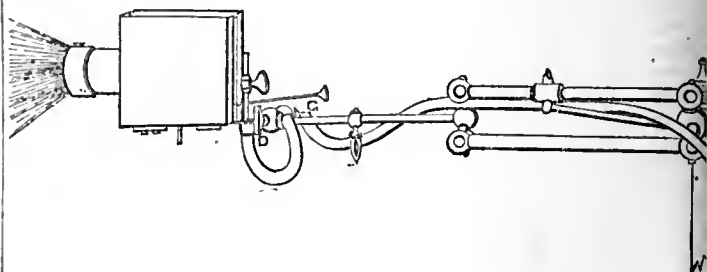


Fig. 23.

This lamp is fitted for photo-micrography and surgeon's use. By means of parallel rods this light is capable of movement in a backward or forward, horizontal, or up-and-down motion.

A very varied exhibit is shown by Walter Tyler, London. His grand triple lantern has an imposing appearance. It is fitted with telescopic rack fronts and extra large front lenses; several of different foci form part of the adjuncts to this lantern. This, and in fact all his lanterns, can be filled with lime or oil light, those for the latter being ingeniously adjusted for the carrying off of the smoke and heat from the lamps contained in the two lower lanterns. Tyler's helioscopic lantern is so arranged that it can be used as an ordinary lantern or for chemical or electrical experiments. This, too, is fitted for oil and lime lights. Reading lamps, slides of various styles, gas

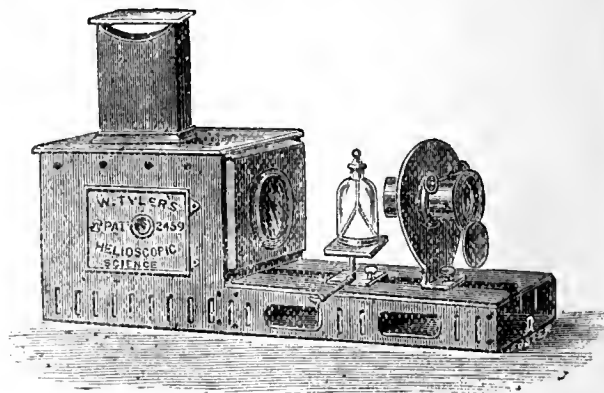


Fig. 24.

bottles, governors, and gauges, ether saturators and back valves, and a variety of appliances, are included in the display of this firm.

Mr. J. R. Gotz shows several novelties, both in processes and in appliances. Two fine negatives, 15×12 , are exhibited, enlarged from cabinet and quarter-plate by Obernetter's method of direct enlarging. The enlarged negatives are on patent plates, a perfectly even thickness of film being necessary to success. The negatives are exposed in an ordinary enlarging camera, developed with iron, and after washing treated with bichromate of potassium. One part of bichromate with five of nitric acid and five of water form a stock solution; this is diluted fifteen to sixteen times with water, and the plate flooded with it. Then follows resensitising with strong liquid ammonia, '880, one part of ammonia and one of bromide of ammonia in one hundred of water. After washing, and a second exposure in diffused light, the plate is redeveloped with the old developer, which may be strengthened up with new. The image will soon reappear, being built up from below the film; hence density must be entirely judged by transmitted light. The enlarged negatives have the character of originals, and many of them are said to yield better prints than the plates from which they are the copies. The process presents many difficulties, and requires considerable experience, but the results are undoubtedly very fine.

Some prints on Obernetter's gelatino-chloride emulsion paper are shown, as well as on plates (opals), coated with the same emulsion.

Amongst the novelties of the season is Mr. Gotz's "new volute"

shutter, an improvement on his former model. In the new form the mechanism is entirely enclosed in a case of ebonite about two-thirds of an inch thick, and, for a whole-plate lens, about two and a half inches wide by four inches high. The instrument is wound up by means of a small milled head at the back, and may be set to either instantaneous or timed exposures by turning a small crank. A succession of six instantaneous exposures can be made, and about four timed exposures, once the shutter is fully wound up, a distinction which was also a characteristic of the first model, while the new form adds a considerable gain in the rapidity of the instantaneous action. Another shutter is the "Wing," which opens by two metal blades from the centre. Its action is very rapid, and it is constructed for timed as well as for instantaneous exposures at will. Gotz's patent camera is also on view, one single 12 x 10 serving as an illustration of his principle of camera construction, which is distinguished by the erecting arrangements, swing from near the centre of the plate, and the perfect balance of the camera obtained with short focus. The adaptation of his $7\frac{1}{2} \times 5$ size for stereoscopic work will interest those who are desirous of bringing about the revival of this beautiful branch of the art-science.

FIFTY YEARS' PHOTOGRAPHY.

CONTINUING from where I left off in my previous communication, we will for a little consider the work done by the American philosopher, Dr. John William Draper. Allow me in the first instance to show you, by means of the lantern, a portrait of this distinguished experimentalist. Draper was undoubtedly the first to obtain a photograph of the moon. This was secured on a Daguerreotype plate on March 23, 1840. The size of the figure was about one inch in diameter, and the exposure was twenty minutes. This photograph is preserved in the New York Lyceum of Natural History. In Draper's memoirs, published in London in 1878, we find all his early photographic researches given in detail, but we need not go into these. We may, however, refer to his two photometers, the chlor-hydrogen and the ferric oxalate. In the former instrument the measurement of the intensity of the light source was sought to be arrived at by the chemical action which takes place when a mixture of hydrogen and chlorine gases is acted on by light, and in the other, as the name implies, ferric oxalate solution was exposed to light, the quantity of carbonic acid evolved in its decomposition being measured either by volume or by weight. Ingenious as these photometers undoubtedly are, they are nevertheless more scientific than practical. Dr. J. W. Draper may be credited with being the first to produce a print from ferric oxalate. This was in the year 1848. Draper occupied himself much with photo-spectroscopic work, and was the first to photograph what are known as the red lines on the spectrum. This he accomplished by the use of bitumen in India. He was Professor of Chemistry and Natural History in the University of New York, having been appointed to the chair in the year 1853. He died on the 4th of July, 1882.

We come now to the collodion era in photography, and the name which is associated therewith, as most of you are all aware, is that of Frederick Scott Archer. We will have his portrait thrown upon the screen while a few details regarding Archer's career may be appropriately given. In attributing to Archer the merit of originating the collodion process, it is not for a moment to be supposed that he was the discoverer of collodion. This substance was prepared, not long after the discovery of gun-cotton, by Schönbein, and was used in surgery to cover injured surfaces. Archer was in early life apprenticed to a silversmith, and subsequently took to modelling for the trade. He afterwards followed the profession of a sculptor, and many excellent busts were, it seems, modelled by him. In March, 1851, Archer published his account of the collodion process in the *Chemist*, though we have evidence that he had produced pictures by means of collodion in the autumn of 1850. The details of the process we are considering are so intimately associated with even present-day operations that we may be excused going into particulars. Suffice it to say that Archer's process was what really popularised photography. Talbotype and Daguerreotype had of course their votaries, but where one practised these processes, ten and more were to be found following the ever fascinating wet collodion process. As is well known, Archer did not in any way derive pecuniary benefit from his discovery. Unlike some of his predecessors, he gave the results of his experiments free to all the world, benefiting others, for it cannot be denied that many fortunes were made through the instrumentality of his discovery. Archer did not live many years after he had made his free gift to the world. In May, 1857, at the early age of forty years, Archer passed away. Mrs. Archer died very shortly afterwards, leaving three orphan daughters totally unprovided for. Through the exertions of the photographic community a sufficient sum was raised to secure to the family sufficient for their education and upbringing.

The collodion process reigned supreme for many years, but it had its drawbacks as well as its advantages. It was not suitable for outdoor photography, inasmuch as it was necessary to take to the field of operations all the paraphernalia of the dark room. Hence, the desire arose to

produce a plate that could be prepared at home, having the necessary-keeping qualities, so that it could be brought back after exposure for subsequent development in the studio. So much was attempted in that direction that we can do no more than simply refer to one or two of the more prominent processes. Abney, in his article on *Photography* in the *Encyclopædia Britannica* gives the credit to M. Gaudin as being the first to experiment with collodion dry plates. This was in the year 1853, and his researches are detailed in *La Lumière* for that year under the dates of April 23 and May 27. All the collodion dry plate processes devised had a strong family likeness, the plate being coated in the first instance with iodised collodion, afterwards sensitised in a nitrate of silver bath, and finally washed, had what was known as the preservative applied to it, and many were the preservatives put forward from time to time. We may refer to the following: tea, coffee, albumen, tannin, honey, gum arabic, beer and gelatine. Tanpenot's process, which I know was worked by some of our members, was reckoned one of the most reliable of the dry plate processes—in this albumen played the part of the preservative. Again, the gum gallic process, introduced by R. Manners Gordon, was also one giving good results. We will only refer to another, viz., Major Russell's tannin process, and this process leads us to speak of what we now know as the "alkaline developer," for it appears that in 1862 Major Russell introduced it in connexion with the plates prepared by his method. In this developer we have, as is well known, three bodies present—an alkali; a reducing agent, for the most part pyrogallie acid; and a restrainer, a soluble bromide. This developer placed a new power in the photographer's hand, but it was not till the gelatine rapid plate made its appearance that its real importance became manifest.

We will now come down to the year 1861, and in this year we find that a distinct advance was made when Bolton and Sayce brought forward their collodion emulsion process. As is well known, this method did away with the sensitising bath, the sensitive salt of silver being formed in the collodion, and the salts of decomposition removed by washing. The actual gaining sensitiveness was not by any means great, it was rather the reverse; but the method of proceeding when applied to the vehicle gelatine has been the means of giving us all the brilliant results photography has in these latter years achieved. Up to the point we have been considering the iodide of silver had formed the mainstay of the photographer, but with the introduction of the emulsion plate recourse was had to the bromide. Emulsion processes may be broadly classed as washed and unwashed. In the latter the emulsion was washed *in situ* on the plate, in the former the washing was effected on the material as a whole.

Leaving collodion emulsion, and passing on to consider its more successful rival—gelatine emulsion—the first in the field to point out its possibilities was Dr. Richard Leach Maddox. We present you with his portrait. Dr. Maddox in 1871 secured negatives by means of a silver salt emulsified in gelatine. In 1874 Mr. A. Kennett published a formal giving good results, and in 1878 Mr. C. Bennett, a photographic amateur, published results showing how great sensitiveness and rapidity were to be obtained by keeping the gelatine liquid for several days at a low temperature. This mode of obtaining the silver salt in a highly sensitive condition received the somewhat homely term of "cooking." The results obtained by the foregoing experimenters were sufficiently remarkable to bring others into the field, and the consequence was that many modifications were introduced, all having the same end in view, viz., to produce a very susceptible photographic plate. We may simply refer to some of the names associated with this work, the late Dr. von Monckhoven, Dr. H. Vogel, of Berlin, Colonel Stuart Wortley, Mr. W. B. Bolton, Mr. W. E. Henderson, and many others.

There is one investigator who stands out pre-eminently in scientific photography, and who has done much towards clearing up many of the chemical changes involved when light acts on the sensitive gelatine film, I allude to Captain Abney. To appreciate fully the value of the work done by Abney a certain amount of chemical knowledge is necessary. Had he done nothing else, the preparation of his peculiarly constructed form of silver bromide, whereby he was enabled to photograph the red rays of the spectrum and the rays beyond, would have earned him the foremost place. Abney first pointed out the capabilities of hydroquinone as a developer, the point of difference between this substance and the pyro being that while the latter requires the presence of the restrainer, the former can be used *per se*. As I would like to refer to what has been done in processes where silver has not been made use of, and to photo-mechanical processes, we will require to pass on. I feel that I am disposing very summarily of much that is interesting and necessary for a true estimate of the gradual development of that process which has made photography the thing it actually is; but in order that I may not appear before you again this session with another continuation I will try to compress the more salient points still to be touched upon into the narrowest possible limits. A few words, then, in the first instance regarding the carbon process. We have in our first communication already referred to the reaction noted by Munro Ponton of the reduction by light of a bichromate; but another fact has to be recorded, and it is this, that should gelatine, glue, gum, or albumen be present along with the bichromate, these substances become insoluble. Taking gelatine and mixing with it a certain amount of colouring matter, and coating paper with the mixture, thereafter treating it with a solution of bichromate, we find that after exposure to light we are enabled by the dissolving away of the unaltered gelatine by means of hot water to obtain a picture.

Certain precautions are necessary, such as developing from the back, &c., to secure the half tones, but these we need not enter upon, as it is with the history of the subject we are more immediately concerned. Talbot had utilised this property of the insolubility of the altered gelatine for the production of his etched plates in 1853, but Poitevin, a French chemist, patented a carbon process in England in 1855, and Pouncey, an Englishman, published in 1859 a similar process. Half tones were wanting in both processes. It was not till 1861 that carbon printing became an accomplished fact. Mr. J. W. Swan may be reckoned the true pioneer, when he showed how to develop the picture from the back by transferring it to an indiarubber support while developing; he it was who first introduced the now familiar carbon tissue. We have not the time to go into all the simplification of details which has gradually been evolved in the working out of the process, but we may simply refer to Sawyer's flexible support, which was a decided advance, and which was introduced by Mr. Sawyer in 1871. The carbon process remains with us to this day, and judging from the number of pictures on opal plates produced by this means presented for sale in the various shops in Glasgow, it shows no sign of diminishing vitality.

W. LAXO, JUN.

(To be concluded.)

CAMERA CLUB CONFERENCE PAPERS.

II.

SCIENCE AND ART.

By Dr. P. H. EMERSON.

SINCE all mental progress consists, as Mr. Herbert Spencer has shown, for the most part in differentiation—that is, in the analysis of an unknown complex into known components—surely it were folly to confuse any longer the aims of Science and Art. Rather should we endeavour to draw an indelible line of demarcation between them, for in this way we make mental progress, and Science and Art at the same time begin to gather together their scattered forces, each one taking under its own standard those powers that belong to it, and thus becoming integrated, and necessarily stronger and more permanent; for evolution is integration and differentiation passing into a coherent heterogeneity. Now, I do not mean to premise that this confusion between Science and Art exists everywhere; it does not. But I feel sure that it exists largely in the ever-increasing body of persons who practise photography. The majority of these have not thoroughly, nay, not even adequately, thought the matter out. It is obvious, then, according to the teachings of evolution, that, if we are to make progress, this differentiation must be made, thoroughly understood, and rigidly adhered to by every practitioner of photography. Each one must have his aim clearly stamped upon his mind, whether it be the advancement of Science or the creation of works whose aim and end is to give æsthetic pleasure. Proceed we now to analyse the difference between the aims and ends of Science and Art. Let us first approach the subject from the scientific standpoint.

Assuming that we have before us a living man, let us proceed together to study him scientifically, for the nonce imagining our minds to be virgin tablets, without score or scratch. Let us proceed first to record the colour of his skin, his hair and eyes, the texture of his skin, the relative positions of the various orifices in his face, the number of his limbs, the various measurements of all these members. So we go on integrating and differentiating until we find that we have actually built up a science—ethnology. If we pursue the study, and begin to compare different races of men with each other, we find our ethnology extends to a more complex anthropology. We next observe that the eyelids open and close, the lips open, sounds issue from the mouth, and our curiosity leads us to dissect a dead subject; and we find that beneath the skin, fat, and superficial *fascia* there are muscles, each supplied with vessels and nerves. We trace these vessels and nerves to their common origins, and are led to the heart and brain. In short, we find the science of anatomy grows up under our hands, and if we go on with our studies we are led into microscopy. Then we begin to ponder on the reasons why the blood flows, on the reasons why the *corrugator supercilii* and *depressor anguli oris* act in weeping, the *musculus superbus* in practical arrogance, and the *luratur anguli oris* act in snarling or sneering. So we go on studying the functions of all the organs we find in our man, and, lo! we are deep in physiology; and if we go deeply enough, we find the thread lost in the most complex problems of organic chemistry and molecular physics. And so we might go on studying this man; and if our lives were long enough, and if we had capacity enough, we should be led through a study of this man to a knowledge of all physical phenomena, no wonderful and beautiful is the all-pervading principle of the conservation of energy, and so indestructible is matter. As we proceeded with our studies we should have been observing, recording, positing hypotheses, and either proving or disproving them. In all these ways we should have been adding to the sum of knowledge, and in the greatest steps made in our advancement we should have made use of our constructive imagination—the highest intellectual power, according to recent psychologists.

The results of these investigations, if we were wise, would have been recorded in the simplest and tersest language possible, for such is the

language of Science. It is needless to point out that in these records of our studies, as in the records of all scientific studies, too many facts could not possibly be registered. Every little fact is welcome in scientific study, so long as it is true. And thus the humblest scientific worker may help in the great work; his mite is always acceptable. Such is, alas! not the case with that jealous goddess, Art; she will have nothing to do with mediocrity. A bad work of art has no *raison d'être*; it is worse than useless—it is harmful. To sum up, then, "Science," as Professor Huxley says, "is a knowledge of the laws of Nature obtained by observation, experiment, and reasoning. No line can be drawn between common knowledge of things and scientific knowledge, nor between common reasoning and scientific reasoning. In strictness, all accurate knowledge is Science, and all exact reasoning is scientific reasoning. The method of observation and experiment by which such great results are obtained in Science is identically the same as that which is employed by every one every day of his life, but refined and rendered precise."

Now let us turn to Art, and look at our imaginary man from the artistic standpoint. Assuming that we have learned the *technique* of some method of artistic expression, and that is part of the science we require, we will proceed with our work.

Let us look at the figure before us from the sculptor's point of view. Now, what is our mental attitude? We no longer care for many of the facts that interested us when we were studying the man scientifically; we care little about his anatomy, less about his physiology, and nothing at all about organic chemistry and molecular physics. We care nothing for his morality, his thoughts, his habits and customs, his sociological history, in fact; neither do we care about his ethnological characters. If he be a good model, it matters little whether he be Greek, Italian, or Circassian. But we do care, above all, for his type, his build, and the grace with which he comports himself; for our aim is to make a statue like him, a statue possessing qualities that shall give æsthetic pleasure. For the *raison d'être* of a work of art ends with itself; there should be no ulterior motive beyond the giving of æsthetic pleasure to the most cultivated and sensitively refined natures.

The first thing, then, we must do is to sit in judgment on our model. Will he do for the purpose? Are his features suitable? Is he well modelled in all parts? Does he move easily and with grace? If he fulfils all these conditions we engage him. Then we watch his movements, and seize on a beautiful pose. Now with our clay we begin to model him. As we go on with our work we begin to see that it is utterly impossible to record all the facts about him with our material, and we soon find it is undesirable to do so—nay, pernicious. We cannot model those hundreds of fine wrinkles, those thousands of hairs, those myriads of pores in the skin that we see before us. What, then, must we do? We obviously select some facts—the most salient, if we are wise—and leave out the rest.

All at once the fundamental distinction between Science and Art dawns upon us. We cannot record too many facts in Science; the fewer facts we record in Art, and yet express the subject so that it cannot be better expressed, the better. All the greatest artists have left out as much as possible. They have endeavoured to give a fine analysis of the model, and the Greeks succeeded.

It is beside the question to show how Science has exercised an injurious influence upon certain schools in art, but that would be very easy to do. At the same time the best Art has been founded on scientific principles—that is, the physical facts have been true to nature.

To sum up, then, Art is the selection, arrangement, and recording of certain facts, with the aim of giving æsthetic pleasure; and it differs from Science fundamentally, in that as few facts as are compatible with complete expression are chosen, and these are arranged so as to appeal to the emotional side of man's nature, whereas the scientific facts appeal to his intellectual side.

But, as in many erroneous ideas that have had currency for long there lurks a germ of truth, so there lurks still a leaven of Art in Science and a leaven of Science in Art; but in each these leavenings are subordinate, and not at the first blush appreciable. For example, in Science the facts can be recorded or demonstrated with selection, arrangement, and lucidity—that is, the leaven of Art in Science. Whilst in Art the physical facts of nature must be truthfully rendered—that is, the leaven of Science in Art.

And so we see there is a relationship between Science and Art, and yet they are as the poles asunder.

(To be concluded.)

Foreign Notes and News.

THERE appeared in a late number of the *Bulletin de la Société Française de Photographie* a description of a method for removing the so-called dichroic film on negatives, that appears red by transmitted, and green by reflected, light. The negative is plunged for some minutes into water, and afterwards, for some twenty to forty seconds, into a solution of 2 : 100 of perchloride of iron; then, without washing, into a solution of fresh hyposulphite, and finally washed in a copious supply of water. The film

in question has only been found to appear when alkaline developers have been allowed to act too long upon negatives that had been insufficiently exposed in the camera, and even then only with quick-acting emulsions.

THE entrance of instantaneous photography into the domain of diplomacy would seem to mark an epoch in the history of the art; at any rate, it is an excellent proof of the lofty position which it has succeeded in gaining for itself in the modern world. The German Emperor was anxious a short time back to obtain some photographs of the ambassador and his suite, who had arrived in Berlin with the presents sent to the Emperor by the Sultan of Morocco. The law of Mohammed, however, expressly forbids his disciples to permit any kind of effigies of their persons to be produced, whether by the brush of the artist or the camera of the photographer. What was to be done? The Emperor appears to have been pressing, the ambassador unwilling to commit sin. The Gordian knot was cut by two ingenious courtiers—Count Kanitz and Count von Lütichan. The court photographer, at their suggestion, placed himself in ambush, and at the proper moment after the presentation pressed his trigger and took a pistol photograph of the unwitting follower of the Prophet!

THE last general meeting of the *Amateur Photographic Club* of Vienna seems to have possessed more than the usual interest of such reunions. Prof. O. Simony had just returned from the Canary Islands, of which he gave an entertaining account; while Dr. Jnl. Hofman exhibited a number of photographs and reproductions which he had taken by the magnesium flash lamp from coloured originals, and made an explanatory series of remarks which appear to have occupied a considerable time. The patience of the audience was, however, at last rewarded by the exhibition of the very interesting photographs which Dr. Seolik had taken of pre-Christian inscriptions, more especially of cuneiform characters discovered on bricks from Southern Babylonia, and which he elucidated with considerable erudition.

ACCORDING to the *Moniteur de la Photographie*, M. Block, jun., of Paris, by an ingenious arrangement known to many of the old collodion workers, has succeeded in rendering visible the development of a negative to a whole class. The negative was placed in a vessel with parallel sides of red glass, into which the developing fluids were introduced, and the whole projected on a screen by the oxyhydrogen light.

A BERLIN society, whose object is the providing of suitable work for ladies and girls of the better classes, has decided to select photography as one of the most suitable kinds of employment, and has arranged for a quarterly course of instruction and lectures in the art-science.

HERR C. LIEBERMANN, of Alizarin, has lately succeeded, by means of reduction with ammonia and zinc, in preparing a new body of a yellow colour, which he calls anthrarobin, and which, especially in alkaline solutions, possesses the power of absorbing oxygen in a high degree. Anthrarobin, though not soluble in water, dissolves in alkalies, and still better in alcohol and gelatinous acetic acid. As, however, gelatine plates are always developed with alkaline solutions, an experiment with anthrarobin would be well worth trying for this purpose, especially as only dilute solutions of alkalies are required to dissolve it. Anthrarobin solutions, however, require constantly to be prepared afresh, as they do not keep well.

A FORMULA has been communicated to the French Society of Photography by M. Ottenheim for development, by means of combined hydroquinone and pyrogallie acid; the following solutions, which keep well, should be prepared beforehand:—

Solution A.	
Water	340 grammes.
Carbonate of soda	50 "
Sulphite of soda	25 "

To be mixed while hot, and 5 grammes of hydroquinone to be added after filtration.

Solution B.	
Water	375 grammes.
Sulphite of soda	50 "
Pyrogallie acid	7.5 "
Sulphuric acid	3 drops.

To develop, take 55 c.c. of A, and 15 c.c. of B.

M. Ottenheim produced some negatives developed by means of these solutions, which were found to be very clear and vigorously defined.

DR. DRONER, of Berlin, has been recently pointing out a new method by which the assistance which has so frequently been rendered in the past by photography to various practical sciences has received a still wider

extension. Instantaneous photography has, according to him, proved itself of great value in experiments on the strength of building materials, and seems likely to do so still more in the future. In testing the breaking strain of a steel bar, either by pressure or strain, it is often of great importance to fix exactly the instant when the piece of metal gives way. On subjecting a piece of metal to pressure, the question arises, What alterations of form take place in the metal at the time, and what alteration of form occurs when the metal is slowly released from this pressure? The assistance of instantaneous photography has proved of value in furnishing answers to both these questions.

DR. C. ARNOLD, of Hanover, recommends, in the February number of the *Photographische Mittheilungen*, the employment of pyrocatechin as a developer. For plates of a size up to 18 x 24 centimetres he employs a mixture of 0.05 grammes pyrocatechin and 5 grammes of carbonate of potash dissolved in a proper quantity of water. As pyrocatechin is more easily soluble than hydroquinone, he employs when travelling a solution of soda of suitable strength, and adds to it when required as much pyrocatechin as will go on the point of a penknife, which is easily dissolved by shaking the bottle. This new developer possesses all the advantages which the inquirer in *Nature* has observed, especially the capacity of causing a clean and regular development, so that even when the solutions are comparatively cold the process still takes place with comparative rapidity. The plates when developed may, after washing, be fixed in ordinary daylight. According to the intensity of illumination the amount of carbonate of potash in solution must be increased or diminished. Bromide of silver, gelatine paper, and diapositives may be treated with the same developer as above. Should pyrocatechin become more generally employed, Dr. Arnold seems to think that its price would soon fall to the level of that of hydroquinone.

JUDGES' AWARDS. R. W. THOMAS & Co.'s COMPETITIVE EXHIBITION, Crystal Palace, March 19 to April 13, 1889.—Judges, Messrs. J. Gale, G. Davison, and Andrew Pringle. *Class I. Portraiture (including groups)*. Silver medal, W. H. Banks, Trinity College, Cambridge; bronze medal, the Rev. F. C. Lambert, 62, St. Andrew's-street, Cambridge.—*Class II. Landscape (including figure subjects)*. Silver medal, S. D'Arcis, 6, Brent Villas, Hendon; bronze medal, Alexander M. Morrison, 10, Renfrew-street, Glasgow; honourable mention, the Rev. F. C. Lambert.—*Class III. Architecture (including interiors)*. Silver medal, J. T. Hopwood, Kilton Hall, Stamford; bronze medal, the Rev. F. C. Lambert.—*Class IV. Instantaneous Photography*. Silver medal, no award; bronze medal, Jerome Harrison, 365, Lodge-road, Hockley.—*Class V. Lantern Slides*. Silver medal, Low Sergeant, South Norwood; bronze medal, M. J. Harding, College-hill, Shrewsbury.—*Gold Medal for the best Photographic Work*: J. T. Hopwood.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4131.—"An Improvement in Detective or other Cameras." F. MIALLE.—*Dated March 1, 1889.*

No. 5114.—"Improved Apparatus for Displaying Photographs or Cards." I. GREENBURY.—*Dated March 25, 1889.*

No. 5173.—"Improvements relating to the Mounting of Photographs, and to the Preparation of Facsimiles of Public and Private Records, Deeds, and the like. Complete specification. D. K. ZIMMERT.—*Dated March 25, 1889.*

No. 5297.—"Improvements relating to the Development of Photographic Pictures." M. ANDRESEN.—*Dated March 25, 1889.*

No. 5211.—"Apparatus for Automatically Producing and Completing Photographs." Complete specification. K. RAMSECK and B. SCHAFER.—*Dated March 25, 1889.*

No. 5234.—"Improvements in or relating to Photographic Cameras." W. H. R. KERRY.—*Dated March 27, 1889.*

No. 5275.—"Improvements in the Arrangement, Construction, and Mounting of Photographic Cameras." L. E. PERKEN, F. L. PERKEN, and A. RAYMENT.—*Dated March 27, 1889.*

No. 5337.—"Improvements relating to Photographic Cameras and to Apparatus for Use in connexion therewith." W. H. SMITH and W. WILLIS.—*Dated March 28, 1889.*

No. 5360.—"An Improved Portable Camera." J. R. GERRELL-BONNAUD.—*Dated March 28, 1889.*

No. 5374.—"An Improved Method of Photographic Printing." W. W. J. NIXON.—*Dated March 29, 1889.*

No. 5409.—"Improvements in the Production of Photographic Pictures." J. HANCOCK.—*Dated March 29, 1889.*

No. 5439.—"A New or Improved Apparatus for Automatically Exhibiting Pictures and the like upon Receipt of a Coin." C. LAUTZ.—*Dated March 29, 1889.*

No. 5442.—"Improvement in Photographic Plate-holding Boxes and Cameras." Communicated by C. P. STERN. H. J. ALLISON.—*Dated March 30, 1889.*

No. 5513.—"Apparatus for Containing Photographs or other Suitable Articles." D. A. F. ANDERSON.—*Dated April 1, 1889.*

No. 5525.—"Improvements In Photographic Hand Cameras." D. McNAMARA.—*Dated April 1, 1889.*

No. 5530.—"Improvements in Photographic Dry Plates." G. C. WHITFIELD.—*Dated April 1, 1889.*

No. 5542.—"An Improved Stand or Frame for Exhibiting Photographic Lantern Slides, Negatives, and other Transparencies." A. H. WORMALD.—*Dated April 1, 1889.*

No. 5610.—"An Improved Photographic Camera." A. C. PEMBERTON.—*Dated April 2, 1889.*

No. 5650.—"An Improved Combination Receiving, Delivering, and Distributing Apparatus for Photographic Coating Machines." Complete specification. J. W. T. CADETT.—*Dated April 2, 1889.*

No. 5713.—"Apparatus for Containing and Displaying Photographs or other Suitable Articles, or to Form a Photographic Dark Slide." D. A. P. ANDERSON.—*Dated April 3, 1889.*

No. 5920.—"Improvements in Photographic Cameras." C. RAYMOND.—*Dated April 6, 1889.*

PATENTS COMPLETED.

AN IMPROVED DARK SLIDE FOR PHOTOGRAPHIC CAMERAS AND IMPROVEMENTS IN CAMERAS TO BE USED THEREWITH.

No. 5462. ANKETELL MATTHEW HENDERSON, 20, Avoca-street, South Yarra, Victoria.—*April 12, 1888.*

My invention consists first and mainly of an improved dark slide for photographic cameras, and secondly of certain improvements in such cameras, to be used in connexion with my dark slide, although such slide can be used with any kind of square bellows camera or any box or detective camera of sufficient depth.

The dark slide consists of a flat box or tray containing a number of carriers or frames for holding the sensitive plates or films. These carriers or frames can be made of metal, cardboard, wood, or other suitable material. Each carrier or frame is hinged on a pin, which passes through the sides of the box or tray, and has at one end a bent arm or other contrivance by means of which the carrier or frame inside can be swung or partially revolved, and these pins are so arranged that each plate can be swung or revolved about ninety degrees. This is done by arranging the line of pins at an angle of forty-five degrees with the ends of the dark slide which is fitted with the usual sliding or folding shutter, which can be opened when the slide is in position in the camera, and this shutter if sliding may be made to remove altogether from the dark slide, and to hold it when so removed I provide small clamps on the back of the dark slide. The dark slide may be made to slide into grooves in the back of the camera, or to slip between the ground glass and the camera back, or to fix to the back with clamps as may be found most convenient, or the dark slide may be made of sufficient depth to form a box camera. The dark slide is used as follows:—

When the sliding or folding shutter is removed the exposure of the front plate is made in the camera in the usual manner. This plate, then, by means of the bent arm on the pin is turned at right angles into the body of the camera, thus presenting the back and edge of the carrier or frame to the lens, and exposing the sensitive plate or film in the next carrier or frame. Before exposing this film, the lens or dark slide must be brought nearer to the extent of the thickness of the carrier or frame. To do this accurately I use a scale on the sliding part of the camera or on the lens, the lines on which correspond with the thickness of the carriers or frames. For detective cameras, where focussing is performed by estimating the distance of the view or object from the camera, I use a double scale, the division of the one corresponding with the thickness of the carriers or frames, and the divisions on the other representing the alterations of focal lengths at the varying distances of the view or object. These are fitted to the sliding body of the camera or to the lens, as may be most convenient, so that by bringing the line representing the distance in conjunction with the line representing the plate or film whose surface is exposed the image cast by the lens on the surface will be in focus.

To provide against the access of light to the edges of the plates when the carriers or frames are turned out into the body of the camera I use a shutter hinged to a pin passing through the front of the camera, and fitted with a bent arm or other contrivance by means of which the shutter can be hinged or revolved so as to cover the backs and edges of the carriers or frames and prevent access of light to the edges, and this shutter can be made with the edges turned back like an inverted tray for greater security. Where the lens projects inside the front of the camera I make the centre of this shutter of pliable material. To further protect the plates from light I line the inside of the dark slide and the portion of the camera into which the plates project with velvet or similar material, and when the dark slide is made for use in a bellows camera I hinge in front of the front carrier or frame a tray which can be turned out into the body of the camera to enclose the plates or carriers when so turned out.

To hold the carriers or frames in their places in the dark slide parallel to each other I use various contrivances. For small plates or films I use an arm fitted with a spring and hinged to a pin passing through one end of the dark slide, and fitted with a bent arm or stud for partially revolving same. When the arm is turned out into the camera each plate in turn can be released, and the spring forcing back the arm against the remaining carriers or frames will hold them in position. Another method is to have a catch plate of wood or metal covered with velvet or similar material at one end of the dark slide held in contact with the carriers or frames by a spring. This catch is attached to a pin passing through the end of the dark slide so that it can be drawn back when desired to release the carriers or frames. I use sometimes V-shaped studs or a rack on the bottom of this catch plate to hold the carriers in exact position. For large plates or films I prefer a similar catch plate for each carrier or frame, each fitted with a pin passing through the end of dark slide and arranged over each other, so that raising an inner catch will raise all the outer ones also. As before mentioned, the dark slide can be used in any square bellows camera or box or detective camera of sufficient depth, but I prefer to use one of the special cameras, hereafter described.

For a detective camera I use a sliding box camera, and place the sensitive

plates or films in the carriers or frames so that their centres are in a line parallel with the sides of the camera. Where a lens of short focus is used, I project the portion of the camera front into which the carriers project so as to allow room for them.

For travelling cameras I place the plate or films in the carriers with their centres parallel with the centres of the pins on which the carriers revolve, and I carry the lens on a front which moves parallel to these pins. In the first camera this is done by attaching the front to parallel links and holding it at the correct focal distance by a link attached to the top with lines marked thereon, or holes bored therein at distances corresponding with the various films or plates. In the former case the double scale already described is used, in the latter case a pin on top of the camera is provided which fits into the holes, and thus holds the front at a correct focal distance. This pin can be made to slide so as to adjust the front for varying distances of the view or object. The rest of the body of the camera I make of pliable leather or cloth, or indiarubber cloth.

In the second camera I use, the lower part of the front is hinged to the upper, and opens parallel to the line of pins of the carrier or frames. The lens is fixed in a sliding plate on the front, fitted with a double index as before described. The lower part of the body I make of leather cloth or similar material.

IMPROVEMENTS IN DARK SLIDES OR PLATE HOLDERS FOR PHOTOGRAPHIC CAMERAS.

No. 6992. MICHAEL TAYLEURE, Market Place, Pocklington, Yorkshire.—*May 10, 1888.*

The invention relates to that part of a photographic camera known as the dark slide or plate holder, which is used to contain and transport the sensitised plate. I construct my slide in a special and peculiar manner so as to be perfectly light-tight. It may be single or double and the shutters may be specially constructed so as to draw right out, a great advantage for landscape work on a windy day.

The invention is specially applicable for dry plate photography, and the slide may be made of tin or other suitable material. The special construction of the slide is a feature of the invention.

The mode of action is as follows:—

Draw out the slides, which are curved at the top where the rings are; the latter are provided for the purpose of keeping the indiarubber in its place, as well as to exclude the light from the plates when in use. When drawing out the slide facing the lens with one hand, place the other hand upon the other slide to keep it in its place.

After drawing the slides out to charge the slide with fresh plates, place the sensitised plates back to back with a piece of card the size of the plates between, as seen in the sample sent, so as to keep the other plate secure from the light.

The slides will pack in a small compass, and no dark room or tent is required.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. A dark slide or plate holder in which the orifice of the slot, into which the shutter or shutters are passed, is closed by elastic or springy material when the shutter is not in position, but which yields to the pressure of the shutter when the latter is pushed in, and swells out, filling the slot, and keeping the light excluded as the shutter is withdrawn, whereby the shutter can, if it be desired, be entirely withdrawn, without permitting the entrance of light through its slot. 2. A dark slide or plate holder for photographic cameras in which a flat frame, divided into separate compartments by the removable partition, and having guides or channels, and an elastic roller or spring, is adapted to receive the sliding shutters on each side of the partition aforesaid, whereby said shutters can be completely drawn out when it is desired to uncover the sensitised surface of one of the plates, without the risk of lighting the sensitised surface or film of the other plate, substantially as described.

IMPROVEMENTS IN SPIRIT LAMPS FOR THE RAPID AND PERFECT COMBUSTION OF MAGNESIUM POWDER WITHOUT PERCEPTIBLE SMOKE FOR PHOTOGRAPHIC PURPOSES.

(Communicated to me from abroad by John William Charles Coven Schirm, Professor, of Breslau, in the Empire of Germany.)

No. 1504. EDMUND EDWARDS, 35, Southampton Buildings, Chancery-lane, Middlesex.—*January 28, 1889.*

This invention relates to improvements in spirit lamps for the rapid and perfect combustion of magnesium powder for photographic purposes, and it has for its objects—first, the reduction of the quantity of magnesium used, by perfect combustion, to such a minimum that no inconvenience whatever from smoke or noxious vapours is experienced even in the smallest room, without, however, in any way diminishing the photographic power of the light below the quantity necessary for photographic purposes; and second, the construction of the lamp so as to render its use perfectly safe, and to prevent all danger in case of accident, making its transport from one place to another perfectly safe and easy.

The lamp consists of a hollow metal or glass body filled with compressed sponge or spongy matter and having an opening closed with wire gauze. To the body of the lamp is fixed, by means of a pin, a small brass tube, bent up rectangularly and widened to a small conical receptacle at its end, and connected at its other end with a pneumatic ball, or other apparatus, by means of an indiarubber tube.

The sponge of the lamp being saturated with spirits of wine and the lamp ignited, it will burn with a long blue flame using very little material, and on account of there being only enough spirits of wine to saturate the sponge the lamp will, if knocked over by accident, go out immediately, and in no case will any spirit of wine run out and cause any danger by ignition. By turning a small brass tube round its pin the funnel is brought out of the flame and a small quantity of magnesium powder (about two centigrammes) is filled into it and then the whole is turned back again into the flame.

At the moment in which, by pressure on the pneumatic ball or equivalent apparatus, air is sent through the brass tube, the magnesia powder is blown through the axis of the flame and the latter itself is at the same time, by the strong current of air, sent through its whole length greatly augmented, and its heating quality is at this instant so increased as to render the combustion of the magnesium powder complete, and more perfect than in any other lamp, especially of the kind having a circular wick and current of air through the centre, as in these lamps the blowing through of more air than is necessary for the flame, in order to increase its heating quality, only diminishes it, and so widens the opening in the circular flame that a great part of the magnesium powder is blown through this opening without being ignited.

On account of the combustion of the magnesium powder in the present lamp being so perfect, it is possible, without decreasing the power of the light below the amount necessary for photographic purposes, to diminish the quantity of magnesium powder to such a minimum that no smoke is perceptible and no inconvenience whatever is experienced from it even in the smallest room, and after a number of flashes from two or more lamps.

Thus all cumbersome apparatus for conveying away the smoke, necessary with other lamps, is avoided, as also the danger generally accompanying spirit lamps, thereby giving the possibility of taking photographs in any room and at any place without the slightest inconvenience or danger.

Several lamps may be connected by India-rubber tubes to one and the same pneumatic ball, thus enabling the operator to produce the flash exactly at the same time at two or more places, and, by suitable disposition of the lamps around the object to produce a light equal in every respect to good daylight.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—An improved spirit lamp for the complete combustion of magnesium powder without perceptible smoke, the lamp being so constructed as to avoid all danger in case it is accidentally upset, substantially as described and shown in an accompanying drawing.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 14	North London	Madison Hall, Upper-st., Islington
" 15	Glasgow & West of Scotland Am.	20, West Regent-street, Glasgow.
" 16	Bolton Club	The Studio, Chancery-lane, Bolton.
" 17	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 17	Bury	
" 17	Barnley and District	Mechanics' Institution.
" 17	Hyde	
" 17	Manchester Camera Club	Victoria Hotel.
" 17	Edinburgh Photo. Club	5, St. Andrew-square.
" 17	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 18	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

LAST TUESDAY.—Mr. James Glaisher, F.R.S. (President), in the chair.

A discussion took place about the giving of medals at the Annual Exhibition of the Society, in which discussion Messrs. J. Traill Taylor, W. Bedford, W. S. Birt, Friese Greene, Chapman Jones, T. Samuels, George Davison, T. Sebastian Davis, W. E. Debenham, A. Cowan, and Herbert Fry, and Captain Mantell took part. It was eventually resolved to advise the Council to resume the giving of medals, and arrangements were made to place the nomination and election of jurors in the hands of the members at large, in accordance with one of the new rules. The meeting recommended that the seven jurors should consist of five members of the Society and two non-members, to give opportunity for the invitation of two eminent artist-painters to act. Nineteen members voted for the resumption of the medal system, and five against the resumption.

Mr. JOHN STILLER read a letter from Colonel Waterhouse, dated Calcutta, March 20, setting forth that he had been trying experiments on the photographing of the lines of the ultra red end of the spectrum; he had tried alizarine blue and anthracine blue for the purpose—strength, one in ten thousand parts of water, with one per cent. of strongest liquid ammonia in both cases. The resulting plates gave strong sensitiveness from C to A of the spectrum, and beyond to Z. He had not tried their full capabilities; they seem to be insensitive to yellow, and can be worked in an ordinary dark room without fog; in copying work they give increased sensitiveness to red. He had also tried rhodamine, an amido-phenolphthalein, which gives a vivid fluorescence not destroyed by acids; its sensitiveness to yellow is scarcely equal to erythrosine. He considered that something was wanted to supplant eosine, the use of which was somewhat blocked by patents.

At the suggestion of the PRESIDENT, discussion on this communication was adjourned until the next meeting, when he hoped that Captain Abney would be present.

Mr. SPILLER added that Colonel Waterhouse also stated that no doubt the French patent had been the making of orthochromatic photography.

The President exhibited a photograph of the stars in Cygnus taken by Mr. Isaac Roberts at Maghull.

Mr. FRIESE GREENE then read a paper on *Some Effects probably due to Phosphorescence, Electricity, and Colour Sensitiveness*. At the close he performed two experiments, in one of which he placed two bars of soft iron opposite each other, and between their two ends placed at right angles a damp sensitive gelatine plate, wrapped loosely with folds of opaque paper to protect it from light. An intermittent current was sent, by means of a make-and-break commutator, through two long coils of insulated fine wire surrounding

the two iron bars. A strip of platinum foil on opposite ends of the damp sensitive film enabled the latter to complete the circuit of a bichromate battery. The result was that there was some feeble reduction, occupying an oval space about as big as an egg, between the ends of the two platinum strips, but where the magnetic force was most concentrated in the centre of the oval was a jet black spot, about as big as a pea, between the poles of the two electro-magnets. In his next experiment he used an ordinary sensitive plate, which had been treated with the following solution:—

Nitrite of silver	10 grains.
Cyanine	10 "
Glacial acetic acid	2 minims.
Commercial decoction of horse-chestnut bark	1 ounce.

One drachm of the above was mixed with twenty ounces of water and one drachm of ammonia; the plate was soaked in this for two minutes, then well washed and dried. Such plates, he said, must be prepared with care, as they have a tendency to fog and to show dust spots, but they will photograph far down into the red end of the spectrum. By experiment he proved to those present that the plates had the latter power.

The discussion of Mr. Greene's paper was also adjourned.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 4.—Mr. J. Moran in the chair.

The Hon. SECRETARY read a letter from Mr. A. L. Henderson, expressing regret at inability, because of doctor's advice, to attend the meeting to say "Good-bye" before his departure on the following day for Australia.

Mr. COWAN exhibited some prints on opal developed with quinol, saying that the latter developer answered that purpose as well as ferrous oxalate and gave less trouble. He also exhibited quinol and pyro-developed negatives produced in comparative experiments under similar conditions, with the result that he preferred pyro for the purpose.

Mr. A. HADDON said that some doubt had been expressed at the last meeting about Mr. Harrison's statement that the electric lamp at St. Katherine's light-house, Isle of Wight, gave the light of seven million candles, but that when they considered that the light was measured after being collected by optical apparatus and sent out in one narrow horizontal beam, it did not seem so strange.

Mr. W. H. HARRISON remarked that his original statement was that two members of the engineering staff at Trinity House had told him, for the purpose of publication, that it was the most powerful electric light in the world, and gave the light of seven million candles; also that the exact figures, if there were any error, would probably be found in Sir James Douglass' lecture delivered a few days before at the Royal Institution. He (the speaker) had seen the carbons used, and they were thicker than his wrist.

A question in the box said that supposing a large number of negatives two inches square to be taken and enlarged to lantern-plate size, also a similar number four inches square and reduced to lantern-plate size, would there be much perceptible difference in the quality of the results when the positives were projected on the screen, because this point affected the weight of tourists' baggage?

Mr. COWAN replied that the four-inch negatives would give decidedly the best results. In some negatives of animals at the Zoological Gardens, which somebody had taken on excessively small plates, the particles of emulsion produced a visible grain on the screen when enlargements had been made as stated.

Mr. W. E. DEBENHAM thought that there would be no perceptible advantage with the four-inch plate; the difficulty mentioned by Mr. Cowan could be overcome by using a fine emulsion.

Mr. E. CLIFTON remarked that any spots on the smaller negatives would be enlarged.

Mr. DEBENHAM replied that if a particle of dust were floating about, it would be more likely to fall on a four-inch than on a two-inch plate. Optical advantages were on the side of the smaller lens required by the smaller plate.

Mr. W. BEDFORD said that the smaller lenses worked more quickly and gave greater depth of focus; altogether he thought the advantages to be in favour of the smaller camera.

Another question was, "What is the cheapest solvent for celluloid?"

Mr. PRESTWICH thought a solution of camphor in alcohol might answer.

Mr. BEDFORD suggested acetone, which was a powerful solvent of resins, but not particularly cheap.

Mr. William England exhibited prints from negatives of photographic cameras which he had taken by the flash light.

Mr. HADDON exhibited one of Cagniard Latour's small sirens and explained its construction.

The ordinary lantern night meeting of the Association was postponed until the 15th instant.

CAMERA CLUB.

On Thursday, the 4th instant, Sir DAVID SALOMONS read a paper on *Universal Formulas for Enlarging and Reducing*; Mr. E. Ferrero occupied the chair.

Previous to the lecture Mr. Charlton Wollaston exhibited an ingenious hand camera from Messrs. Robinson's, constructed to carry the same spool as the Kodak; the Chairman drew attention to a cheap and handy lantern-slide box; and the Hon. Secretary handed round some specimens of Mr. Blanchard's platinum black process.

In his address Sir David Salomons showed the working out of his formula, which was devised to give the exposure for any variation of light and density of negative, factors being introduced to give the value (ascertained by previous experiment) of these variables. The formulae were said to be most suitable for artificial light work where the light might be considered constant, but could be used for daylight by the working of an actinometer. Some doubts were expressed as to the possibility of fixing accurately and with facility values for

light and density under different conditions, but the lecturer stated that the formula had been found of great practical value in actual working.

Thursday, the 18th instant, will be a lantern evening. In addition to other work which members are invited to bring, the series prepared by the Boston Photographic Society, illustrating Boston, U.S.A., now in circulation in England, will be shown.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

APRIL 2.—Mr. J. Traill Taylor (President) in the chair.

The HON. SECRETARY (Mr. N. P. Fox) read a paper on *The Three Modifications of Platinotype* and demonstrated the hot bath process. In reply to a question, he said that the hot bath process would be most useful to any one who only wanted to develop a few prints occasionally, as the platinum salt being in the developer of the cold bath, and not keeping well longer than a day, made it very expensive unless two or three dozen prints were treated at a time.

Mr. J. OAKLEY called attention to the fine effects obtained with the Eastman bromide paper when using the hydroquinone developer, the image being softer and of a warmer colour.

Mr. L. MEDLAND found a great advantage in soaking dry plates in an old solution of hydroquinone to commence the development, finishing with a fresh solution.

The next meeting will be on Tuesday, April 16, when Mr. Freshwater will exhibit a series of lantern views taken in India; there will also be a discussion on the hydroquinone developer.

HOLBORN CAMERA CLUB.

APRIL 5.—The annual general meeting was held at the headquarters, 100, High Holborn, when the following were elected officers for the ensuing year:—*President*: Mr. W. Rice.—*Vice-Presidents*: Messrs. G. A. Freeman, B.Sc., F.R.S., and C. H. W. Biggs.—*Committee*: Messrs. Nunn, Dear, Beckford, Smith, Myers, Irving, and Edwards.—*Librarian*: Mr. H. C. Gay.—*Treasurer*: Mr. D. R. Lowe.—*Secretary*: Mr. Fred. Brocas.

The SECRETARY stated that during the last nine months the number of members had increased from twelve to forty-eight, and the Club had a balance of over 10*l.* to its credit. A new set of rules were passed, and it was arranged to hold the first field-day at Richmond on Saturday, the 13th instant.

The following were elected members of the Club:—Messrs. Ernest Benest, W. H. Bois, F. Jackson, A. Newmann, Rev. George William Allen, Messrs. F. W. Edwards, John Raphael, Edward J. Edmonds, A. J. Myers, and J. A. Grant.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

At a meeting held at 76, Peckham Rye, on Friday last, April 5, it was resolved that a Society named as above be formed. A Treasurer and Secretary were elected, and a Committee of seven formed, who, with the officers of the Society, proceeded to draw up a set of rules.

The meetings will be held on alternate Fridays during the winter months, and once a month during the summer months. The subscription to be 5*s.* per annum.

During the evening the names of eighteen gentlemen were proposed as members.

The next meeting (in consequence of Good Friday falling on the ordinary meeting night) will be held at 76, Peckham Rye, on Friday next, April 12, at eight p.m., to which gentlemen who wish to support the Society are invited to attend.

Proposals for membership may be sent to the Hon. Secretary, Mr. S. W. Gardner, 7, Barry-road, East Dulwich, S.E.

LEEDS PHOTOGRAPHIC SOCIETY.

FEBRUARY 11.—The President in the chair.

Messrs. Walter Taylor, J. T. Dodgson, and George Campbell were elected members of the Society.

Mr. J. C. THOMPSON then exhibited a large collection of lantern slides illustrative of scenery on the Rhine. The slides, Mr. Thompson explained, were all professional ones.

At the close of the exhibition a discussion on their merits took place.

MARCH 11.—This being the annual lantern exhibition, upwards of four hundred slides were sent in by seventeen members of the Society. From this number two hundred and fifty were selected for exhibition.

The hall was filled with members and their friends, who expressed their appreciation of the exhibition.

LEWES PHOTOGRAPHIC SOCIETY.

APRIL 2.—Mr. T. W. Thornton (President) in the chair.

Mr. E. Hammond was elected a member of the Society.

Mr. J. THURKS read a paper on *Hints to Beginners*, which contained many practical hints to the members who were not beginners. He brought two exposed plates which, at the conclusion of his paper, were developed, one by himself with pyro and ammonia, the other by the President with hydroquinone, both of which turned out to be good negatives, although the pyro-developed one was inclined to be rather thin.

A short discussion followed.

The President showed a negative which had been exposed in a camera with conical bellows and which had parts cut off by them.

Mr. P. Morris showed a photograph of the moon taken with an ordinary telescope; and the Hon. Secretary a changing bag which he used, also some

prints, including one of a train in motion, taken in March with an ordinary drop shutter, developed with hydroquinone.

At the next meeting, to be held on May 7, a demonstration of *Enlarging* will be given by the President.

BOLTON PHOTOGRAPHIC SOCIETY.

APRIL 4.—Mr. E. N. Ashworth presiding.

Mr. Percy Knott was elected a member.

Mr. R. Leigh, who has lately returned from an extensive tour in the United States, and who has made over seven hundred exposures with a Kodak, brought to the meeting some sixty or seventy slides, which were most interesting.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

APRIL 3.—Mr. Councillor Andrews in the chair.

The SECRETARY announced the death of Mr. N. E. Rollason, one of the founders of the Society and its first Honorary Secretary; and a vote of sympathy and condolence with his relatives was passed.

It was decided that, weather permitting, the first excursion of the season should be held on April 25.

The meeting then proceeded to the examination of the apparatus that had been brought for exhibition.

Mr. Sturmy brought, among other things, Beck's detective camera, and gave a demonstration of its working. Other articles shown were Marion's vignette serrator (with the aid of which the Secretary gave a practical lesson in vignetting), Fell's mounting set, Optimus plunge shutter, Optimus wick trimmer, an improved dark slide, and many others of utility.

A number of the pictures sent in for the "Frost and snow scene" competition in *Photography* were on view.

A number of exposures by the magnesium light were then made, the President and Secretary being the sitters.

DARLINGTON PHOTOGRAPHIC SOCIETY.

APRIL 8.—Mr. T. Howlett in the chair.

Mr. Hollis was elected a member.

Mr. W. F. K. STOCK opened a discussion on the advantages gained by the use of hydroquinone over sulpho-pyrogallol as a developer for dry plates, lantern slides, and bromide paper. Several specimens of each were shown, and members stated their experience with each developer.

It was decided that a monthly competition of negatives, prints, and slides be held amongst the members of the Society, the subject to be chosen each month, and that the subject for the present month be "A river scene."

BURNLEY PHOTOGRAPHIC SOCIETY.

APRIL 3.—The President (Mr. J. Butterworth) in the chair.

The following were elected members of the Society:—Mrs. J. O. S. Thursby, Messrs. J. Simpson, W. F. Sagar, R. Robinson, T. Preston, A. Moorhouse, F. Robinson, G. Garner, J. W. Wright, T. Bell, W. Thompson, C. J. Massey, W. Witham, R. J. Hurtle, J. M. Ferguson, and F. Hartley.

The PRESIDENT having briefly related the history of the Society, and explained how the new rooms, with their admirable fittings, would assist those who wished to become photographers,

Mr. W. I. CHADWICK then delivered an admirable address on *Stereoscopic Photography*, explaining the mysteries of binocular vision, by which we see one picture although we look at it with two eyes. This is done by the blending of two images by means of the optic nerve. The stereoscope, in like manner, blends two pictures so that we appear only to see one. Mr. Chadwick described the best methods for taking pictures in the camera, and exhibited, by means of stereoscopes, several brilliant examples taken by himself in different parts of the country.

At the next meeting, April 24, the President will give a paper, *My Experiences in Egypt*.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 4 (extra meeting).—The President (Mr. A. W. Beer) in the chair.

The object of the meeting was to witness the exhibition of the slides sent by the Boston (U.S.A.) Camera Club, entitled *Illustrated Boston*, the explanatory lecture being read by the HON. SECRETARY (W. A. Watts). The series is remarkably well got up, every arrangement for its successful exhibition being made with great care, and is in that respect a model for imitation. The slides are, generally speaking, of good quality, and the whole lecture very interesting.

The synopsis is too long to quote *in extenso*, but beginning with Boston in olden times the first map is shown and contrasted with a map of the present day. The tourist is then carried round the harbour, the docks and ferries; thence to odd bits of old Boston, such as the Old North Church, where the lantern was hung in the belfry as a signal of the movements of the British troops. The public buildings are then visited—Faneuil Hall, the State House, the Post Office; then the educational and literary institutions, such as the High Schools, the Art Museum, Trinity Church, the avenues and parks. "Fair Harvard" follows with its various buildings—the "Longfellow House," the "Silent Cities," the "Summer Pleasures," along the beach, and elsewhere. Old Haunts and Old Houses, which include some, for America, venerable relics, are amongst the most picturesque of the slides sent, and the beauties of the Charles River. There are some sixty-seven slides and a reading an hour and a quarter. The series has been sent, as previously mentioned, to the Liverpool Association in trust for the use of any photographic society on this side of the water desiring to exhibit it, and in the hope that societies in this country may be induced to

prepare similar series of cities or scenery, and in like manner send them to America.

At the close a number of slides by members of the Association were exhibited, and a vote of thanks passed to the Boston Camera Club for their gift, and to the Hon. Secretary for reading the lecture, in acknowledging which he expressed the hope that Liverpool would actively get up a series during the coming summer and autumn, and offered his services in organizing and preparing the requisite description.

Illustrated Boston will be exhibited at the Camera Club, April 18; Glasgow, 23; and Warrington, 30. Applications for the use of the series should be addressed to Mr. W. A. Watts, Highfield-road, Appleton-in-Widnes.

SHEFFIELD CAMERA CLUB.

APRIL 5.—Mr. B. W. Winder, F.C.S. (Vice-President), in the chair.

The following gentlemen were elected members:—Rev. C. Clementson, M.A., Messrs. Frank Harrison, M.R.C.S., J. W. Charlesworth, and R. R. Neill.

Mr. E. HOWARTH, F.R.A.S., then read a paper entitled *Suggestions for a Photographic Survey of Sheffield*. After having pointed out the work which was being done by photography in surveying the heavens, he called attention to the recommendations made at the last meeting of the British Association that local photographic and geological societies should be asked to make a collection of photographs of the geology of their respective districts. As this would require the combined action of geologists and photographers, it was scarcely possible for the Sheffield Camera Club to undertake this work at present; but there was another kind of photographic survey that might properly and successfully be undertaken by the Club. This was the preparation of a collection of photographs illustrating the chief historical, antiquarian, and topographical features of the town and district. Mr. Howarth mentioned many interesting relics of the past of Sheffield that had disappeared, leaving no record, and urged the desirability, while others still remained, of ensuring their permanent record by means of photographic pictures. He then sketched out a plan for carrying this into effect, suggesting that the town and district should be divided into twelve sections, each section being allotted to two members, who should be provided with a map of their section and a memorandum-book giving a list of the places and objects to be photographed; that the first year's operations should be confined to the immediate neighbourhood of Sheffield, but should be extended year by year to embrace all places of interest within a radius of about twenty miles.

In the discussion that followed it was unanimously decided to carry out the plan, and a Sub-Committee was appointed to arrange the details.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

APRIL 4.—Mr. William Lang, jun., in the chair.

Messrs. William Vercel, David R. Clark, M.A., and T. Pent were elected members of the Association.

Mr. LANG then read the second and concluding portion of his paper, *Fifty Years' Photography* (see page 251). As in the previous portion of his paper, Mr. Lang made use of the Association's lantern to show a very interesting series of portraits he had prepared of the various scientists to whose researches the present position of the photographic art is due.

Mr. Paton showed a very fine series of transparencies of marine subjects. These were made by the collodion process and toned with platinum.

The majority of the meeting concurred with Mr. Paton in the opinion that although the collodion process was more troublesome to work than the gelatine, the results obtained, especially when the transparency has to be reduced from a large negative, are very much superior.

PAISLEY PHOTOGRAPHIC SOCIETY.

APRIL 2.—Mr. John Fullerton presiding.

This Society finished up their winter session by a lantern exhibition.

The CHAIRMAN briefly called attention to the photographic exhibition now being held in the Art Gallery, and stated that the Society had made rapid strides in the photographic art, and he was very pleased to find them so energetic in their desire to provide the public with entertainments such as the one they were about to have, and the presence of such a large number clearly proved that their efforts in this department were highly appreciated.

Two hundred and eighty slides were then exhibited by means of a binocular lantern, and were lucidly described by Mr. James Mure.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

APRIL 5.—Mr. W. Jamieson in the chair.

Mr. George Duncan Edzell was admitted a member.

Mr. R. A. SCOTT, M.A. (Junior Vice-President), gave a *Sketch of the Progress of Photography*. He treated of the various processes which have been employed, and of the many difficulties which have had to be overcome, before the science arrived at its present state of comparative perfection.

Some fine specimens of Daguerreotype, calotype, and wet collodion positive processes were shown and much admired, more especially a Daguerreotype of Sir Walter Scott's Monument, Edinburgh, taken by Mr. J. S. Grant in 1847.

The arrangements for a field-day on April 27 were completed, and the meeting adjourned.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

MARCH 1, 1889.—The first regular spring lantern slide exhibition of the Society was held at the rooms, 124, West Thirty-sixth street, and comprised fifty slides

contributed to the lantern slide interchange by the St. Louis Camera Club, and seventy by the members of the Society.

The interest shown in lantern slide making is very encouraging to the Committee. From present indications there will be no difficulty in obtaining a fine collection of slides to represent picturesque New York.

MARCH 8.—*Illustrated Boston*, by the Boston Camera Club, was shown before the Society, and comprised sixty-seven views. The description of the pictures was prepared by Mr. Arthur H. Dodd, who was present to read it. Mr. William Garrison Reed has the honour of being the member of the Club who suggested the idea of illustrating the city.

MARCH 12.—The regular monthly technical meeting of the Society was held.

Mr. F. C. BEACH read a paper on the *Effect of Electricity on Dry Plates*, describing a number of scientific experiments.

Mr. Charles Simpson exhibited a peculiar changing bag to be hung from the neck and to be used when in a sitting position.

Mr. DAVID WILLIAMS explained the outfit, which he intends to use during the summer on his trip abroad.

The Chemical Committee read a report on *The Sulphites of Potash*.

Mr. G. D. MILBURN exhibited an improved Bausch and Lomb shutter, having a special air valve device by which the time of the shutter was very easily regulated. He also read a paper on *Enlarging on Bromide Paper*, following it with a successful demonstration, enlarging a child's head two inches in diameter to life size, and used for this purpose the Society's optical lantern with a limelight. An exposure of twenty seconds was given.

The PRESIDENT announced the election of Dr. J. M. Eder, Leon Vidal, A. Davanne, Dr. H. W. Vogel, J. Glaisher, and M. Carey Lea as honorary members of the Society. He also read a few proposed amendments to the Constitution, among which was one allowing amateurs or professionals residing beyond the corporate limits of the city of New York to become corresponding members on payment of a fee of five dollars.

Correspondence.

Correspondents should never write on both sides of the paper.

PLATINUM TONING.

To the Editor.

SIR,—The use of platinum as the toning metal instead of the more usually employed gold is again on the tapis. Mr. Valentine Blanchard is the sponsor of the present process, specimens of which he showed last week at Anderton's Hotel, but without, as far as I can gather, giving any details of his method of working.

Platinum toning has always presented a peculiar fascination to me, and I have frequently experimented with this salt, in the place of gold, as a toning agent for silver prints. I have to confess, however, that up to last autumn my experiments were decidedly not successful. Up to that date I had always employed the salt which is commercially sold, sometimes as platinum bichloride, sometimes as the tetrachloride, and often as simply chloride of platinum. This salt, according to Pizzighelli, is in reality platinum acid ($\text{Pt Cl}_2 \cdot 2\text{HCl} + 6\text{H}_2\text{O}$), and the free hydrochloric acid attacks the silver image. If, however, the platinum salt be neutralised it refuses to tone, being in this state unlike gold, which is probably reduced from the auric to the aurous stage by the addition of the alkalis. Platinum, on the contrary, has to be acidified by some other acid, and remains presumably in the platinum state. Mr. Willis, in his early platinum experiments, found that the platinum salts were not reduced by the proto-salts of the heavy metals, and in order to obtain his platinum image he had recourse to the platinumous salts. Reasoning by analogy, it seemed necessary, in order to get the best toning results with platinum, that the platinumous salts should be used.

It was not, however, till last year, with the advent of the cold bath platinotype process, that any of the platinumous salts came into my hands. Remembering my old deductions, and having them strengthened by the fact that Captain Pizzighelli, in his book on "Platinotype," gives silver as an equally good reducer of the platinumous salts as iron, I proceeded to put my theory to the test of practice. Taking some ordinary plain salted paper, I printed it as usual and then washed it to free it of the free silver; then laying it on a sheet of glass, I brushed it over with the ordinary developing solution, as recommended by Mr. Willis for the cold bath process. This consists of a solution of the chloroplatinite of potassium, and potassic oxalate, and monopotassic orthophosphate. Success was absolute; the red of the silver print changed to platinum black with the same rapidity as does the iron-coated paper of the Platinotype Company. My first prints came out too chalky, for there is a considerable reduction in the detail and half tone, but by carrying on the printing further this can be compensated for and most perfect results obtained, entirely indistinguishable, I believe, from ordinary platinum prints. During the process of toning the print passes through several tones of a pleasant and warm colour, and by using a weaker solution than the above there are under control; but as I consider it necessary for permanence that the image should be entirely formed of platinum, I have always allowed the substitution to complete itself, so that an application of bichloride of mercury does not in any way alter the tone or colour, whereas if any silver were present it would do so by bleaching the metal.

Of course a subsequent hypo bath was necessary to dissolve out the chloride of silver, although even were some hypo left in the print I doubt much whether it would hurt the image. The time of printing is of course considerably longer than with the ordinary platinotype paper, although one has the advantage of being able to see what one is doing during the printing operation, but the results are undoubtedly quite as good.

I contented myself at the time with simply describing the method of working, and showing some specimens (*vide Journal of the Camera Club*, December, 1888, page 177), as I intended to work out a similar process, and what I consider a more useful one—that is, the obtaining of enlargements in platinum. Something of this sort has, I believe, been done in France, but I have never been able to get hold of a description of their method of working; that is to say, whether they employ a platino or platino-salt. I do not foresee any difficulty in converting a developed image, like the Talbotype or Blanquart Errard's process, both of which could be toned with gold into metallic platinum, but have not yet found time to experiment in this direction. But as other workers are now experimenting in this direction, the above hints may be useful as far as regards the printing-out process I have described; success, I can assure every one, is certain.—I am, yours, &c.,

LYONEL CLARK.

Camera Club, April 9, 1889.

HYDROQUINONE DEVELOPER.

To the Editor.

SIR,—The prominence which is everywhere being given to development with hydroquinone, and the many differences of opinion that seem to exist on the matter, induce me to contribute a few lines on the subject, though I confess that my experience has not as yet been very large. There is one point on which all seem to agree, that the new developer gives results resembling wet plates. Now, I feel inclined to ask sometimes whether a good many who make this assertion have had any experience of wet plate work. It seems to me that many imagine that a black image with a great deal of clear glass constitutes the characteristic quality of a wet collodion plate. Now, I worked for many a season wet plates, and I think others who have done so will support me when I say that a real good negative produced by this process contains but very few points of clear glass; indeed, some of the best had a slight grey veil over the shadows. Many authorities on the process, as you will remember, recommended slight exposure to actinic light, and other dodges, for obtaining this effect. It would appear, therefore, that this very clear glass is not an advantage to be sought for, and I am convinced that a better printing negative will be secured if we use hydroquinone without bromide or other restrainer, except sulphite of soda and potash or soda hydrate; this will give a slight grey veil very like wet collodion.

I am sorry to see hydroquinone formulae getting more complicated. What is the use of putting in citric acid, as do Mr. Swan and Mr. Thomas in their latest formulae? There is no doubt Mr. Swan is right in saying that meta-bisulphite of potash has a most retarding effect with hydroquinone—far greater than can be accounted for by the presence of free acid.—I am, yours, &c.,

GEORGE MANSFIELD.

Nass, April 7, 1889.

WHITE OR YELLOW SPOTS ON PRINTS.

To the Editor.

SIR,—Not having seen the prints on which, as described in your last, white or yellow spots appear after finishing or during the final drying, I do not know if my experience will be of any service. Some years ago I was much troubled with the appearance during drying of many white or yellowish spots—most conspicuous in the skies or light parts; the cause succeeded for a long time in evading detection; I went through the whole process myself with care, thinking that they arose from some carelessness of assistants, but for some time nothing could be discovered.

My practice was to dry the prints in a detached building, remote from fire and chemicals, by spreading them on light wooden frames covered with a cheap paperhanger's canvas. It was noticed that the spots were more frequent in damp weather than at other times, and at last the canvas was suspected, and on covering it with clean sheets (from the domestic stores) the spots vanished. It should be remarked that the canvas had been in use for several years, so that there seemed no reason to suspect it, and it still seems to me rather odd that it should have decomposed all at once and so suddenly, for something of that kind appears to have happened. Fresh canvas of a better quality was put on the frames, and the spots disappeared, and have not troubled me since.

I should add that my present practice is to dry the prints on loose cotton sheets (which can be occasionally washed) laid loosely on the old frames.—I am, yours, &c.,

RUSSELL SEDGFIELD.

SPOTS AND STAINS ON GELATINE NEGATIVES.

To the Editor.

SIR,—It was stated a short time ago in your "Answers to Correspondents" that the red silver spots or stains in a gelatine negative could not

be removed without ruining the negative. I am happy to say that such is not my experience, for I have done it many times most successfully, and, on reading the statement above alluded to, I looked up a negative which I knew to be in a bad state with silver stains. I first took a print from it as it was, then treated it as I generally do in such cases, and took a print from it afterwards, both of which prints I submit to your inspection.

Now I will tell you how the plate was treated, so that both you and your correspondents can do likewise. First, I placed the negative for a few minutes in an alcoholic solution of iodine—two or three grains to one ounce—then washed it with water and placed it in the hypo bath—about two ounces to the pint—until the silver stains were removed, then washed and dried in the usual manner. Should this process reduce the density of the negative, it can safely be intensified with mercuric bichloride, and ammonia, or with hydrosulphuret of ammonia. I have done it both ways with success, only the sulphuret-ammonia is so offensive it compels you to do it on the roof.

Although I have given you a remedy for the evil complained of, I consider "prevention is better than cure," and the only safe way to treat gelatine negatives, especially in our moist climate, is to varnish them with a thick collodion first, and then with ordinary spirit varnish afterwards, before even a proof is taken on silver sensitised paper.—I am, yours, &c.,

J. WERGE.

11a, Berners-street, W.

A PHOTOGRAPHIC PUBLICATION FOR JAPAN.

To the Editor.

SIR,—It may be of some interest to your readers to know that a periodical devoted entirely to photographic matters has been started in this country. The name of the paper is *Sashin Shimpo*, which, being interpreted, means "Photographic News." The name of the chief editor is K. Ogawa; the publishing office is Hakubundo. The paper is issued monthly, and the price for a copy is fifteen sen, there being between two and three sen to the penny.

I send you a copy of the first number, warning you that in reading it you must begin at the last page, at the right-hand side of that, and that you must read in vertical lines.

So far as I know, Japan is the only Eastern country in which a journal devoted exclusively to photographic matters has been published by the people of the country, but even this is not the first appearance of such a journal in Japan. *Sashin Shimpo* was published during the years 1881–82. Ogawa was at that time nominally only assistant-editor, but the working of the paper so far depended on him that when, in 1882, he left his country for America the publication had to be stopped. I have seen one volume of this early attempt; it contains, among other things, a very fair portrait of Daguerre.—I am, yours, &c.,

W. K. BURTON.

[A specimen extract from *Sashin Shimpo* is given on another page.—Ed.]

THE BERLIN EXHIBITION.

To the Editor.

SIR,—Will you kindly inform your readers that an exhibition will be held at Berlin in the autumn, to commemorate the jubilee of photography? The exhibition will open on the 15th September and close in the middle of October. Place, the "Royal Academy," Unter den Linden, Berlin. Five divisions will be made—1. History of photography and applications in science and art, industry, engineering, &c.; 2. Portraiture and landscape photography of an artistic value; 3. Photographic printing processes, autotype, collotype, zincotype, photogravure, &c.; 4. Apparatus and chemicals; 5. Photographic literature. The exhibition is open to all comers. There will be awards for specially valuable contributions and superior productions. Particulars will be published later.

I have been appointed collector and agent for Great Britain, and shall be pleased to answer inquiries. Exhibits must be addressed to the Photographic Exhibition, Königliches Academie-gebäude, 38, Unter den Linden, Berlin, W. Intending exhibitors should notify their intention before the 31st of May to me or to Dr. W. Zeuker, Wichmann-str., 17, Berlin, W.

Exhibits must be at their destination by the 31st of August, and should, therefore, be delivered to me by the 15th of the same month.—I am, yours, &c.,

J. R. GORTZ.

19, Buckingham-street, Strand, London, W.C., April 8, 1889.

"SWEATING."

To the Editor.

SIR,—I should like, through the medium of your valuable paper, to call the attention of your readers to an ever-increasing number of photographers (save the mark) who are doing their level best to ruin the profession.

Let me start with a few queries. 1. Are the charges of the average photographer so exorbitant that the trade is to be cut up by capitalists who can and do work for a small percentage over working expenses? 2. Is half-a-crown a dozen for *cartes-de-visite* a fair price for these men to charge? 3. Why do not the Lords' Sweating Commission inquire into the manner in which these capitalists sweat and grind down their *employés*?

This condition of things must do great harm to photographers generally, and the small ones in particular. These sweating photographers are springing up in all directions, and you will find several not a hundred miles from our great business thoroughfares of Regent-street and Oxford-street.

Some of our country brethren may say that the price I quoted in my second query can't pay. It does pay the capitalist, but how about his assistants? I know one or two of these places where the assistants have to work during the summer for twelve or fourteen hours a-day, and for the most miserable salaries. Well, you say, the assistants can leave. Yes; but who will employ them if it is known where they have been working? The assistants are usually from the country, so they naturally do not know who they are going to work for until they are engaged.

Is it not time that public opinion generally, and the opinion of photographers in particular, expressed itself on this condition of things? Probably photographers who are fortunate in having big businesses will say, "How can your half-a-crown a-dozen men hurt us?" They will hurt you, and the future will show it more plainly than any words of mine. They degrade the profession in the eyes of the public. Moreover, the evil is spreading, and some photographers who ought to know better are giving way to the fever, and by means of sweating their *employés*, are, at middle-class prices, giving first-class work. If you do not suffer already you will, and that sooner than you expect. Can some of the readers of your valuable paper suggest a remedy for this state of things? Anyway, I hope the subject will be taken up, and that abler pens than mine will give their views upon this cankerous evil that is threatening to shake the profession to its foundations.—I am, yours, &c.,
FAIR PLAY.

April 8, 1889.

PSYCHIC PHOTOGRAPHY.—A CORRECTION.

To the Editors.

SIR,—In the article on psychic photography in last week's JOURNAL the writer states, on the authority of Mr. Maskelyne, that Mr. Hudson "made every person sign a book, agreeing to ask no questions." In justice to Mr. Hudson will you permit me to say that this is far from correct? I could mention several instances in which no such stipulation was even hinted at, although the parties were complete strangers to Mr. Hudson.—I am, yours, &c.,
GEO. S. THOMSON.
Clifton, April 6, 1889.

[As regards Mr. Hudson's practice in this respect, when his studio was in the Holloway-road, Mr. Maskelyne is quite wrong.—ED.]

TRANSPARENCIES WITH ORNAMENTAL BORDERS.

To the Editors.

SIR,—It is with regret that I find myself under obligation to lodge a protest against the validity of the patent granted to William John Wilson, 1, Chapel-road, Ealing, Middlesex, for "Improvements in Photographic Transparencies." Eighteen or nineteen years ago I made transparencies, using glass plates with ornamental borders. These plates were made for me by Forest, of Liverpool. Various sizes and designs were used.

Mr. Wilson claims as his invention the using of these bordered plates. I have ample testimony to adduce in support of having used glass plates with ornamental borders on which I made photographic transparencies long before Mr. Wilson did so, and on that ground I claim exemption from any patent right of his to stop me from producing such pictures. At that time I made a good many of these transparencies on bordered glasses for ornamental purposes, some of which I had finished in transparent colours, which enhanced their beauty very much.

However, I found that for window decoration they were of little use. As an instance, I fitted up a staircase window of nine panes; the original glass was very finely obscured, and in putting in the transparencies the two glasses were kept a quarter of an inch apart. At top and bottom of each pane were two openings for ventilation. I waited patiently to see how the alternations of damp, frost, and sunshine would affect them. With the returning spring they gave signs of going, and the summer sun completed what winter in its various moods had begun. If this happened with collodion plates, what may we expect with gelatine, which has such a tendency for moisture? I sent a very fine picture of this class to the Earl of Strathmore on a large plate: it was an enlargement of the sundial in front of Glamis Castle.

I also made transparencies on flashed glass, removing the colours by means of fluoric acid, thus having pictures on clear glass with coloured borders. The fluoric acid is very good for making a translucent backing for such pictures.

To-day I have found in my repository of exploded ideas and experiments one of these bordered plates, with the coating of collodion still on it. As the monthly meeting of our society is on Thursday this week, I intend to take the plate with me and make some remarks thereon.

I have no doubt Mr. Wilson knew nothing of what I had been doing nineteen years ago, but that does not alter the facts I have stated. I can believe these plates being introduced commercially may have a good sale for home decoration where damp will not affect them. I wish Mr. Wilson every success in his new venture, but his patent rights I entirely ignore.—I am, yours, &c.,
JOHN ROBERTSON.

Dundee, April 8, 1889.

Exchange Column.

•• No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange universal whole-plate studio camera, swing back, two dark slides, for outdoor camera same size.—Address, W. C. B., 25, High-street, Rochester, Kent.

Will exchange a Ross' No. 2 c.-p.-v. lens for modern tourist camera and slides, half-plate; any difference adjusted.—Address, F. SIMCO, Wellingborough, Northamptonshire.

Beck's No. 3 new extra rapid autograph rectilinear portrait lens for cabinet, just cost 11l., f-4; will exchange for first-class studio camera.—Address, W. DAKIN, Photographer, Sheffield.

Wanted, quarter-plate bellows folding camera, in exchange for quarter-plate box camera and lens, rack and pinion.—Address, ALFRED MAYBANK, 40, Crimscott-street, Grange-road, London, S.E.

Will exchange a 8½x6½ camera, head-rest, Shakespeare in forty-two numbers, a snow-scene background, Dryden's *Vivgil*, and *Gil Blas*, for tricycle.—Address, B. RHODES, 30, Eastgate-street, Gloucester.

7½x5 Kinetar camera by Rouch, all movements except reversing back, leather bellows, five double slides, three fronts, whole-plate lens with iris diaphragm, instantaneous shutter, and tripod; exchange for half-plate long extension camera with three double backs and all motions.—Address, JAMES POLLARD, 101, Albion-street, Leeds.

Complete set of apparatus, consisting of 8x5 modern bellows camera, swing back, double back, and carriers, achromatic lens, rotating stops, folding tripod stand, patent circular top, complete in polished wood case; will exchange for double extension half-plate portable set, or for modern hand camera of detective class, or for optical lantern.—Address, CHAS. STICHO, 40, Lansdowne-street, Brighton.

Answers to Correspondents.

•• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

M. Guttenberg, Manchester.—Three photographs of the Rev. Dr. Herman Adler, Delegate Chief Rabbi of the Jews of Great Britain.

F. M. Sutcliffe, Whitby.—Three photographs of a model of Whitby Abbey.

E. & H. T. ANTHONY & Co.—Received.

PROVINCIAL.—It will appear next week.

GIAGGIOLO.—A private communication has been sent.

BORE.—Leintypic and gelatine relief printing are the same.

PAPER.—Use albumenised paper for the purpose you mention.

BRILLIANT.—Try the effect of fuming the paper with ammonia before printing.

GRAPHO.—The size of the country offers an advantage, otherwise there is none.

INQUIRER.—Write to Simpkin & Marshall, Publishers, London, who can supply the book.

X. B. Z. L.—We have not seen the instrument to which you refer, so cannot give an opinion.

GEORGE FINDLAY.—The transferotype of the Eastman Company will serve your purpose well.

P. R.—The image may be reversed by placing a mirror at an angle a little distance in front of the lens.

G. HAUBERNE.—No, the negative is very much under exposed, and no amount of forcing would have brought it up.

ROBERT asks whether a negative washes quickest by being immersed in water face up, face down, or on end.—Face down.

WALTER.—Gelatin with which lampblack is incorporated will answer the purpose. Let there be a trace of glycerine present.

ADOLF JANSSON (Stockholm).—We have no acquaintance with the camera named, and regret that the distance between this office and the agent is too far to conveniently call and see it.

PERPLEXED.—See the article which appeared in the columns of this JOURNAL of November 18, 1881, headed *Practical Hints for Making Carbon Transparencies for Enlargements; Defects and Remedies*.

D. F.—The boiling point of water is both 80° and 100°, as well as 212°. Everything depends upon which of three thermometer scales is employed. The first of the above figures represents Reaumur, the second the Centigrade, and the third the scale of Fahrenheit, the last of which is commonly used in this country.

INVERNESS.—We shall be pleased to see you when you come to London. There is not the slightest objection to the experiments referred to being carried on, even if, as you say, it will take "two or three days." There is plenty of accommodation in it in the shape of bench-room, so you need be at no loss on that score.

DONOTHY.—We suspect that neither of the wide-angle lenses named will possess an advantage over the other as regards the amount of light transmitted to the plate. The including of a wide angle imperatively demands the use of a small diaphragm, this altogether irrespective of the diameter of the lens itself.

MICRO writes: "With a duplex paraffin lamp, metal shade, one and a half inch wicks, and substage condenser, I cannot get sufficient light on the focussing screen when using an eighth of an inch objective. Would an electric lamp be suitable, or what illuminant do you recommend?"—In reply: The electric or limelight.

MCGURK.—1. If it is the back focus that is six and a half inches it ought to answer sufficiently well for taking cabinet heads. The "roughness" of the picture does not depend upon the lens. If it is wanting in sharpness the presumption is that the lens is not good.—2. There are no objections to wide-angle lenses when employed for taking wide-angle pictures.

SOLUBLE.—We learn that an award was really made in that class, but that its announcement was, for some reason of which we are unaware, transferred to another class for a special medal. As you will see, we are not making any descriptive or critical remarks on the pictures in this exhibition. If you would instruct some one to call at this office with a copy for inspection we shall willingly give you our opinion as to its merits.

W. GUTTENBERG says: "I tender my thanks to 'Junius' for suggesting to me the use of papyroxylene in connexion with my time train for use in my magnesium lamp, and intend to experiment with it at my earliest opportunity. I am afraid that it will have the same drawback that gun cotton has in regard to burning with a yellow colour. I shall feel obliged if 'Junius' will inform me if I can procure a sample which will burn free of colour."

T. G. WHAITE writes, in reply to the inquiry of "E. W. M." relative to photographing in Normandy and Brittany: "Brittany has long been my favourite camping-ground, and there is little that is of artistic or antiquarian value that I have not seen. It is famous for Celtic monuments—Menhirs, Dolmens, Cromlechs, Tumuli, Pierres Brulantes, &c. There are also fine shipping pictures to be made at the sardine fishing towns on the coast. Living and travelling can be done cheaply if you know how to go about it."

F. B.—If you had ever attempted to embody in a picture an idea that depended for success wholly upon catching a fleeting expression that must be *natural* to have any value—such idea, in fact, as formed the "point" of many of Roylander's pictures—you would have recognised that "Junius" referred to the rapidity of gelatine plates when he spoke of greater facilities. The "art of concealing art" does not consist in rendering what is supposed to be an expressive smile by an inane grin, as was too often the case in the old days of long exposures.

J. GOLDSWORTHY writes: "Will you kindly tell me (1) the best way to make a good and cheap varnish for ferrotypes that will dry quick and glossy?—2. Also, I have a few photographs in my album that have faded. Could you tell me the best thing I could do to bring them back to their original colour?"—1. A ferrotype varnish to apply cold may be made by dissolving gum dammar in benzole. The proportions to be determined by experiment.—2. Some prints can be restored by removing them from their mounts, and immersing them in a weak solution of bichloride of mercury.

INCORRIGIBLE.—1. This can only be attained by careful study and imitation of the works of others who have acquired a high position as artists.—2. Study a series of articles on lenses in our volume for 1883. You will there find all the particulars necessary.—3. Same as No. 1, applied to landscapes and architecture.—4. Study the excellent series by Mr. Redmond Barrett, which appeared in our volume for 1886, as regards retouching, and in 1887 as applied to colouring.—5. For this and many other departments of photography, study the last edition of Hardwich's *Photography*, published by Churchill. You may also study Robinson's *Pictorial Photography* with great advantage.

LANTERNIST writes: "1. I have two rooms each fourteen feet square, communicating with each other by a central door three feet wide. If I place an optical lantern at the end of one room, and a screen at the end of the other, can a six-foot disc be obtained? or will the diameter of the disc be limited to the three-feet width of the door? The eye takes in a six-foot circle in the position named.—2. Does the Pamphengos light emit too great heat, or a small too disagreeable for drawing-room exhibitions?"—In reply: 1. A six-foot disc will be obtained under the conditions.—2. The Pamphengos lamp will not emit a smell, provided it be kept free from oil on the outside. We have not found the heat excessive.

T. J. H.—The strength of a simple aqueous solution of nitrate of silver may be ascertained with a sufficient degree of accuracy for all practical purposes in photography by means of that form of hydrometer known as the argometer.

F. H. EVANS.—The apparent discrepancy is not difficult of explanation. Contact printing is generally performed, and the highest quality of result can only be obtained by that method with *slow* plates. With such slow plates as gelatino-chloride (for development), collodion emulsion, or some of the specially prepared commercial lantern plates, there is, comparatively speaking, sufficient latitude, especially when we consider that by the employment of a feeble artificial light of tolerably constant force the effect may be graduated to a nicety. Even with very rapid plates and a weak artificial light of known value it is not difficult to expose within bounds; by daylight impossible. The practice of giving three or four times the really necessary exposure, and trusting to development for the rest, is what we wished to condemn in transparency making.

EDDOWES'S Shrewsbury Journal is now issuing a weekly supplement containing a photograph produced by photo-mechanical means of one or other of the fine residences in the surrounding country.

PHOTOGRAPHIC CLUB.—The Bank Holiday outing will be to Twyford station for Sonning, train leaves Paddington at half-past ten. The subject for discussion at the next meeting, April 17, will be *Copying Silver Prints*.

On Thursday, the 4th instant, Mr. G. H. Slight read a paper, *A Retrospect of Photography*, before the East London Natural History and Microscopical Society, Bow and Bromley Institute. Several pictures by various photographic processes were exhibited. At the close the usual discussion ensued.

At the Central Institution of the City and Guilds of London Institute Mr. T. Bolas, F.C.S., is to give a course of six lectures on Photography, commencing on May 8, 1889. The subjects comprise *The Use of Artificial Light in Photography*, *Photo-Mechanical Printing Methods*, and *Direct Contact Printing Methods*.

We have received from Mr. W. England a flash lamp for photographic purposes. The lamp is made of japanned tin. Cotton wool, upon which alcohol is poured, lies in a saucer, through which a short brass tube projects, the other end of the tube being connected with a pneumatic ball by means of a rubber pipe. The magnesium powder is, by means of a hopper supplied with the lamp, poured into the tube and blown out into the centre of the flame by a squeeze on the ball. Connecting pieces are also supplied, by which two or more lamps may be ignited simultaneously. The lamp presents a neat appearance, and is so small as to be easily carried in the pocket.

At the Liberal Club, Glasgow, on the evening of Thursday, April 4, Mr. John Skinner, of the Albion Albuminising Company, was entertained to dinner by many members of the photographic profession and his friends previous to his departure from Glasgow for Sydney, where he intends to reside for the future. On this occasion he was presented with a gold watch, and also a set of handsomely bound volumes, amongst which were the works of Robert Burns. Mr. John Parker made the presentation, and in the most genial of terms paid tribute to Mr. Skinner's worth both as a friend and a business man, and the company's good feelings were heartily expressed, wishing him well in the new field of labour he has chosen. Amongst the gentlemen present were Messrs. Stuart, Parker, Verel, Turnbull, Mason, Stevenson, McKenwick, Lang, Dowie, &c.

ALDERMAN WEBSTER OF WARRINGTON.—With regret we announce the death of Mr. Samuel Mather Webster, a gentleman well known and highly respected in Warrington, and a warm friend of this JOURNAL. Being by profession a chemist, he was intimately conversant with photography in all its branches. He took an active interest in the educational and literary establishments of his native town, and as Hon. Secretary of the Mechanics' Institute he placed it in a financially successful condition. An Alderman of the Warrington Town Council, he was well known and highly respected. His connexion with the Town Council dated from 1847, he being Mayor for three years. He was elected to several responsible offices, and at the time of his death—which occurred on the 3rd instant, at the age of seventy-three—he was Chairman of the School Attendance Committee, Vice-President of the Museum, Library, and Arts Committee. He had a taste for literary work, was for many years local correspondent of a Manchester newspaper, and subsequently became proprietor of the *Warrington Times*. Interested in art work, he was when young a painter of no mean ability. Many of his good qualities are reproduced in his son, Mr. George Watmough Webster, the esteemed and well-known photographer of Chester.

NOTICE.

NEXT week, owing to Good Friday, THE BRITISH JOURNAL OF PHOTOGRAPHY will be published on Thursday, the 18th instant. Consequently all communications and advertisements should be sent one day earlier than usual.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1511. Vol. XXXVI.—APRIL 19, 1889.

PRACTICAL CONSIDERATIONS IN STUDIO BUILDING. IV.

BEFORE dismissing the subject of the pitch of the roof, we would draw attention to one more point to be considered—the rain. We have dealt with the effect of snow, which is only an occasional visitor, but rain has always to be endured and provided against, and the steeper the roof the less the danger of its entering in. Glare from the sun and leakage of rain are the two greatest evils to be provided against by the studio builder. We were once discussing the subject of leaky roofs with a house painter of large experience, and he told us he had never seen the glass roof yet that did not leak at one time or another. Certain precautions, some of which he named, might be taken to reduce the leakage to a minimum; but it was a miracle to find one perfectly water-tight. One of the chief causes of leakage, he stated, was the getting the glass into the frame too quickly. Every bar should have at least two coats of good paint before the glass is put in, and, most important of all, the margins of squares of glass themselves should be painted, on each side, for a breadth of about half an inch, and the paint allowed to set before commencing to glaze. "By this means," he said, "the paint and the putty 'grow together,' and scarcely ever leak, if properly done, even when the outside putty has 'perished.'" And certainly the instances pointed out to us as examples of these precautions seemed to bear out his advice. There are other substances used besides ordinary putty for securing the glass to their frames, and other devices for doing away with putty altogether, but as these could only be suitably treated by those familiar, by practical contact, with their advantages and disadvantages, we will not dwell further upon them.

Taking it for granted that, however great the care taken with the roof, there will always be a possibility of leakage, there are some studios built where from the outset danger of this sort is provided against. One mode is to attach a narrow zinc gutter to the under side of each spar which carries the glass, so that if drops of rain do gain access the gutters will receive them and carry them away. Another plan that has been recommended is to have cut into each spar, in the direction of its length, and before putting it in its place, a narrow groove or channel, into and along which any leakage water will travel. This seems to us an excellent idea, and one that could be put into effect while the studio was in course of erection; there is, indeed, nothing but the question of extra cost to prevent this being carried out in any existing studio, and there are many now in existence where it could be most advantageously done. Our strong advice is to take every pains in making the roof "tight" at first.

But, granted a roof secure against the entry of rain at the outset, periodical re-paintings will be necessary to keep it so; yet the very steps taken to this end may bring about the evil itself. This will happen if the roof be not made of spars sufficiently stout—be they of wood or iron—to withstand the weight of workmen without deflection. How many of the studio roofs now in existence are there which are not defective in this respect! We presume this state of affairs is a survival of wet-collodion days; we can scarcely imagine the deficiency of strength to arise from motives of economy, as the difference in cost between a substantial and safe roof and one of the most flimsy description could only be most trivial. As to the thicker spars obstructing too much light, surely five per cent.—for they could scarcely rob the light to a greater extent—might in these days of quick plates be sacrificed to gain the comfort and convenience of a non-leaky roof! *Verbum sat sapienti.*

Forming part of the great question of roof construction, ventilators must next be considered, made as they are in almost every conceivable shape, from a simple lid in the roof to the most elaborate and complicated structures. It would be futile to indicate a particular form as being the best, for every studio builder has a fad on this subject; but it will be advantageous to point out three considerations sufficiently frequently neglected.

First. The whole principle and practice of ventilation is not summed up in the conception of making an aperture in the highest part of a heated room to let out the heated air, on the principle that, hot air being lighter than cold, it must rise in a given apartment, and make an exit through any aperture there provided. The theory looks pretty, almost perfect, but practice shows that more frequently than not the external air comes in at this particular aperture instead of the inner air going out. Our remarks would be extended to an inconceivable length to discuss this one point alone in all its bearings; it must suffice here for us to draw the attention of the studio builder to the fact that this popular theory is a fallacy when applied without counterbalancing acquaintance with the peculiarities of its application.

Second. There are a large number of ventilators sold which, by means of an outer vane, actuated by wind, work an Archimedeian screw, or otherwise, and literally fan or pump out the air from a room, whatever the conditions of counter-currents or "suction." These ventilators may be very efficient, and often are; but the point to which we call especial attention is, that on the particular occasions when their action is most needed—the close, sultry days, without a breath of air stirring—they utterly fail: they are reduced to the level

of the simple aperture in the roof, and are less efficacious even than it, for the path of exit is obstructed.

Third. A ventilator, of the most efficient kind ever constructed, is of little value unless its sectional area is of considerable size in proportion to the room to be ventilated. It is simply a question of emptying an apartment of given size in a given time, and this all depends, *ceteris paribus*, upon the size of the exit aperture. Clearly, then, to periodically empty the air from a studio—for this and cooling it are convertible terms—the requirements are, exit apertures of sufficient area, and suitably placed as regards counter-currents, and not dependent upon the force of the wind to put them in action. Unfortunately, the solution of the question is more difficult than it appears; it is one upon which doctors differ to a surprising extent.

We can only offer the wish that every one who attempts it may experience the fortune of that one in fifty who only, we believe we should be correct in stating, is successful in effecting this consummation so devoutly to be wished.

THE DEVELOPMENT OF TRANSPARENCIES.

Assuming the plate to have been correctly exposed, according to the general rules laid down in previous articles, there still remains the need for special care in the development of the transparency. As already shown, the positive image differs from that of the negative in that it must represent the highest lights as perfectly bare glass without any trace of deposit, and must also, as it were, condense the various gradations within a far narrower compass. In other words, the transparency must present to the eye a perfectly graded picture commencing from clear glass, the deepest shadows being, however, many degrees removed from perfect opacity, which in this case would lead to heaviness. In fact, for most purposes, but especially in lantern slides, the very deepest shadows should be transparent enough to permit print to be legible through the film when pressed in contact.

These conditions necessitate that the character of the deposit be as nearly perfect as possible, and the development conducted with the greatest skill, following upon what is really the main thing—correct exposure. But though accuracy in exposure is of paramount importance, it is not to be relied upon alone to give perfect results.

We have already shown, in speaking of exposure, that there is less need of minute accuracy when slow plates are used than when the sensitiveness is greater, and precisely the same rule holds good with regard to development. Having previously mentioned collodion plates, we may commence by dealing with these, taking first of all wet collodion.

Many, perhaps most, operators regularly employ the iron developer for transparency work, though others, and we are with them, strongly prefer pyro. We are not now referring to the iron and pyro methods most familiar to the modern photographer, namely, ferrous oxalate and alkaline pyro, but to acidified solutions of ferrous sulphate and pyrogallol. The iron developer, when all things (bath included) are in perfect condition, works with beautiful cleanness and with a much shorter exposure than pyro, hence, no doubt, the preference given to it. But it is not so easy to keep up the conditions which conduce to the highest quality of result in transparency work as it is with pyro, and besides this—which is, perhaps, of

more importance—the “grain” and colour of the image are not so good.

Where iron development is employed, a solution of ferrous sulphate of normal strength—i.e., fifteen grains to the ounce—is perhaps better for general purposes than either more or less. It is better not quite new, though should not be too old; from two or three days to a week, after mixing, will be found the best age. The restraining acid employed will have a great effect upon the colour of the image, and its proportion will rule, not only the clearness of the lights, but also the delicacy of gradation. With the bath in first-rate condition, a minimum proportion of acid will be necessary, but as the silver solution becomes charged with ether and alcohol, and the other consequences of use, the quantity will have to be slightly increased. It must also be borne in mind that a small proportion of acid conduces to softness of gradation; a larger proportion to greater density and more sudden contrasts.

As regards the kind of acid employed, acetic will undoubtedly be found the most generally useful, and when employed alone, from fifteen to twenty minims of the glacial acid will be required to each ounce of fifteen-grain iron solution. Citric, formic, tartaric, nitric, sulphuric, and probably many other acids have been used in conjunction with iron; but for our present purpose there is little need to depart from the one first named. Variations in tone—we are supposing it is not intended to tone artificially—can be produced by substituting a portion of one of the last named acids for a corresponding quantity of acetic, care being taken of course to ascertain their respective equivalent values. Citric acid helps to give a purple black tone; formic yields a brown or reddish tint; tartaric and nitric are principally noticeable for the clean white or metallic surface-colour they give; while if a pure neutral black or grey is desired, sulphuric may be employed. As a rule, the organic acids lend to the production of a black or deep brown colour and great vigour, while the mineral acids give grey or neutral images and greater delicacy.

Variations of the iron solution, such as the substitution of the acetate or nitrate for the sulphate, formerly found much favour, at least for negative work, but for the present purpose do not seem to offer much advantage, their function being rather to yield detail and vigour with a comparatively short exposure than to confer any special benefits of value on a transparency. If, however, it is desired to “prospect” these modified developers, they may be formed by adding to the ordinary solution of ferrous sulphate something less than the equivalent of acetate of soda, or nitrate of barium. The former gives a compound solution containing acetate of iron and sulphate of soda, the latter, if the exact equivalents be employed—which, however, is not advisable—a solution of nitrate of iron alone, as the sulphate of barium formed by double decomposition, being insoluble, separates. These modified solutions of course require to be acidified in the usual manner, but naturally the proportions and nature of the acids may require varying.

Some operators use and recommend other additions to the developer, chiefly of an organic nature—such as sugar, gelatine, and many similar substances; but we have never, even for negative purposes, been able to recognise any real advantage in their use. Gelatine is, perhaps, the best in the form first recommended by Mr. M. Carey Lea—viz., dissolved in sulphuric acid and carefully neutralised. This increases the fineness of the deposit, but must be used very sparingly, as it is a most

powerful restrainer, and, if added in excess, destroys all delicacy of gradation.

If pyrogallic acid be substituted for sulphate of iron, the first and most important difference will be that a very considerable increase will be necessary in the exposure. But, as a counterbalancing advantage, the deposit will be much finer and the colour of the image, as well as its general characteristics, superior. Such at least is the general opinion; but for those who are satisfied with the neutral tint, clear shadows, and somewhat metallic appearance of the iron image, will probably scarcely care to incur the increased exposure.

With the bath in perfect condition, and rather more strongly acidified than is needful for negative work, some of the most beautiful tones can be obtained with pyro development, varying from rich pure black to brown, various shades of purple, or even distinctly red colours. We have in years past, with a well-matured collodion, containing a full proportion of iodide, and all conditions of working satisfactory, produced negatives as well as transparencies of a rich claret or port wine colour by transmitted light, a class of tint that gives a peculiarly rich effect in transparencies, especially for the lantern.

It is scarcely necessary, or, indeed, advisable, to depart from the employment of acetic acid as the restrainer, as the others mentioned in conjunction with iron either offer no advantage or give a decidedly inferior result. Using the pyro and acetic acid in the proportion of one grain of the former to half a drachm of the latter to each ounce of solution, the strength may be varied by dilution in order to suit the class of negative or the character of image required; the stronger solution tends to produce a softer and more harmonious picture, and is better suited for hard, dense negatives, the converse being the case when diluted. If black or purple tones, with a tendency to blue, be desired, then citric acid may be substituted for acetic; this is a much more powerful restrainer, and should only be used in the proportion of about one grain in place of half a drachm of acetic. Or the two acids may be used in combination.

It is usually recommended to mix the pyro and acetic acid solution fresh each day, in which condition it possesses its greatest energy. This may be necessary in ordinary negatives, especially in portrait work, when it is desirable to make the shortest possible exposures, but for transparencies it is not needful; in fact, the solution seems to work absolutely better when a day or two old, and retains its good qualities for several days, certainly over a week.

It would be wrong to leave the subject of the development of wet plates without alluding to the once general practice of silver intensification, or "redevelopment," as it was erroneously termed. This practice came into general use on the introduction of the iron developer, by means of which, and a short exposure, a thin, delicate image was first produced, to be afterwards intensified by the application of a second and more powerfully restrained solution of iron, or of pyro with a little free silver. This plan may be advantageously adopted in conjunction with iron development for transparencies, when it is not desired to lengthen the exposure; and if pyro be employed as the intensifier, though the results are not equal to those obtained with pyro alone, they partake of the same character, and are by most judges preferred to the pure iron tone. Let the pyro be of the strength of one grain to the ounce with half a drachm of acetic or one grain of citric acid, or preferably a combination of the two. Citric gives a colder tone than acetic, but preserves and restrains the solution better. Add a

few drops of plain ten-grain solution of silver nitrate, using more in proportion as a black or cold tone is desired, or it is needful to increase the contrast.

Alkaline and modern forms of development will be separately treated.

"Spring cleaning," and general preparations for the approaching season, appears to be the order of the day amongst professional photographers just now. Already business is decidedly "looking up" in the majority of the leading London establishments. So far as we are aware, there are no very special novelties being introduced at present. The demand for large direct portraiture, however, appears to be rapidly increasing, as we predicted some time ago it would, and, what is more, we learn that it is fully appreciated by the public. In fact, it is a decided commercial success with those who have made it a speciality.

We have always deprecated the taking of life-size portraits direct, and shall continue to do so; but several of those who, during the past few years, have provided themselves with the appliances for doing them are not now employing the apparatus for that purpose. They are, however, putting it to its more legitimate use, namely, for taking portraits on plates of similar dimensions, but including half or three-fourths of the figure only, principally the latter. Three-quarter-length portraits, taken direct on, say, twenty-four-inch plates, with a lens of suitable focal length, when the posing and lighting are good, are very imposing pictures. Such pictures, we are told by those who make a feature of them, are highly approved by their patrons, while they find by experience, if the portrait be taken on a larger scale, it seldom, if ever, proves satisfactory. The reason for this is not far to seek, because, for the larger scale, the lens has to be approached near to the sitter, while, for the smaller, its distance more closely approximates to that from which *cartes* and cabinets are usually taken.

LARGE direct portraiture ought to be highly remunerative to those who make it a speciality. As the necessary apparatus for it is somewhat costly, those who do the excessively low-priced pictures are scarcely likely to adopt it, on account of the outlay. Therefore, it is probable that there will never be that ruinous competition, as regards price, with this class of work that there is with the smaller sizes. Hence, large direct portraiture may be looked forward to as a somewhat select branch of business.

AND the sensitometer numbers given with dry plates of any real value? They ought to be, but there is little question they are often misleading rather than otherwise. It frequently happens that a plate said to be, say, twenty-four by the sensitometer, proves, in practice, to be less sensitive than another mentioned as being twenty-two or even less. Is this discrepancy due to some makers overstating the sensitiveness of their productions, while others under-estimate theirs? Or does it arise from a difference in value of the light used in testing? Or is it due to a variation in the density of the sensitometer screen employed? Or from the whole of these circumstances combined? Recently we saw two sensitometers in use in a plate manufactory, one of which, on careful testing, was fully two numbers in advance of the other. And upon trying the screens side by side on a piece of sensitive paper the difference was even still greater. A standard light and a standard screen are yet *desiderata*. But when they are found they must be employed conscientiously to be of any real value.

THE strong light we have been having of late is making the contents of many showcases look excessively dingy. It is truly surprising how little attention is paid to this subject by many photographers, particularly those in the metropolis. They take immense pains and trouble to get up the specimens in the first instance, but seem to care but little for them afterwards. Some of the *causes* shown at the railway stations are in a woeful plight. When a print fades, surely it is a very easy matter to take another from the negative. The

public exhibition of fading pictures is a decided discredit to photography.

CONSIDERABLE vigilance is being shown just now by the Custom House authorities, with reference to the importation of foreign goods, to see that the Trade Marks Act is complied with. This is all well and good, but we have heard several complaints of the careless way in which it is done. Cases are opened, the paper ruthlessly torn off the packages, and not secured again. Goods which had been carefully packed by the senders are replaced anyhow, so that they can be got back into the case, without consideration as to the damage they may sustain in further transit. In one instance, a large nail, instead of being driven into the wood of the case, was driven inside it, and some distance into a piece of apparatus. Notwithstanding this apparent show of energy on the part of the Customs' officials, there is no question that a great deal of photographic material is being sold in this country which has been made abroad, and which bears no indication whatever that it is not of home production. Particularly is this the case with lenses, chemicals, and photographic stationery.

How much better the majority of landscape photographs would look if the natural sky, as it existed when the picture was taken, could be secured in the negative without sacrificing any of its other good qualities. Particularly would this be the case with the clouds seen at this time of the year, say just after a smart April shower. A large proportion of the clouds printed-in from stock negatives are in no way suited to the pictures for which they are used, and therefore often make it utterly incongruous. This would never be the case if the clouds were secured at the same time as the landscape. Various "dodges," more or less practicable, have from time to time been suggested for attaining this end, but the fact remains that the larger proportion of clouds seen in amateurs' negatives are printed-in from commercial stock negatives.

NOTHING is easier, when taking the landscape, and there are good clouds at the time, without altering the position of the camera, except, perhaps, raising the front a bit, to take a second negative, exposing it specially for the sky. By this means an excellent cloud negative, suitable to the landscape, would be secured, which could be utilised without any troublesome masking or blocking-out, because the two negatives would be in duplicate as regards subject. It may be argued that this would often involve the use of two plates for one picture. This is true, but then three or four pictures of exceptional excellence are far preferable to half a dozen of little merit.

IN nine cases out of ten, when clouds are printed-in to a stereoscopic picture from a second negative they are a total failure when seen in the stereoscope. If, however, the plan suggested above be adopted, the clouds will always be in harmony with the picture, and will also possess the proper stereoscopic effect when viewed in the instrument.

A LETTER from a correspondent, in our last issue, on "sweating" in photography, directs attention to the ill-effects of competition namely, the large amount of work that must necessarily be done for a very little pay. However, the sweating system in photography has not yet assumed such proportions as to call for legislative interference, as our correspondent suggests. That sweating is carried on there is no doubt, otherwise photographs could not be produced at the ridiculously low prices they sometimes are. Long hours and small wages must largely rule in some quarters, but not, we hope, in good-class establishments.

IN no branches of the art is sweating carried on to the extent it is in the production of the cheap opal pictures, to which we have before referred, and in the colouring and finishing of photographs. The latter often passes through three or four hands before it reaches the customer. In the lower grades of this branch of work, such as the tinting of publication portraits, and the colouring of cheap opals, the prices paid to those who actually do the work are, we are told, so ridiculously small, that it is almost a wonder that people can be found to under-

take it at all. However, we are given to understand that a large proportion of this work is done by young ladies of the middle class, who do it to obtain a little extra "pin money," and not really as a means of livelihood. This, however, makes the matter no better—indeed, it makes it worse—for the needy ones who have to depend upon their labour for the necessities of life.

THE SIMILARITY OF ACTION OF DIFFERENT DEVELOPERS.

THE observation made by Mr. Cadett in the course of his paper on *Development*, given before the Camera Club, to the effect that all the different developers he had tried exhibited precisely the same power in rendering detail, though perhaps at first sight rather startling, must, I think, commend itself to the more careful and observant of manipulators. Presuming, of course, that the best use is made of each different combination, that is to say, that the utmost detail is got that the developer is capable of bringing out, I have never found that there was anything really appreciable to choose between any of the wide range of mixtures possible. But when it comes to density, gradation, and *printing value*, the case is very different. For instance, who that has experimented with developers, using the sensitometer, has not discovered that with the same class of film—i.e., a large plate, or sheet of paper cut into small sections—the same number will be got out invariably by any developer if it be applied for a sufficient length of time? I do not mean to say that by a sufficiently long application the whole range of numbers will be compassed, because such is certainly not the case; but a certain point is reached beyond which the most energetic solution will not act further, however long permitted to act, though the slower workers will gradually reach it allowed. But the difference in the appearance of the developed images will be as great as, or greater than, the variation in the time occupied, both in vigour and in the "picking out" of grade from grade. Perhaps some unthinking reader may ask then, "Why vary the developer at all?" or, "Why not use a 'one solution' developer, instead of condemning such as unscientific?" Well, the reply is very simple. In actual practical development, the action of the developer is rarely, if ever, carried to its utmost limit; not even in the case of "instantaneous" exposures. The science of development consists in so modifying the character of the solution to suit the time of exposure, that it shall produce the result desired before it has reached the point of exhaustion. If this were not so there would be no such thing as "latitude." We should have to expose with the strictest accuracy, and then the developer might be allowed to act for any length of time. But what would be the consequence of leaving a plate that had received a "normal" exposure to develop, say, all night? Why simply that though no more detail, properly so-called, would be produced than if the action had been arrested at the right time, the gradations of light and shadow would be utterly lost, the density of the image be infinitely too great, and most probably a hopeless veil of fog thrown over the whole by the abnormal action of the solution.

The fact pointed out by Mr. Cadett is, however, I think, strongly in favour of the theory of Mr. Payne Jennings, also alluded to in the same paper, that, however brief the exposure may be, the image is completely formed, if it were only in our power—which it is not, with our present knowledge—to bring it out. But considering the advances made in late years in this direction, there is no knowing how soon the necessary knowledge may dawn upon us.

Another remark of Mr. Cadett's will be re-echoed by many good workers, and perhaps cavilled at by others equally good, namely, that the more non-actinic the colour of the negative the greater will be the delicacy of its gradations. There can be no dispute on the question of the relative prettiness of negatives developed with and without sulphite of soda, nor of the difference in the rapidity of printing; but there are many who cling to the idea that the old pyro-stained images give the better prints, and still more who favour sulphite, because of the "wet-plate character" it gives to the negative.

It scarcely requires argument that a dense image offers a better chance of securing a wide range of delicate gradations—a more extended "gamut" as it has been called—than a comparatively thin one. But the scale must start from "zero," and the range of grada-

tions will be only limited by the length of the scale. The scale should extend, in fact, from "clear glass" to "opacity," the two limits beyond which it is impossible to pass. The "backers" of pyro-stained negatives forget that they necessarily shorten their scale by having no "zero," while the lovers of sulphite, on the other hand, overlook the fact that in many—perhaps the majority of instances—they stop many degrees short of opacity, and consequently curtail the scale at the other end. Sulphite or ferrous oxalate developed negatives resemble a wet plate in colour more than in gradation. It is not the colour, but the gradation of collodion negatives that cause them or their recollection to remain so firmly fixed in the remembrance of the old votaries of the art. Some of the finest and most delicate, as well as vigorous collodion negatives ever produced are as far removed in colour from the neutral black of ferrous oxalate or sulpho-pyrogallol as the most deeply pyro-stained gelatine, or even farther. Mr. Cadett's dictum remains correct.

B. W. C.

ALBUMINO-BROMIDE PAPER.

SOME time ago I noticed the mention in your columns of the possibility of utilising, as a makeshift for enlarging or similar purposes, ordinary ready-sensitised albumen paper treated with solution of a soluble bromide in order to convert the silver chloride into bromide. As I have frequently, during many years past, availed myself of this method of extemporising a moderately rapid paper for printing by development, and found it both useful and reliable, I think that with our modern facilities, especially in development, it may be fairly removed from the category of "makeshifts," and classed as a really practical help. I say this more especially because it is not only as a substitute, in cases of emergency, for the now generally used bromogelatine paper that it offers itself; because even in the chance cases where the supply of such paper should run out, the results obtained with the substitute are scarcely likely from their different character to give satisfaction. But I aver that a distinct and characteristic style of picture is obtainable by development upon bromised albumen paper which gives it a *raison d'être* entirely its own.

Many who have so far changed their opinions as to favour the now popular black or platinotype tones have scarcely yet lost their fancy for the albumen surface; and certainly for small work such tones, combined with the finish of albumenised paper, produce a marvellously pretty effect, while for large work if the gloss be an objection it may be dispensed with, and the peculiar and distinctive character of the picture retained.

My own experience with ready-sensitised paper has been comparatively—or I may say very—limited, as I have only tried that modification of the plan recently, and since I came across the mention in your pages. My practice has been to sensitise my own paper, and it has been with such that I have invariably done my work. There is everything to recommend this course where regular work is to be done by the process, since, when it is perfectly well known under what condition the chloride paper has been prepared and sensitised, there is a better chance of securing the finest result in converting it to its new purpose. In fact, when it is known what strength of sensitising bath has been employed, some idea may be formed of what strength of bromide solution will give the best result.

So far as my experience with commercial sensitised paper has gone, I have not found it to give such generally satisfactory results as the home-prepared article, probably because, being comparatively devoid of free silver nitrate, the chloride present is barely sufficient to meet the requirements of a developed print. Still, very good work may be done, especially in small sizes, when delicacy rather than vigour is the quality to be sought. In ready-sensitised paper I have obtained the best success with a weak bromide bath long applied—say, fifteen grains of bromide of potassium to the ounce of water and allowed to act for not less than a quarter of an hour. The paper is simply floated on the "converting" bath in the same manner as in sensitising, the surplus solution removed, and the sheet hung up to dry.

When the paper is of my own sensitising, I regulate the strength of the converting bath to that of the silver bath, using about one-third the strength of bromide (of either potassium or ammonia) as compared with silver. For instance, if the silver bath is sixty grains, I find a twenty-grain bromide bath ample. If it be stronger than

this there is a danger of the chloride or bromide of silver being dissolved, and the paper robbed of its sensitive material. To avoid this at all times, and to obviate the necessity for particular care in the time of floating, I saturate the bromide bath with silver by shaking it up with a small quantity of freshly precipitated silver bromide, or, what answers equally well, by adding a few drops of solution of silver nitrate and filtering before use.

If the paper is sensitised for ordinary printing, the surplus solution will be removed from the surface by means of a glass rod or by drawing the sheet over the side of the dish; in which case, especially after drying, the albumen surface will be quite ready for floating upon the converting bath. But if the surplus silver be not thus removed, or if the sheet be removed directly from the silver to the bromide bath, unsightly markings will occur on the surface from the conversion of the excess of silver into a scum-like deposit of bromide. To avoid this when specially silvering the paper, I float for a rather shorter time than I should for ordinary printing, and allow the sheet to hang for ten minutes or a quarter of an hour before placing on the bromide bath, during which time the excess of nitrate will have been converted into chloride, or absorbed into the paper.

For large work, or when the albumen gloss is undesirable, I float the reverse side of the sheet, which then becomes the sensitive surface. It is useless to print on the back of the paper when the front is sensitised, as the picture is then formed mainly in the paper, is but partially visible on the front, and scarcely at all at the back, but shows well as a transparency. When, however, the back is placed in contact with the sensitising solution, the chlorides contained in the albumen layer find their way through to meet the silver, and the result is the formation of a bold, strong, and rich-coloured image, when the reverse side of the paper is presented to the light.

A very noticeable increase of sensitiveness is attained by a somewhat roundabout method. After sensitising, the sheet is allowed to drip for a few minutes, and is then floated on a weak solution of carbonate of soda—five grains to the ounce—which converts the excess of nitrate into carbonate of silver. If the carbonate be used much stronger there will be danger of injuring the albumen film. After again hanging for a minute or two, or removing the excess of liquid from the surface, the sheet is transferred to the converting bath, which should be of bromide of ammonium; this, in converting the chloride and carbonate of silver, forms by double decomposition a small trace of carbonate of ammonia, which acts as the accelerator.

The floating on the converting bath should last about ten minutes, but no harm is done if it extend longer. On no account immerse the paper at this stage, or the image will be made to penetrate into the body of the paper, which, however useful it may be for negative purposes, is not to be desired when positives are in question. When the conversion of the chloride is complete, then immersion may be resorted to, and is, indeed, desirable in washing out the excess of soluble bromide; the process is thus hastened, and no possible harm can accrue from the freest and most liberal use of water.

Upon the thoroughness of the washing, and the consequent removal of as much as possible of the free bromide, will depend in a great measure the sensitiveness of the paper. Several sheets may be worked in the same dish or vessel, and if a constant stream of water be kept up from half an hour to an hour it will be ample, after which the sheets may be "blotted off" singly with clean bibulous paper, and hung up to dry. It may be observed that when thoroughly washed such paper should keep indefinitely, and is infinitely less liable to injury than gelatine paper from any cause whatsoever, neither heat nor damp exercising any ill effect.

As regards sensitiveness, I class paper prepared in this manner as about equal to, or perhaps a little slower than, Alpha paper, when the same development is adopted; but a good deal will depend upon circumstances. If greater sensitiveness is desired, the paper may be soaked for a few minutes in a weak solution of carbonate of ammonia, though this is dangerous if ferrous oxalate is to be used as the developer, unless a very thorough washing intervene. The developing solution itself may be warmed in cases of slight under exposure, but the practice is not to be recommended, as it tends to degrade the lights of the picture.

Of the different methods of development I must speak in a future article, simply saying here that alkaline pyro, hydroquinone, and

ferrous oxalate are equally available, while those who remember "old times," and do not object to the lengthened exposure necessary, may use "acid pyro," or even gallic acid.

ERNEST GRAHAM.

ECHOES.

In last week's issue, Mr. W. Guttenberg asks me a question with regard to papyroxylene, which I am afraid I cannot answer as satisfactorily as he might wish. The yellowness of the flame is quite as pronounced as in the case of ordinary gun cotton, or it may be more so, for it varies with the rapidity of combustion; and this again, in the unconfined state, depends upon the physical character of the explosive, and not wholly upon its degree of nitration.

A perfectly dry and well "pulled-out" tuft of gun cotton will flash off with a degree of rapidity that varies, of course more or less, with its chemical composition, but is always sufficiently rapid to deserve the term of "flash." Papyroxylene, on the other hand, may be made of the highest degree of "explosiveness," but yet which will burn with about the rapidity (?) of a slow match, simply because it is so thick and compact in its physical character. For instance, a sample I have made from thin Swedish filter paper, with equal parts of undiluted acids, at the temperature of 62°, is, in consequence of the parchmientising action of the sulphuric acid, as thick as, or thicker, than stout cartridge paper. When cut into strips and laid in a continuous "train" on the floor, and creased so as to prevent as much as possible contact with the cold surface, it burns only at the rate of about an inch in a second. But the combustion of any magnesium powder spread upon it is complete if it be but slow, and for prolonged exposures I should think it would answer well.

In order to make a rapidly flashing sample, it would be necessary to employ the thinnest tissue paper and a very much larger proportion of nitric acid, in order to prevent the parchmientising action, and to keep the product as thin and light as possible. If Mr. Guttenberg would like to try samples of the two sorts, I shall be pleased to forward him some through the Editor.

With respect to the yellow colour, however, I do not think it can be considered detrimental—as I assume Mr. Guttenberg regards it—on account of any supposed slowing effect it may have on the magnesium. Granted that a certain proportion of useless rays are mixed with the chemically active magnesium, I question whether the value of the latter is thereby reduced. It is not as if the light were passed through a non-actinic medium which robbed it of the whole or a greater part of its activity; on the contrary, the active rays are present in vastly preponderating proportion, and fully capable, so far as I can see, of exerting their full inference. It is a case, in fact, of white light *plus* a small proportion of yellow, and not, as would otherwise appear, white light *minus* a portion of its violet and blue.

If the admixture of coloured with white light robbed the latter of any of its chemical activity, it would seem that a very considerable leakage of daylight might be permitted into the "dark room," especially when ruby light is employed. Such is not the case however, in spite of the, I may say, established reversing action of the red rays, which one would imagine would suffice to "kill" any slight glimpses of white light that might filter in. Not so however, for the most minute traces of white light seem capable of exerting their full power for evil, as most photographers must have discovered.

The battle of hydroquinone goes on right merrily, and in this, as in almost anything—especially things photographic—it seems possible to elicit opinions and ideas of the most opposite character. As regards the value of the substance as a developer this is not to be wondered at, since, all the world over, "different people have different opinions; some like apples, while some like 'inyns!'" But when it comes to the chemical composition of the material, one would expect a somewhat closer agreement; for while chemistry is not so exact a science as mathematics, it is practically so within limits.

But here we have one statement contradicted by another with such plainness and directness, that one begins to wonder whether chemistry is not, after all, about as much guess work as phrenology or palmistry. Still, where differences exist and have to be written about in scientific matters, it is incumbent on the disputants to express themselves with-

out personalities or without the imputation of unworthy motives. I was sorry to see, in a letter in the correspondence columns a fortnight ago, a suggestion that certain figures given in a paper read semi-privately by an entirely disinterested party were—well, practically, "cooked," to suit a certain hypothesis. That, I venture to say, is stepping beyond reasonable bounds; and the further suggestion, that most accurate workers are usually the most modest, is unnecessarily and unpleasantly critical, but suggests that if the accuracy of every worker were gauged by his apparent modesty, even the writer of the letter I quote from might find himself not placed in a high rank as regards reliability.

I am willing to believe the remarks were made in joke, for it is always difficult to express jocoseness in "black and white," especially in conjunction with scientific matters, and it is always dangerous to "chaff" in writing. Some years ago I mortally offended a dear friend by some facetious (?) remarks clumsily written, and to quote Oliver Wendell Holmes—

"And since, I never dare to write
As funny as I can."

I am, perhaps, laying myself open to the charge of poking my nose into business that is no concern of mine; but my function, it must be borne in mind, is to be critical, though I hope—as I endeavour—to keep within the proper lines. What I have written is in defence of, and a protest against, respectively, two perfect strangers to me, my only excuse for interference being that they have become public characters in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY.

JUNUS.

CRYSTAL PALACE INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—V.

By far the least satisfactory things to submit to public show in a photographic exhibition are lenses. Speaking generally, they are all kept in well locked-up cases, thereby acceding to the general wish of the general public to be delivered from temptation, for in this class of wares it is emphatically a case of precious goods made up in small parcels. Even if submitted to examination, one can, at least, say that they are well finished, very pretty, and very diversified as regards dimensions and application; but in the absence of a camera with a ground glass, on which to see their performance, this is all that it is possible to say. For their excellence as efficient working tools for the photographer we fall back upon the reputations of the respective makers. With this by way of exordium, we proceed to state that—

Ross & Co. (112, New Bond-street, W.) exhibit portrait and view lenses, any, or all, of which will sustain the well-earned high reputation of this firm. Many of the latter of these are adapted to fit one flange, an advantage greater by far than appears on the surface, and on which, did space permit, we could dilate at great length. A special novelty consists in their New Patent Concentric Symmetrical Lens, concerning the nature of which no definite public announcement has yet been made. A camera exhibited by this firm possesses the very acme of portability and neatness, but as it was described in these columns only a short time since (page 58), we refer the reader to that description for full particulars. Among their exhibits also are a full-sized skeleton finder attached to a camera, an enlarging lantern, and chemical cases.

The showcase of J. H. Dallmeyer (25, Newman-street, W.) is quite representative of the lenses manufactured by this well-known firm, being replete in every respect. One noteworthy exhibit in it consists of an iris diaphragmatic shutter affixed to a large lens, containing a variety of ingenious adjustments of a chromometric nature. Cameras and finders are also exhibited by Mr. Dallmeyer.

Very varied, too, are the lenticular exhibits of William Wray, Highgate, who, during the past twelve months, has brought out several new productions, both as entirely original or as further developments of works formerly executed by them. Among these is a single landscape lens composed of three components, different (so far as we learn) in arrangement from anything hitherto effected in single-triple combinations. This firm also exhibits a new shutter, time and instantaneous, entitled the "Caldwell."

The Docwra Triple Lantern, which was last year exhibited by W. C. Hughes, Kingsland, E., and for which he obtained the medal, is this year present in an improved form, and it comes attended by numerous other lanterns of an allied nature, and with many appliances for this now popular instrument. These embrace Bijou and other enlarging lanterns having rectangular condensers, oxyhydrogen

microscopes, polariscopes limelight burners, long-focus objectives, and the well-known Gilchrist science lantern for demonstrating chemical experiments. One useful novelty we are glad to see amongst Mr. Hughes's exhibits—it is a metallic binding for lantern slides, somewhat on the same principle as the brass "preserve" of old collodion positive days, but modified, of course, to suit this special requirement. Those who are annoyed by the tearing of the paper bindings of slides that are in constant use will find in this metallic binding something that will put a termination to their troubles.

Could a general representative exhibition of photographic apparatus be complete if J. Lancaster & Son, of Birmingham, were absent? Surely not. The great populariser of amateur "sets," Mr. W. J. Lancaster, was present at the opening of the exhibition, attended by a staff of assistants, busily employed in getting his exceedingly varied and large stock displayed in an adequate manner. In cameras there are the "Instantograph," "Le Merveilleux," and "Le Meritoir," all of the 1889 patterns, the "International," the "Ladies," the "Detective," the "Stereo-Instantograph" (a move in a decidedly excellent direction), the "Special," the "Waistcoat Pocket," and others. Then in lenses there are Portraits and Rectigraphs, the latter in several forms and possessing several capabilities, being both rapid, wide, and narrow angle, together with single landscape achromatic combinations. Equally varied are the shutters shown by this firm of manufacturers, whose exhibits include, also, lamps of various forms, print and negative washers, cases for cameras, and numerous other objects of utility.

A large supply of photographic appurtenances are to be found on the stand of Mr. William Tylar (Birmingham), amongst them being zinc-plate boxes, dark-room lamps, with different shades of ruby glass, pulp trays, trays provided with plate lifters, washing racks which fold in small compass, rockers, cameras, stands, burnishers, and, in fact, everything that is necessary for both professional and amateur. Mr. Tylar has recently brought out a film clip, by which one end of a film is securely held whilst being developed. The jaws of the clip are held together by means of a spring, which also forms the handle, pressure upon which will cause it to release its hold. Vignette clips, also recently brought before the public by this house, also fill a long-felt want, as by means of these a sheet of cardboard, which has been previously cut in form for a vignette, can be instantly clamped to the printing frame. These clamps, though very simple in construction, are very effective.

J. F. Shew & Co., besides their well-known stock of cameras and stands of every description, exhibit their Eclipse Changing Back, by which a dozen plates can be changed for exposure, the changing box being the dark slide itself; an ingenious clip, by means of which a camera may be readily attached to the stem of a tree or fence, in place of a stand. The clip, when folded up, occupies a small space.

A fine display of transparencies is exhibited by the Paget Prize Plate Company. The stand of transparencies, being illuminated at right by means of the electric light, has attracted no small attention from the visitors to the Palace.

R. W. Thomas & Co. have an exhibit of their well-known plates and chemicals, specimens obtained by the use of their plates, and the new detective camera of J. B. B. Wellington.

A number of general exhibits by various parties are made on one or two stands under the charge of Mr. E. N. Smart, of Clapham Junction, there being specimens of work done in plates manufactured by F. W. Vétel; cameras, by W. R. Baker; an automatic print holder, by Horace O. Oliver; cameras of various sizes and styles, by Rendall & Co.; albums and mounts, by E. Fox & Co.; burnishers, by Whitaker; camera gun, by J. Lenton Berry; flash lamps, by A. James; fancy and plush frames, by O. Siebel & Co.; specimens of pictures taken on plates made by B. J. Edwards & Co.; a dark slide, by T. J. Rickwood; and several others.

W. Morley has an attractive show of cameras, stands, and lenses. Mr. Morley, as a dealer, occupies the high vantage ground of being a good practical photographer, and knows just what is suited to public taste.

The Platinotype Company exhibit some fine specimens, of various dimensions, taken by the Platinotype process.

The Eastman Dry Plate and Film Company (London) have a goodly show of all, or mostly all, of those appliances with which their names are so well associated. Here are the mammoth cameras of the Scovill manufacture and their well-known Kodak. McKellen's cameras are shown, together with enlarging and other cameras; also roll holders, enlarging easels, bromide and transferotype paper, stripping films, Zschneider's self-binding mounts, film carrier for cut sheets, quadruplex enamellers, retouching sets, washing apparatus, transparency frames with etched glass (by the

way, is it not now a rather old American invention about which some of our correspondents are having an unpleasantness amongst themselves?), and printing frames. This firm also exhibits the centrifugal separating machines of Watson, Laidlaw, & Co., which

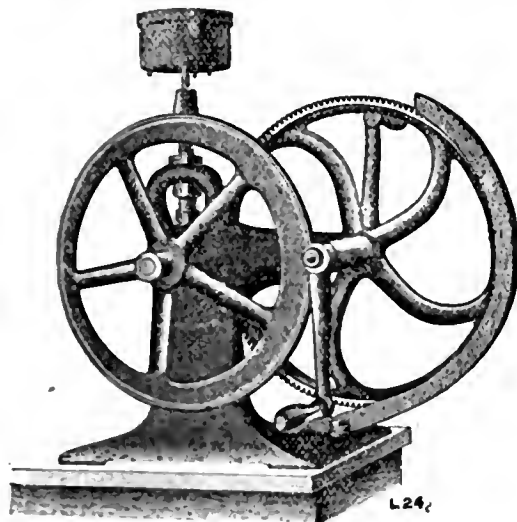


Fig. 25.

for the small user has assumed a more convenient form than when it was last figured and described by us, as will be seen from the specimen shown in the above cut. The speed attained is very high.

The London Stereoscopic Company's exhibit comprises complete outfits for beginners and students, chemical chests, detective and



Fig. 26.

hand cameras, vest or secret cameras, also an ingenious form of camera, the appearance of which is similar to a book (Fig. 26). Portable or lawn studios are also shown, "Black band" and other lenses are also exhibited, these lenses being fitted with an iris diaphragm.

Plates of all degrees of rapidity are also prominent in their display.

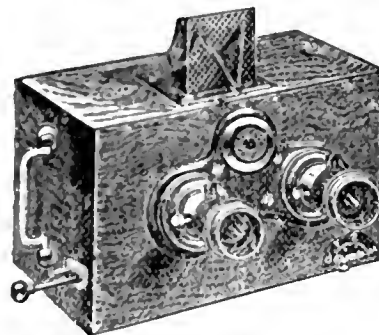


Fig. 27.

Amongst some of the novelties by this firm is a reversing tripod top, enabling a camera to be instantly turned on its side in order to take

vertical pictures. These tops can be adapted to any stand. Also a compact form of hand stereoscopic camera, the chief points claimed being extreme portability and compactness combined with utility. The camera when packed contains lenses, three double dark slides, and instantaneous shutter. As will be seen by the cut, this camera is furnished with a handle to facilitate carrying. Portable printing frames, burnishers, lamps, photographs, &c., are all to be found amongst the exhibits of this well-known firm.

Lanterns—biennial and triple—are exhibited by J. H. Steward. His "Perfect" lantern has a fine appearance, and is fitted with various objectives of different foci, telescopic fronts, registering stages, double slide, curtain shutter, and all the minutiae with which a lantern of a high quality can be furnished. He also shows an incandescent electric optical lamp of one hundred candle power, which is constructed in such a manner that it is claimed that the area of light is concentrated so that all the rays are available for projection. An ample supply of gas regulators, cylinders, gas testers, and complete photographic sets, are also to be found among the exhibits of this well-known firm.

Since writing the foregoing, the Exhibition is closed. Taken all in all, there was undoubtedly a finer and larger display of photographic apparatus than has been known to have been seen elsewhere, the newest and best of everything having been there displayed.

AN EASY AND ECONOMICAL METHOD OF MAKING LANTERN PLATES.

A FEW weeks ago I was showing our Editor some lantern plates that I had produced by a new formula which I have lately worked out. He was so pleased with them that he asked me if I would publish a full description of how I made them.

I headed my communication as above and began as follows:—"Many of your readers will no doubt say that it is not worth the trouble to prepare one's own plates when they can be bought at a shilling per dozen." Then I came to a full stop in more senses than one, and I asked myself if it was worth while going on any further.

On thinking over the matter since, I have come to the conclusion that, as many of your readers have joined the ranks of amateur photographers since the days when the subject of the preparation of dry plates was one which occupied a large space in the columns of our journals, it will be necessary for me to first explain fully the points connected with the subject to enable your younger readers to decide, each for himself, as to whether it will be advisable for him to take the trouble of preparing plates for his own use.

First, as to the cost. I find that with the emulsion, the formula for making which I am about to publish, I can coat one hundred and twenty plates $3\frac{1}{2} \times 3\frac{1}{2}$ at a cost for material of *fivepence*. A friend of mine told me lately that he expects me to show some plates next which had been coated with some gelatine and bromide of potassium, and then rubbed with a shilling over the surface. If it were possible to produce plates at all or of a better quality by that method, I do not see any objection in doing that—besides, it would reduce the cost of production.

But the question of quality is of far more importance than that of price, and if I found that I could gain anything in quality by using more silver in the emulsion, I would most certainly do so; but I have conclusively proved to my own mind that the quality of the plate depends upon the formation of the silver haloid during the preparation of the emulsion far more than upon the amount of silver in the film, and that after one has obtained a film giving sufficient density, that every atom of silver put into it beyond that is not only wasted but is really injurious, on account of the additional silver blocking up the image, especially in the shadows.

We may say then that if we cut up our waste negatives into plates three and a quarter inches square, and clean off the old films, that one halfpenny per dozen would represent the total cost of the plates. If any one is so fortunate as to have no waste negatives, glass cut to that size can be purchased at 3s. 6d. per gross, and I have no doubt that if there were any demand for it, the dealers would soon lower the price to 2s. 6d. per gross.

It must be clearly understood that, because these plates can be prepared for such a low price, it does not follow for one moment that at present the cost of material to the plate makers is no more than that, or that they use anything approaching such a small amount of silver in their films as I do; indeed, I am very doubtful whether a formula suitable for the preparation of, say, ten or twenty ounces of

emulsion, would be suitable for the same when made in quantities of ten or twenty gallons, and I can quite believe that several plate makers are working with a very small margin of profit in supplying quarter-plates at a shilling per dozen.

During a long series of experiments extending over the past seven or eight years, to try to discover the laws which govern the primary formation of the silver haloid in an emulsion, and the relation it bears to the production of the latent image and its development, I have noted many points which would require pages of this JOURNAL to describe; but I think I may summarise them as far as this branch of the subject is concerned, by saying that I feel convinced that for small plates, such as lantern slides, to obtain the best results it is absolutely necessary for the particles of silver bromide to be in as fine a state of sub-division as possible, and that these particles must be kept sufficiently apart by the vehicle holding them in suspension, that the developer is only able to reduce them to the extent that they are acted upon by light.

Perhaps I can explain my meaning better if we suppose that a developed gelatine film containing the reduced particles of silver in a very coarse state of division (such as in a very rapid gelatine plate) is represented by a number of billiard balls embedded in a large block of ice: on looking through that block of ice the billiard balls would have shut off a certain amount of transmitted light. (With a negative we would say that it had a certain degree of density through the particles of silver blocking out the light in a similar manner.)

Next, we will represent a film containing the silver particles in a very fine state of division (such as in a collodio-bromide plate) by a similar block of ice, in which is embedded a vast number of small marbles.

We can readily understand that as these marbles would lie so much closer together, a much less quantity in bulk would block out the same amount of light passing through the lump of ice than in the case of the billiard balls. I think this will clearly explain how it is that with only about a *quarter of a grain of silver in a plate three and a quarter inches square* I can obtain greater density than often is obtained on a plate containing six or seven times that amount of silver when prepared by the ordinary method.

This will also explain my reason for using such a small quantity of silver in the film, especially for lantern plates which are only exposed to a light the strength of which can be controlled. If I were to use the same amount of silver in a fine state of division as is used when in a coarse state, I should obtain a great deal too much density, and lose all that brilliancy in the shadows so necessary for a good lantern plate.

There is another very important gain in using a small amount of silver in a very fine state of division, and that is for a lantern slide we require the image to be of the finest possible detail and range of tone. To go back to the simile of the block of ice and the billiard balls, as representing coarse particles of silver bromide in the film. If a pencil of light were to strike a small point on one of these balls or particles, the whole of it would be reduced by the developer (as silver bromide cannot exist in contact with freshly reduced silver), and in consequence there would be a blocking up of detail, because more silver would be reduced than was actually acted upon by light.

But if the same pencil of light struck one of the marbles in a group the same size as the billiard ball, that only would be reduced by the developer, the other marbles (*i.e.*, fine particles) being protected from the reducing action of the developer by the gelatine surrounding them.

I think we shall now be able to understand why we are able to get so much better results with a collodio-bromide plate in which the silver haloid is very slowly formed in an extremely fine state of division during the preparation of the emulsion when compared with a transparency produced on an ordinary gelatine plate, and it also gives us a clue as to how to prepare a gelatine emulsion able to equal the former in quality.

The next point that an amateur would require to know is, to what extent would home-made plate making interfere with the arrangements of an ordinary household?

If one can obtain the use of a room with a table or bench in it for two or three hours of an evening, and be allowed to cover up the fireplace for a day or so, that will be the sole amount of inconvenience to which the "powers that be" will be put. As to the plant required, any one who has a few tools, and has a slight idea how to use them, can easily make the form of drying box which I shall describe. This would come in useful if he afterwards decided to make his own plates for the camera, if only to the extent of recoating his spoilt and useless negatives—articles of which amateurs, as a rule, have a good supply.

The last question is, "Can an ordinary photographic amateur with

little chemical knowledge prepare satisfactory plates?" I say most decidedly, "Yes."

I have never quite been able to understand why the halo of mystery and awe at present surrounding the process of plate making is so generally existent in the minds of photographers.

When we think of the vastly greater difficulties in the old collodion dry plate day, which the amateurs of that time successfully overcame, and when we note the great amount of energy on the part of amateurs of the present day in trying every possible variety of apparatus, instantaneous shutter, developer, &c.—the more complicated it is the more greedily it is pounced upon—one wonders how it is that this, I might say in many cases wasted, energy is not directed to plate making to a greater extent than it is.

To prepare very rapid plates with any degree of certainty requires a great amount of care and experience, and until that amount of experience is gained, I would not advise any one to attempt to make rapid plates. But there is no great difficulty in preparing a good slow plate, which is just the thing for landscape work during the summer months; and if your readers who think of giving plate making a trial will first try their hands at preparing small slow plates, such as for lantern slides, they will afterwards be able to coat larger plates with a more rapid emulsion with some certainty of success.

It must be remembered that those who, eight or ten years ago, attempted plate making on a small scale, and gave it up, worked under very different conditions.

In the first place, the great thing tried for then was extreme rapidity, without any certain knowledge of the causes which produced that rapidity. Then again, at that time, little was known or even guessed as to the part that the gelatine played in producing the failures met with. Now the gelatine makers know much better how to produce an article suitable for photographic work, and I am quite convinced that it is to the sample of gelatine used that nine-tenths of the difficulties met with in preparing rapid plates are really due.

In my next communication I purpose to give, in as simple a manner as possible, a full description of the articles required and the method of making the emulsion I have spoken of. Before doing so, however, I thought it better to write the above, so that any one can answer for himself the question, "Is it worth the trouble?"

HERBERT S. STARNES.

SCIENCE AND ART.*

We shall now endeavour to discuss briefly how our remarks apply to photography. Any student of photographic literature is well aware that numerous papers are constantly being published by persons who evidently are not aware of this radical distinction between Science and Art.

The student will see it constantly advocated that every detail of a picture should be impartially rendered with a biting accuracy, and this in all cases—this biting sharpness being, as Mr. T. F. Goolall, the landscape painter, says, "Quite fatal from the artistic standpoint." If the rendering were always given sharply, the work would belong to the category of topography or the knowledge of places—that is, Science. To continue, the student will find directions for producing an unvarying quality in his negatives. He will be told how negatives of low-toned effects may be made to give prints like negatives taken in bright sunshine; in short, he will find that these writers have a scientific ideal, a sort of standard negative by which to gauge all others. And if these writers are questioned, the student will find the standard negative is one in which all detail is rendered with microscopic sharpness, and one taken evidently in the brightest sunshine. We once heard it seriously proposed that there should be some sort of standard lantern slide. My allotted time is too brief to give further examples. Suffice it to say, that this unvarying standard negative would be admirable if Nature were unvarying in her moods; until that comes to pass there must be as much variety in negatives as there are different moods in Nature.

It is, we think, because of the confusion of the aims of Science and Art that the majority of photographs fail either as scientific records or works of art. It would be easy to point out how the majority are false scientifically, and easier still to show how they are simply devoid of all artistic qualities. They serve, however, as many have served, as topographical records of faces, buildings, and landscapes, but often incorrect records at that. It is curious and interesting to observe that such work always requires a name. It is a photograph of Mr. Jones, of Mont Blanc, or of the Houses of Parliament. On the other hand, a work of art really requires no name—it speaks for itself. It has no burning desire to be christened, for its aim is to give the beholder aesthetic pleasure, and not to add to his knowledge or the science of places—i.e., geography. The work of Art, it cannot too often be repeated, appeals to man's emotional side; it has no wish to add to his knowledge—to his Science. On the other hand, topographical works appeal to his

intellectual side; they refresh his memory of absent persons or landscapes, or they add to his knowledge. To anticipate criticism, I should like to say that of course in all mental processes the intellectual and emotional factors are inseparable, yet the one is always subordinated to the other. The emotional is subordinate when we are solving a mathematical problem, the intellectual is decidedly subordinate when we are making love. Psychologists have analysed to a remarkable extent the intellectual phenomena, but the knowledge of the components of the sentiments or the emotional phenomena is, as Mr. Herbert Spencer says, "altogether vague in its outlines, and has a structure which continues indistinct even under the most patient introspection. Dim traces of different components may be discerned; but the limitations, both of the whole and of its parts, are so faintly marked, and at the same time so entangled, that none but very general results can be reached."

The chief thing, then, that I would impress upon all beginners is the necessity for beginning work with a clear distinction between the aims and ends of Science and Art. When the art student has acquired enough knowledge—that is, Science—to express what he wishes, let him, with jealous care, keep the scientific mental attitude, if I may so express it, far away. On the other hand, if the student's aim is scientific, let him cultivate rigidly scientific methods, and not weaken himself by attempting a compromise with Art. We in the photographic world should be either scientists or artists; we should be aiming either to increase knowledge—that is, Science—or to produce works whose aim and end is to give aesthetic pleasure. I do not imply any comparison between Science and Art to the advantage of either one. They are both of the highest worth, and I admire all sincere, honest, and capable workers in either branch with impartiality. But I do not wish to see the aims and ends of the two confused, the workers weakened thereby, and, above all, the progress of both Science and Art hindered and delayed.

Next, I shall discuss briefly the ill-effects of a too sedulous study of Science upon an Art student.

The first and, perhaps, the greatest of these ill-effects is the positive mental attitude that Science fosters. A scientist is only concerned with stating a fact clearly and simply; he must tell the truth, and the whole truth. Now, a scientific study of photography, if pushed too far, leads, as a rule, to that state of mind which delights in a wealth of clearly-cut detail. The scientific photographer wishes to see the veins in a lily-leaf, and the scales on a butterfly's wing. He looks, in fact, so closely, so microscopically, at the butterfly's scales, that he never sees the poetry of the life of the butterfly itself, as with buoyant wings it disappears in marriage flight over the lush grass and pink cuckoo flowers of May.

I feel sure that this general delight in detail, brilliant sunshiny effects, glossy prints, &c., is chiefly due to the evolution of photography; these tastes have been developed with the art, from the silver plate of Daguerre to the double albumenised paper of to-day. But, as the art develops, we find the love for gloss and detail giving way before platinotype prints and photographic etchings.

The second great artistic evil engendered by Science is the careless manner in which things are expressed. The scientist seeks for truth, and is often indifferent to the manner of expression. To him, "Can you not wait upon the lunatic?" is, as the late Matthew Arnold said, as good as, "Canst thou not minister to a mind diseased?" To the literary artist, on the other hand, these sentences are as the poles asunder—the one in bald truth, the other literature. They both mean the same thing; yet what aesthetic pleasure we get from the one, and what a dull fact is, "Can you not wait upon the lunatic?" There are photographs and photographs—the one giving as much pleasure as the literary sentence, the other being as dull as the matter-of-fact question. The student with understanding will see the fundamental and vital distinction between Science and Art as shown even in these two short sentences.

And now, ladies and gentlemen, I do not think I can do better than finish this section by quoting another passage from the writings of the late Matthew Arnold.

"*Deficit una mihi symmetria prisca.*"—The antique symmetry was the one thing wanting to me," said Leonardo da Vinci, and he was an Italian. I will not presume to speak for the American, but I am sure that in the Englishman the want of this admirable symmetry of the Greeks is a thousand times more great and crying than in any Italian. The results of the want show themselves most glaringly, perhaps, in our architecture, but they show themselves also in our art. Fit details strictly combined in view of a large general result nobly conceived; that is just the beautiful *symmetria prisca* of the Greeks, and it is just where we English fail, where all our art fails. Striking ideas we have, and well-executed details we have, but that high symmetry which, with satisfying delightful effect, contains them, we seldom or never have. The glorious beauty of the Acropolis at Athens did not arise from single fine things stuck about on that hill, a statue here, a gateway there. No, it arose from all things being perfectly combined for a supreme total effect."

And now I must finish my remarks. I have not perhaps told you very much, but if I have succeeded in impressing upon beginners and some others the vital and fundamental distinction between Science and Art something will have been achieved. And if those students who find anything suggestive in my paper are by it led to look upon photography in future with a new mental attitude, something more important still will have been attained. For in my humble opinion, though it is apparently

* Concluded from page 252.

but a little thing I have to tell, still its effect may be vital and far-reaching for many an honest worker, and if I have helped a few such my labour will have been richly rewarded indeed. DR. P. H. EMERSON.

A QUARTER'S RESUMÉ OF PHOTOGRAPHIC PROGRESS.

[A Communication to the Birkenhead Photographic Society.]

THE Council of this Society have done me the honour of asking me to continue the quarterly summary of photographic intelligence so ably carried on by Mr. H. N. Atkins, who has left this part of the country and settled in Bristol. He was pre-eminently happy in this work. I accept the position under a deep sense of my unfitness, but am fortified in the belief that a willing hand meets with a ready response from those I desire to enlighten.

In making this quarterly statement, I propose to commence with hydroquinone, or, more properly speaking, quinol. The following are the best formulae I have tried. The first was given by Messrs. Mawson & Swan, Newcastle-upon-Tyne, with whose make of plates it answers admirably:—

A.	
Quinol	20 grains.
Citric acid	2½ "
Sulphite of soda	20 "
Water	5 ounces.

B.	
Caustic potass	40 grains.
Sulphite of soda	25 "
Water	5 ounces.

C.	
Bromide of potass	26 grains.
Water	1 ounce.

D.	
Caustic potass	40 grains.
Water	5 ounces.

Fix in a solution of hyposulphite of soda 1 lb.; water, 20 ounces. For usual exposures use equal parts A and B, adding 5 minims of C for every ounce of solution.

For over-exposed plates use D instead of B, with an extra quantity of C. For under-exposed plates omit C, and in extreme cases add 6 or 8 grains of sulphite of soda to every ounce of developer.

More or less sulphite gives more or less density.

This formula answers equally well for Ilford plates. Thomas's plates are better with their own developer, viz.:—

No. 1.	
Quinol	40 grains.
Sodium sulphite	½ ounce.
Citric acid	15 grains.
Potassium bromide	7½ "
Water	5 ounces.

No. 2.	
Sodium hydrate	40 grains.
Water	5 ounces.

Use equal parts of each solution.

Quinol acts differently, or rather indifferently, with certain plates, consequently plate makers must make their emulsion to suit quinol, and give over trying to write it down; they may just as well try to stem the torrents of Niagara with an umbrella. Photography, historically, is a history of one advance superseding another, and the sooner they discover this developer in that character the better for themselves.

The latitude it gives in exposure is its most valuable quality. It acts very well with Carbutt's flexible negative films, and is equally useful in developing bromide paper. I strongly recommend our members to adopt this mode of printing; it has a great future before it. Its other advantages are too well known to make it necessary for me to enter into further details; suffice it to say, professionals are readily taking to it, feeling the inevitable must be faced if they are to keep pace with the march of improvement.

The amateur, ever alive to the shortest way to the goal, must "make honey whilst the sun shines" in our short summers. I would also remind him that the prize slides of the winter now passing were slides reduced by the camera from whole and half-plate sizes to lantern size, 3¼ x 3¼.

Ha. tion is the next subject I have to bring under your notice. It is an old photographic trouble, well known in collodion days. I met with it in 1852, and overcame it with fine ground glass (on both sides, leaving no bright side for reflection); this proved an effectual cure, besides which, it quickened the sensitive plate. One-side ground is now becoming noised as a novelty. In very many cases we are only raking up the embers of the past. I sent a dozen of my double-sided ground glasses to Messrs. Mawson & Swan to sensitise for me, and have now the pleasure of placing them before you; one is taken with cross lights, which is the severest trial I can think of. I would call your attention to the prints

from the negatives, in which I think you will notice a certain softness peculiar to the treatment.

The stereoscope and how to stimulate its revival is my last subject. I make no effort to give you an exhaustive explanation of this delightful branch of our art-science. I must refer the novice to THE BRITISH JOURNAL ALMANAC for 1887, in which Mr. J. Traill Taylor, the editor, gives twelve chapters upon it.

I aim to reduce the appliances to the simplest form. To produce each picture to 4¼ x 3¼, so that two stereoscopically taken can be placed together, and seem like the old stereoscopic pictures 6½ x 3½, or kept separate as required. This plan gives an additional inch to its height, and this brings it into a standard size, 4¼ x 3¼. You can utilise them as single pictures, or make them lantern slides, or enlarge to whatever size you desire. I exhibit the arrangements I make in my dark slides to suit this arrangement. It may be made into a stereoscopic detective with the advantage of a larger picture. I exhibit prints for your inspection. I would also refer our students to an admirable article by Mr. B. J. Sayce in this year's BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

Our worthy president, Mr. Paul Lange, will not grant me more than ten minutes in delivery of my paper, so I must pause until next quarter-day.

JAS. ALEX. FORREST.

Foreign Notes and News.

At a recent meeting of the Society of Amateur Photographers of New York, Mr. Joseph Beach described a means of cutting out mounts for lantern slides so as to ensure them having a clean edge. A corset steel is sharpened on one of its edges, bent to the desired form, and fastened to a block of wood. It is placed upon sheets of paper, when, with one blow of a hammer, the mount is cut out.

THE following developing formulae have been communicated by Mr. D. Backrach, jun., to the Society of Amateur Photographers of New York, but do not essentially differ from many well known in this country. He says: "As I find the hydroquinone keeps better if meta-bisulphite of potash is added to it, my formula now reads:—

No. 1.

Hydroquinone	1 ounce.
Sulphite of soda	4 ounces.
Meta-bisulphite of soda	30 to 40 grains.
Distilled water	32 ounces.

No. 2.

Sal soda (crystals)	2 ounces.
Sulphite of soda (crystals)	2 "
Distilled water	32 "

I have also improved the formula, and secured much more clearness in the shadows and improved keeping qualities of the pyro solution, by additions to the former formula, and also avoid the staining of fingers. In rapidity of development for large numbers of negatives at a time, as well as for uniformity of result, this method, in my opinion, is without a rival. The following is the formula as improved:—

Solution No. 1.

Pyrogallie acid	1 ounce.
Sulphite of soda (crystals)	3 ounces.
Oxalic acid	30 grains.
Yellow prussic of potash	1½ ounces.
Meta-bisulphite of potash	120 grains.
Water	20 ounces.

First dissolve the sulphite of soda in the water (heated), then add the oxalic acid, the prussiate and the meta-bisulphite of potash, and finally the pyro, and filter.

Solution No. 2.

Stock solution of sal soda	1 ounce.
Stock solution of sulphite of soda	1 "
Water enough to make 8 ounces of developer.	

The stock solutions of the two sodas consist of one pound to half a gallon of water for each. The development by this process is so rapid that using partly old developer with it does not always restrain sufficiently, so in most cases an addition of a solution of bromide of potassium, before commencing to develop, to Solution No. 2 will be an advantage. For instantaneous exposures this is, of course, not required, and this method of development is especially advantageous for that sort of work. If no older developer is at hand to mix with No. 2, it will be necessary to add some bromide solution, also the first plates will come up too rapid and flat. Old developer (No. 2) is the best to mix with the new. I use one half as much of the old as I make of the new solution. This developer is also extremely economical (though I do not look or care for that), not over one-third the amount of pyro being used as in present used methods. In summer-time it may be necessary, when the solution cannot be kept cool, to add some astringent to the pyro solution to prevent softening of

the gelatine and frilling. In that case I have found bichloride of mercury the best thing to use, being without any effect on the action of the developer, only hardening the film and preventing decomposition. I have used ten grains to the twenty ounces of pyro solution given above, and a larger quantity will not hurt the solution."

Dr. BANNOW in the *Photographisches Wochenblatt* ascribes the rapid destruction of hydroquinone in its solutions to the employment of bad sulphite of soda, which readily oxidises to Glauber's salt (sulphate of soda). He recommends, consequently, the purchase of only good crystals of the salt, as the "weathered" specimens take up oxygen from the air much more readily. If this precaution be taken, alkaline hydroquinone solutions will remain good for months, and even solutions containing potash and soda for several weeks at least.

In our last issue we mentioned the interesting experiment of M. Bloch, in which he succeeded by employing a vessel, one side of which was composed of red glass, in rendering the development of a negative viable to a whole class. Last month's number of the *Bulletin de l'Association Belge de Photographie* gives the formula of the developer which he employed:—

To develop a negative 8 x 8—

Water	200 grammes.
Pyrogallie acid	2 "
Gallic acid	2 "
Acetic acid	4 "
Nitrate of silver	a few drops.

The bath was heated to about 25° (C.) to accelerate the development.

Dr. JESERICH, of Berlin, has recently been perfecting a method by means of which photography has still further been enabled to render assistance to the ends of justice. An action was recently brought against a man and wife of the name of Vogel, before the "*Landesgericht*" at Potsdam, who were suspected of having falsified certain documents. The defendants had in a previous civil action made use of a receipt as evidence. Dr. Jeserich's method succeeded in establishing the fact that the number 5 had in this receipt been converted into the number 56, the number 6 having been found to have been written with different ink and another kind of pen from the number 5. The two culprits were consequently sentenced to six months' imprisonment, during which period, it is hoped, reflection will have convinced them of the value of modern scientific improvements to society at large.

The firm of Ad. Braun et C^{ie}, in Dornach in Alsace, are preparing to add still further to the magnificent collection of reproductions of pictures which they have already published. They propose, namely, to issue carbon reproductions on 145 sheets of the Liechtenstein Gallery in Vienna. They have already published some thirty-six sheets, which are said to reproduce the features of the original in a very masterly fashion.

M. TURSCHLA-SIGNA communicates to the *Bulletin de l'Association Belge de Photographie* a method for giving a good brown colour to platinum proofs. He employs for this purpose a hot solution of neutral oxalate of potash, together with a solution of bichloride of mercury, employing as a developer,—

Solution A.	
Oxalate of potash	295 grammes.
Water	1 litre.

Solution B.	
Bichloride of mercury	5 grammes.
Water	100 cub. c.m.

Solution A is heated to from 70° to 80° C.; one then adds solution B. According as more or less of B is added, tones are obtained varying from a greyish blue to sepia brown.

The school for photographic instruction, established last year by Herr W. Cronenberg at Castle Gronenbach in Bavaria, already numbers some forty students, who have been attracted thither from nearly all the countries of Europe. Instruction is given in all branches of photography, and especially in printing.

CAPTAIN ENOCH HIMLY, who has acquired a high reputation through his experiments on hydroquinone, has been lately making some further trials on the action of that reagent in combination with ferrocyanide of potash. He has communicated some of his results to a recent number of the *Photographische Correspondenz*. He states that an addition of ferrocyanide of potash to the hydroquinone developer acts as a forcer, and is especially remarkable for the way in which it brings out the nuances of the negative. By employing a ten per cent. addition of ferrocyanide he found that an intense colouration of the film was produced, so that the time of development had to be shortened. Employing twenty per cent., and increasing the amount of sulphite of soda in the developer, the colouration

was found to be less intense, showing the action of the sulphite of soda to be antagonistic to that of the ferrocyanide. The fineness of nuance obtained in the case of the former experiment is said to be something astonishing.

The Amateur Photographic Club of Vienna held its thirteenth general meeting last month. Herr Carl Srna discussed the employment of pyrocatechin as a developer, and exhibited some negatives on which it had been employed. The Rev. Mr. Hechler gave a lecture on the light thrown on the early history of mankind by the excavations at Babylon, and in Assyria, Egypt, and Jerusalem. His remarks, which were very well received, were illustrated both by originals and by photographs of cuneiform inscriptions. Herr Seolik exhibited an interesting comparative collection of plates developed by hydroquinone and pyrogallol, as also some photographs of the solar corona, obtained during the recent eclipse of January 1 last. Among the exhibits the greatest interest was excited by the masterly reproductions of woodcuts and engravings which Herr Anton Emile had obtained by the wet process. Some of these which were printed on old paper were absolutely indistinguishable from the originals.

The Photographic Society of Switzerland will hold its next yearly meeting on May 6 next in the Hotel National, Zurich. A lecture will be given by Herr J. Brunner, of Winterthur, on the *technique* of Reproduction, which will be illustrated by exhibits.

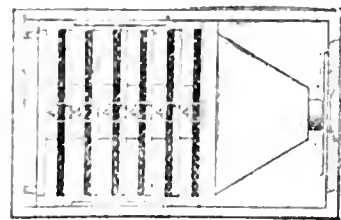
Our Editorial Table.

THE LILLIPUT CAMERA.

By E. & H. T. ANTHONY & Co., New York.

ANOTHER of that small class of portable cameras, which are now becoming very generally demanded in America, is before us. Of very circumscribed dimensions, as shown by the peripatetic artist, at whose side it is slung, it yet contains one dozen plates, all ready for use. True, the plates are not large, being but two and a half inches square, but when the negatives this size are sharp their enlargement to two or three diameters presents no difficulty. Indeed, an 8 x 10 print from one of them which we have received along with several other originals, including the original of that special one, demonstrates the practicability of their bearing a considerable degree of amplification.

The camera is fitted into a neat case, which displays no external feature by which its nature could be guessed at by the public. On opening it the arrangements for holding the plates are found to be very neat. The six double dark slides are pressed forward



by a spring in the rear, and as each slide has a light and a dark top to its shutter the methods of exposing are systematised, so as to prevent confusion when operations have to be conducted under circumstances of pressure, as in a crowded thoroughfare.

Nine dozen sensitive plates are included in the Lilliput outfit, and as the pictures are taken on plates, the manufacturers claim as an advantage for their camera that no novelty in their manipulation has to be overcome by the user, and no danger encountered in any part of the world if not being restocked when the original supply of 108 comes to an end. The lens is rectilinear, and the shutter may work either instantaneously, or, if desired, with time exposures. It is a most elegant little camera, and reflects credit on its designers and makers.

We have before us a new style of developing dish. It is made of seamless steel, and enamelled with white porcelain. A special feature claimed for this dish is that if it were dropped on the floor, it would

not, like glass, porcelain, or vulcanite, be broken. In the bottom of the dish there are two ribs, and also three small cavities sunk in order to allow the easy removal of the plate. The corners of the dish are made at such an angle as to be thoroughly cleaned. It is manufactured by Messrs. Jones Bros. & Co., of Wolverhampton.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 22	North Middlesex Club	The Iron Room, Stroud Green.
" 23	Great Britain (Technical)	5A, Pall Mall East.
" 23	Bolton Club	The Studio, Chancery-lane, Bolton.
" 24	Burnley	Bank Chambers, Hargreaves-street.
" 24	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 24	Burton-on-Trent	The Institute, Union-street.
" 25	Halifax Photographic Club	Mechanics' Hall.
" 25	Liverpool Amateur	St. George's-crescent North.
" 25	Oldham	The Lyceum, Union-st., Oldham.
" 25	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 11.—Mr. A. Haddon in the chair.

The HON. SECRETARY read a letter from Mr. James Matthews, saying that at a future time he had no doubt he could exhibit to the Association some of the Douglass burners; Sir James Douglass had parted with his rights over the burners, and they are now under the control of a company in course of reconstruction.

The HON. SECRETARY next read a telegram from Mr. F. H. Varley, postponing the reading of a paper on *Testing the Speed of Shutters by means of a Siren*.

Mr. J. TRAILL TAYLOR wished to know if any one present knew anything about Mr. Blanchard's platinum process. He added that Mr. Lyonel Clark had worked out a platinum process; then he read the letter of Mr. Clark, which was published in these pages last week.

Mr. ANDREW PRINGLE believed that the first platinum paper introduced by Mr. Willis had silver in it.

The CHAIRMAN thought that such prints as produced by Mr. Clark might be fixed with cyanide of potassium, which would get rid of all the silver in the paper.

Mr. COX saw little advantage in process over the older ones.

Mr. J. J. BRIDGEMAN said that the advantage was in the printing right out; the operator could see what he was doing.

Mr. PRINGLE thought that Mr. Blanchard's process was simply toning by platinum salts.

Mr. TAYLOR said that Mr. Blanchard's process had not been made public, but was to be made known that evening at the Camera Club, no doubt at a later hour; so, if it were like Mr. Clark's, the first publication was at the London and Provincial Association.

Mr. PRINGLE remarked that at that moment it was half-past eight p.m. He thought it double trouble to make a silver print first and then to substitute platinum.

Mr. W. H. HARRISON doubted whether the prints by Mr. Lyonel Clark's process were permanent; he thought that they might consist largely of silver, and that toning was only a surface action. Once, to determine the latter point, he overtook a silver print on plain paper in the acetate gold bath for hours, till the picture was black and cold; then he soaked it for hours in dilute nitric acid, not strong enough to destroy the paper; in the half tones, as the residual silver dissolved, the colour grew warm and pink, resembling the colour of prints by several of the pure gold processes in which he had experimented; in the dark shadows the original blackness was unchanged with the time given in the nitric acid. He thought that prints by Mr. Willis's cold process should be tested for permanency as severely as those by the hot process had been tested.

Mr. TAYLOR remarked that in the burning-in process, in which a platinum image is substituted by toning for one of silver, no silver is left or the burnt image would look yellow.

Mr. COX had found his platinum prints to have a different colour when printed under unvarnished negatives which had been intensified by mercury.

Mr. P. EVERETT asked if any one had tried Dr. Hill Norris's new process.

Mr. PRINGLE said that two of the plates had been exposed on him; in one case the exposure was about the same as for a slow gelatino-bromide landscape plate; so far as he knew, no human being had ever seen the pictures developed on those two plates. The operator said that he sent all plates to Dr. Hill Norris to develop.

Mr. TAYLOR remarked that years ago an American prepared emulsion plates with an excess of soluble bromide, then dipped them in a silver bath as used in the old collodion days.

Mr. PRINGLE had, a few years ago, succeeded in making a collodion emulsion which gave fifteen on the sensitometer, but the emulsion would not keep twenty-four hours.

Mr. J. B. B. WELLINGTON said that collodio-bromide plates treated with erythrosine and ammonia had been made rapid enough to take camera pictures by Hastings's flash light; they had plenty of density.

Mr. A. MACKIE had made a rapid collodion emulsion, but it would give no density.

Mr. TAYLOR had known wonderfully quick plates to be produced by the aid of a preservative consisting of tannin and slightly alkaline gum. He believed the perfection of films, as regards thinness and fineness, to have been produced by Dr. Riley's hot water process, in which albumen was used as a preservative.

Mr. NESBIT said that collodion emulsion could be quickened, as stated by Captain Abney, by adding a few drops of solution of albumen in ammonia. The action is probably due to the ammonia. The films so produced are rotten, but they approach the sensitiveness of gelatine. There is a great difference in organifiers: he had found tannin to be safe and good; decoction of tea is good, but the plates do not keep. From what he had read of Dr. Hill Norris's new process, he thought that it would take up too much time to come into use.

Mr. WELLINGTON exhibited a portion of an unfinished detective camera, and explained the principle on which he had attempted to change plates therein.

Mr. F. P. CEMBRANO, in response to a question, thought the metal "preservers" of Mr. Hughes at the Crystal Palace Exhibition for binding lantern slides to be good, also Hughes's jet for the lantern, with three adjustments for centring the light. He had heard there that Ross & Co. were going to bring out a new lens in which the new Jena glass would be employed. The tourists' cameras of this firm were very compact.

The HON. SECRETARY stated that five or six years ago he was lecturing in Leeds, where Mr. Teasdale showed him some lantern slides he had bound with metal preservers. They might not keep out dust so well as paper binding.

The CHAIRMAN had carefully tried to repeat Mr. Friese Greene's experiment with the eye and a flash light, and had met with utter failure; he wished that Mr. Greene would give the Association some more information on the subject.

Mr. W. BEDFORD asked if the experiment could not be tried with an artificial eye.

Mr. TAYLOR said that the eye of a recently-killed ox might be tried.

The CHAIRMAN stated that the animal must be killed in absolute darkness for the purpose, or the visual purple of the retina would be first bleached.

CAMERA CLUB.

APRIL 11.—Sir George Prescott in the chair.

Mr. VALENTINE BLANCHARD gave an address and demonstration in reference to his platinum toning method. He referred to the serious difficulties attending ordinary platinum methods of printing, particularly for artistic work, where it was so necessary to see the printing throughout. He then described his method of toning the plain salted silver paper with his special toning solution, and went through the actual work, handing round the prints in the condition as taken from the frame, and at different stages in toning, and before and after fixing. The processes generally were the same as ordinarily used with gold toning. Mr. Blanchard recommending a warm toning bath and rather concentrated solutions. Additional interest was given to the demonstration by the exhibition of a large number of pictures printed and toned by the process, chiefly from collodion negatives. These showed in most cases a vigorous black colour.

On Thursday, April 25, Mr. Seyd will read a paper entitled *An Old Printing Process Revived*.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

APRIL 10.—An application for assistance was made, with the result that the amount asked for was granted. The correspondence having been dealt with, it was reported that the action taken re the contributions to the proposed Orphans' Fund had resulted in the following amounts being transferred to the General Fund:—*Photographic News*, 21*l.*; H. M. Smith, Huddersfield, 10*l.* 10*s.*; F. York, 5*l.*; F. Bedford, 2*l.*; W. Bedford, 2*l.*; R. & J. Beck, 1*l.* 1*s.*; and C. E. Elliott, 10*s.*

WEST LONDON PHOTOGRAPHIC SOCIETY.

APRIL 12.—The President in the chair.

Mr. CHARLES WHITING read a paper on *Lantern Slide Making*. The lecturer, in the course of his opening remarks, said he wished to impress upon his hearers the necessity of being exact with their formulae, clean in their manipulations, and, further, not to be disheartened by failures; there was more to be learnt from one failure than from a great many successes. Working by the wet collodion process, it was necessary to resort to reduction in the camera, and, in order to work with comfort, a suitable copying apparatus was necessary. He said he had made some rough experiments in toning by first converting the silver image into iodide of silver by means of a solution of iodine and iodide of potassium, afterwards treating it to a bath of sulphuret of ammonia; this changed the colour to a chocolate brown. He then proceeded to explain and demonstrate the production of lantern slides by the Woodbury process. In the matter of masks, it was advisable to suit the shape to the subject, more artistic results being then obtained. He then gave a practical demonstration of the production of a lantern slide by the wet collodion process, the development being effected by placing the exposed plate in a non-actinic glass tank in the optical lantern.

On April 26 a demonstration on *Enlarging* will be given by Dr. Harrison Low and Mr. John A. Hodges.

UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

APRIL 9.—Dr. R. T. Plimpton in the chair.

Dr. H. FOSTER MORLEY read a paper on *Hydroquinone and its Uses as a Developer*.

After some reference to the discussion which has been carried on in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY relative to hydroquinone and the supposed great differences between samples from different sources, Dr. Morley proceeded to point out that while benzene C_6H_6 is a very stable substance, the more oxygen introduced into its molecule, the more prone is the product to oxidation. Mono-oxy-benzene C_6H_5O , known as phenol or carbolic acid, has but little reducing power; the three di-oxy-benzenes—resorcin, hydroquinone, and pyrocatechin, all of which have the formula, $C_6H_4O_2$ —have considerable reducing power, whilst tri-oxy-benzene $C_6H_3O_3$, or pyrogallol, possesses this quality in a remarkable degree. The reactions of these bodies with ammoniacal solution of silver nitrate and ferric chloride were then described and illustrated by actual experiment with the former.

Resorcin gives no precipitate; but on boiling, reduction takes place, and a black precipitate of metallic silver is thrown down. Hydroquinone gives a greyish-white precipitate, changing on boiling to black metallic silver; whilst pyrocatechin and pyrogallol acid instantly precipitate metallic silver from ammoniacal solution, even in the cold. The reactions with ferric chloride are even more characteristic, hydroquinone gives beautiful dark needles of green hydrate and an odour of quinine, resorcin gives a purple colour, pyrocatechin a green colour, and pyrogallol a violet colour, instantly changing to reddish-brown. Pure hydroquinone may be recognised by its melting-point, which is stated to be 169°C ., but which in a very beautifully crystallised sample was found to be 167°C . A sample which had been kept in the dry state for about six years was found to melt at 168°C ., showing that it was practically unchanged. Hydroquinone may be burned on a platinum spatula without leaving any residue, not even carbon. This test will at once reveal the presence of sodium sulphite and other possible impurities. The purity of hydroquinone may also be tested by a decinormal solution of potassium permanganate. If six milligrammes of hydroquinone be dissolved in fifty cubic centimetres of water (distilled), four c.c. of strong sulphuric acid be then added, and the liquid heated to boiling, 11.3 c.c. of permanganate must be added before the pink colour becomes permanent. This quantity corresponds to a consumption of eight atoms of oxygen by each molecule of the permanganate. As regards development by hydroquinone, Dr. Morley maintained that, unless an alum bath be used, there is great risk of local staining during the progress of drying. He recommended its use both before and after fixing. The developing solution might be heated to 30°C . with advantage, but a higher temperature is attended with considerable risk of blistering. Twenty-four grains of hydroquinone were found to be sufficient to develop four whole plates in succession; plates so developed were shown and were pronounced very satisfactory.

In the discussion which followed, Mr. J. T. LEON said that he had made similar experiments with permanganate to those described by Dr. Morley, and had arrived at substantially the same results. As to the use of the alum bath, he was of opinion that it was sufficient to use it after fixing.

Mr. NORTH had observed this tendency to ink stains on negatives developed with hydroquinone, but had always attributed them to an insufficient quantity of developer; very similar stains were produced in ferrous oxalate development.

Mr. GUNN had observed, in making enlargements, that one corner of the paper was almost invariably stained, and after much investigation had discovered that it always occurred at the corner of the dish from which the developer was poured off, and was presumably due to the action of old developer which had crystallised at that corner, for, on carefully washing the dish after each operation, the stains no longer appeared; possibly the staining by hydroquinone might have some similar explanation.

Dr. MORLEY having replied, the meeting adjourned till Tuesday, May 14, when the Secretary will read a paper *On the Application of Photography to Book Illustration*.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

APRIL 12.—Mr. L. Warnerke in the chair.

The CHAIRMAN addressed the meeting as to the necessity of making the Society a really strong one, and on the manner to accomplish this end, giving them some good, sound, practical advice.

A portrait taken by the flash light, the work of Mr. Herlert, one of the members, was handed round, and met with general approval, it having been taken by a lamp of his own construction.

Mr. WARNERKE kindly consented to take the chair at the next meeting, which will be held at Mr. Seaton's Music Warehouse, 76, Peckham-rye, on Friday, May 3, when he has promised to explain flash light photography, and also to give other interesting communications to the Society.

Gentlemen, both amateur and professional, are invited to attend.

BRIGHTON PHOTOGRAPHIC SOCIETY.

APRIL 9.—The President (Dr. Bean) in the chair.

Mr. D. E. CAUSH read a paper on *Bromide Printing*, which dealt with the subject in an exhaustive manner, and was illustrated by several prints developed by the ordinary ferrous oxalate developer and also with hydroquinone. Mr. CAUSH also passed round several fine enlargements of microscopic subjects.

At the conclusion of the paper an animated discussion ensued.

IPSWICH PHOTOGRAPHIC SOCIETY.

APRIL 9.—The occasion being a lantern night there was a large attendance. Nearly two hundred slides, sent in by Messrs. Cash, Booth, Edwards, Fry, Orchard, Pringle, Read, Vick, Wiggan, Woolcock, and Younger were projected, and showed a decided improvement over those exhibited at the first exhibition in December last.

The first outdoor excursion of the season is fixed for Saturday, May 11, and will be to Holbrook.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

APRIL 11.—Mr. W. Jerome Harrison, F.G.S., in the chair. There was a large attendance.

The meeting was made special for the purpose of a lantern display by the Lantern Committee of the slides lent by the Birkenhead, Liverpool, and Ulster Societies. They were shown on a twelve-foot screen by powerful lanterns, and, with few exceptions, proved very fine slides. They were much appreciated and gained much applause.

The CHAIRMAN announced the subject (*Cameras and Appliances*) for the next meeting.

BRADFORD PHOTOGRAPHIC SOCIETY.

APRIL 9.—The date for sending in pictures to the forthcoming exhibition was fixed for June 3, the exhibition to be opened on June 6, at the Art Museum, Darley-street. Prizes will be given, consisting of silver and bronze medals, in each of the eleven classes.

After the ordinary business was concluded, the members adjourned to the laboratory, where a lantern slide exhibition was held, at which one hundred and fifty slides, made by the members, were shown.

Two specimens of psychic photography were shown by one of the members, discussion on which was adjourned until the next meeting.

Secretaries of other societies will please note that the Hon. Secretary's address is Mr. Walter Leach, 50, Godwin-street, Bradford.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

APRIL 11.—The President (Mr. Paul Lange) in the chair.

Messrs. H. Cockburn, W. H. R. Kerry, F. Hope-Jones, and C. J. Turton were elected as members.

Mr. J. A. FORREST read *A Quarter's Resumé of Photographic Progress* [see page 270]. Mr. Forrest also exhibited some stereoscopic pictures and apparatus.

Mr. H. Wilkinson exhibited a single dark slide which found favour amongst the members, its weight not exceeding two ounces.

The PRESIDENT then announced that Mr. Walter Wilkinson would read a paper on *The Art of Retouching*. [This will appear subsequently.]

Mr. WILKINSON then passed a 10×8 negative round with two portraits on, both being of the same person and exposed alike; he stated that one he had retouched so that the members might see both side by side, and also see the advantage of retouching in portraiture. In reply to a question, Mr. Wilkinson stated that he used turpentine and resin as a medium for his negatives.

On the proposition of Mr. Paul Lange, seconded by Mr. J. H. Day, a hearty vote of thanks was tendered to Mr. Wilkinson for his excellent paper.

Mr. JOHN HARGREAVES, F.R.H.S., then gave a very descriptive account of the slides *Illustrated Boston*, which were shown on the screen, the slides having been made by the members of the Boston Camera Club.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

APRIL 9.—Mr. H. R. Procter in the chair.

Mr. G. Proud was elected a member.

Mr. M. Auty exhibited a home-made hand camera to take half plates, which was much admired.

Mr. J. P. GINSON read a paper on *The Intensification and Reduction of Negatives*.

A discussion followed.

The outdoor meetings for the season were arranged as follows:—Richmond (Yorkshire), Wooler and district, Warkworth, Staward-le-Peel, and Castle Eden.

HASTINGS AND ST. LEONARDS PHOTOGRAPHIC SOCIETY.

APRIL 9.—Mr. W. Thomas gave a clever exhibition of photo-micrographic slides, accompanied by some valuable descriptive observations. Afterwards there was a lantern slide competition, Mr. A. Brooker having offered a prize, consisting of a gross of lantern plates, for the best four slides, to be the sole work of the exhibitors. The award was secured by Mr. Thomas, jun. (the audience being the judges), and as Mr. Pierson, another member, ran Mr. Thomas

so closely, in the opinion of those present, Mr. Brooker announced that he should present another prize to the gentleman mentioned. Some miscellaneous pictures were then shown on the screen, among them being subjects by the Rev. — Macdonald (Norwegian views) and the Rev. A. B. Cotton, who has recently returned from a trip abroad, and has brought with him further evidences of his photographic and artistic skill.

It was announced that at the next meeting, May 7, Mr. H. F. Bultz will read a paper on *Instantaneous Photography*.

SOUTHPORT PHOTOGRAPHIC SOCIETY.

On Monday evening the President, Mr. Benjamin Boothroyd, and Mrs. Boothroyd, gave a *soirée* to the members and their friends in the Hall of the Y.M.C.A. The gathering was a most successful and enjoyable one, there being about eighty guests present. A capital programme, consisting of "picture, song, and story," was gone through, Mr. Nichols, of the Liverpool Photographic Society, being loudly encored for his original "Photographic Song."

A short address was given by Mr. BOOTHROYD, in which he congratulated the members upon the success of the Society up to the present, and hoped that the year upon which they had just entered would be even more successful.

The latter part of the programme consisted of a lecture by Mr. EARL, of the Liverpool Photographic Society, entitled, *Shots with a Detective in Belgium and Holland*, illustrated with limelight views.

DERBY PHOTOGRAPHIC SOCIETY.

APRIL 9.—Mr. R. Keene presiding.

Mr. E. J. LOVEJOY (Hon. Secretary) gave a demonstration on *Developing and Intensifying Gelatino-Bromide Plates*.

The first outdoor excursion of this season is arranged for April 27 to Ashby-de-la-Zouch, when the members of the Nottinghamshire Association will meet the members of this Society.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

APRIL 11.—Mr. George Bankart in the chair.

Three members were elected.

Mr. PICKFORD gave notice of his intention at next meeting to offer a silver and bronze medal for enlargements, to be competed for by the members.

Mr. THOMAS SCOTTON, of Derby, gave a demonstration on bromide printing and transfer to opal. Mr. Scotton thoroughly established the transferotype

in the estimation of the members present. Mr. Scotton afterwards exhibited several magnificent enlargements.

At this meeting the bronze and silver medals were presented by the President to the successful competitors at the late exhibition of prints and lantern slides, namely, Messrs. George Bankart, W. T. Tucker (2), J. Porritt, A. W. Wilson, and W. Taylor.

PHOTOGRAPHIC SECTION OF THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE.

THE first meeting of this Section was held on the 8th instant,—Dr. F. B. White, F.L.S., in the chair. There was a good attendance.

The CHAIRMAN explained the connexion of the branch with the parent Society and the scope of its work. He expressed the hope that much would be done in elucidating the geology and topography of Perthshire by the members of the Section.

He then introduced Mr. FREW, F.C.S., who read a paper on *The Printing Processes*, which he illustrated by numerous specimen prints. He referred in turn to the ordinary silver print, the newer bromide paper, the autotype, the platinotype, and cyanotype processes, and pointed out the characteristics of each.

A reference by Mr. Frew to the work done by Mr. Blair, a Perth man, in perfecting the autotype process, led to an animated discussion on the claims of that gentleman as an inventor.

A limelight exhibition followed, the slides exhibited being the work of Dr. Urquhart, Messrs. R. D. Pullar, Frew, Munro, and Ellison (the Hon. Secretary). For the purpose of illustrating Mr. Frew's paper, a collection of prints by the various processes was kindly lent by the Autotype Company, the Platinotype Company, the Eastman Company, and Messrs. S. Fry & Co.; and also engineering plans and drawings by Mr. Reid, of University College, Dundee.

Correspondence.

Correspondents should never write on both sides of the paper.

APRIL MEETING OF THE SOCIETY.—DONATION OF VALUABLE PAPERS.—THE GAILLARD PRIZE AT LAST AWARDED, OR PARTIALLY SO.—DONATION OF PHOTOGRAPHIC MANUALS BY MM. GAUTHIER-VILLARS & SONS.—A NEW PANORAMIC CAMERA.—M. DARLOT PRESENTS A PORTABLE CAMERA.—A RESULT OF EXPERIMENTS BY M. TONDEUR.—M. LANSIAUX PRESENTS A CAMERA.—PROOFS "IN NATURAL COLOURS."—A NEW VARNISH.—A RAPID SHUTTER.—COMIC SCENES, ETC.

THE Photographic Society of France held their monthly meeting on Friday evening last, the 5th instant, M. Davanne in the chair.

M. Rolland, grandson of M. Carpentier, personal friend of the celebrated Daguerre, made a donation to the Society of different writings relating to the inventor of photography and to his personal acquaintances.

M. Audra read the report of the commission which was named to award the Gaillard Prize. It may be remembered that this gentleman offered 500 francs to any one who could invent an original process for printing positives rapidly. One person only came to the front, and presented the well-known gelatino-bromide process by development. The commission in their report agreed that the process, though giving very good results, did not merit the prize, but agreed that it would be well to award M. Thiebaut 300 francs as an encouragement.

MM. Gauthier-Villars & Sons made a donation to the Society of several works on photography. I shall have the occasion on my return to Paris to give an account of them.

MM. Benoist & Sons presented a new panoramic camera. It turns upon its axis, during which movement the sensitive plate passes behind the lens, and the impression is thus regularly received. The size of the plate is 18 x 50 centimetres. The prints submitted to the inspection of the members were very large, but presented distorted lines and other faults, which perhaps may be eliminated by practice. Two other apparatus were exhibited by the same gentlemen, one being a stereoscopic camera.

M. Darlot, the well-known optician, presented a half-plate camera, its great value being its taking up very little room and very light for tourists.

M. Tondeur informed the Society of the result of some of his experiments in endeavouring to develop during exposure. "I saturated a plate," said he, "with hydroquinone, placed it in a dark slide, and exposed it in the camera. If sufficient exposure be given the negative can be completely developed during the exposure, if insufficiently exposed the plate must be allowed to remain until all the details have been brought out."

M. Tondeur presented a kind of "minocle" or eye-glass, but instead of being of a transparent substance it is made of ebonite. In the centre is a very small hole. He says that by placing this kind of disc before the eye one can judge of the colour of the rays of light, and their actinism can be, as it were, seen, and thus the time of exposure more accurately determined. "One morning," said he, "I was in the street with one of my colleagues, and wished to take an instantaneous view. The light appeared to us very good and suitable. I put the little instrument to my eye, and the light now appeared of a yellowish tint; the faces of the passers-by took a reddish colour. I had not yet sufficient faith in the instrument, and I determined to take a shot. The result was deplorable.

On another occasion the light appeared to me too dull; I put the apparatus to my eye, and was surprised to see that the surrounding objects appeared of a bluish-white tint. The plate was exposed, and a magnificent, fully exposed negative was the result. I must say that I should never have dared to expose a plate in such a light had it not been for the instrument which I now present to the Society."

M. Tondeur intended to exhibit a new rapid shutter, but was desired to postpone it until the next meeting.

M. Lansiaux presented a small hand camera, which he has designated "Photo Express." This camera has attached to it a changing box, so arranged that the twelve plates it contains can all pass behind the lens in less than two minutes. This will indeed be very useful for those who make instantaneous views.

M. Vallot presented a number of proofs "in natural colours" obtained by light, by, said he, the process of Poitevin. All that I can glean is, that after having obtained a coloured image by a prolonged contact under a coloured substance, M. Vallot has succeeded in making the colours obtained a little more durable by an immersion in a bath of sulphate of quinine and a little of the tincture of saffron.

M. Schaeffner presented a new varnish, which offers, says he, many advantages over the old:—1st, It is perfectly transparent; 2nd, The negative need not be dried nor heated; 3rd, No loss of liquid, as the solution can be used over and over again; 4th, It takes the pencil and all kinds of retouch; 5th, It is not superficial, but enters the pores of the negative. This varnish he calls "Hydrophile." It has the advantage of never cracking when dry.

M. Carguero presented a rapid shutter with which a great variety of exposure can be given. Its best feature is that it is small, and takes the place of the diaphragma.

MM. Balagny and Coppeaux presented a great number of proofs representing laughable scenes. These comic pictures obtained great success. One picture represented a farmyard, the milkmaid about to draw water from the well. She appears not to be able to do so, the bucket of water being too heavy, and is seen calling for aid. In the second, a soldier assists her, and is seen pulling at the cord. The bucket will not rise. In the fourth, another servant assists them, and the three are pulling with all their might and main. In the fifth, the whole three are on the ground, the cord having broken. Many such subjects were exhibited and created merriment.

The meeting separated rather late.

PROF. E. STEBBING.

Rome, Italy.

PREVENTION OF YELLOW STAINS.

To the Editor.

SIR,—In the JOURNAL of 23rd September, 1887, I published a formula with the addition of sal ammoniac to the carbonatis. I have also used it with ammonia to advantage. I have lately tried caustic potash, which is generally regarded unfavourable to pyro development, and find with the plates I use (Ilford) to give negatives equal to ammonia without the objectionable fumes, &c., and equally quick in development.

FORMULA.

Caustic potash (sticks)	4 grains.
Sal ammoniac (ground)	4 "
Bromide ammonia	½ grain.
Water	1 ounce.
Pyro (dry)	2 grains.

—I am, yours, &c.,

Southport, April 13, 1889.

J. C.

GELATINE PLATES FOR LANTERNS.—A QUERY.

To the Editor.

SIR,—A question has arisen as to the date of the commercial introduction of LANTERN plates. By lantern plates is meant thinly coated gelatine plates, 3½ x 8½. My recollection of the matter is that they were first introduced commercially in the winter of 1884—this opinion is supported by advertisements and other evidence. On the other hand, one maker claims to have introduced them in 1880, while another party says that they were in the market seven years ago. As the question of who first had the credit of introducing lantern plates commercially might as well be settled, I would feel obliged by the expression of the opinion of some of the readers of your valuable JOURNAL on this question.—I am, yours, &c.,

J. M. TURNBULL.

6, Rose-street, Edinburgh, April 15, 1889.

PHOTOGRAPHING IN FRANCE.

To the Editor.

SIR,—I have observed that there occasionally appears, from some of your correspondents, a species of onslaught against France and on us French; I mean, of course, as regards photography. It is only the other week when it is averred that one man was obliged to leave Brittany alone, and another advised the photographer to leave France and Germany alone. Why? Because he had some imaginary trouble with the Custom House. I say all this is mere bosh, and nobody would lose anything by leaving it untold. Of course you are right when you say that all should be said for and against, and let the public be judge and

make up his mind; but then why, yes why, do you allow always remarks against France to pass, and nothing in favour of it?

Now, please be fair, and state, after reading carefully *THE BRITISH JOURNAL OF PHOTOGRAPHY*, what country would you go to, and what would you avoid? My experience, after reading such, would be to stay at home. Is this your idea of what would be really advisable? Your correspondents in later issues say, avoid France, Germany, and Norway, and so on about every country in Europe, except England. Will you please also note my own experience in free and defectless England. When I came over once I had two dozen plates with me unexposed. I had all kinds of trouble and fuss with Custom-house officers at Charing Cross, London, to be allowed to pass without opening them. Had I not been conversant with the English language, I have no doubt they would have been opened. Next, two years ago I made an extensive tour in Europe, and from Brussels I sent to Messrs. Wratten & Wainwright (they can swear to it) a box of six dozen exposed plates. I marked them as sensitive to light, and inside of box wrote an extensive label explaining the contents, and asking not to have them opened (the plates) except before Wratten & Wainwright. Nothing did help, and one dozen was opened, and, of course, spoiled. Now, my say is, and I have as much right to it as your other correspondents, I say, emphatically, *avoid England*. What next? Where is a man to go if he reads *THE BRITISH JOURNAL OF PHOTOGRAPHY*? Avoid everything is said therein; protests have no show.

Here is what I would say. Avoid no country, but make up with every country's customs, specially so if you are ignorant of its language, and do not think that because you are *English* you necessarily must pass free everywhere, and have less trouble than the inhabitant of such country himself has. I have travelled a great deal you know, and my experience is as follows:—England: my experience was as above; in case of need I would go there again anyhow. Belgium: I found very easy to get plates through Custom by explaining matters. Holland: the plates are opened at frontier of country, and if you are not there you are bad off. Take your plates along with you, but do not avoid Holland for that. France, Germany, Austria, Switzerland, and Italy are all very easy to pass at the Custom House or at the frontier, provided you explain politely to the official how matters stand. I have no difficulty whatever in those countries. I must, however, add that I spoke the different languages of these countries, and this made of course matters easier. I would say here that in most cases, if not all, you can find in the different cities you go to in Europe (Continent) *some one* speaking English or French; and let me tell you this is more than you can say about England, where you cannot find at a station and most of the hotels, small or big, probably one party speaking French or German out of one hundred. English is spoken at Calais, but I never heard any one speaking French at Dover or London, for that matter, at the stations. However the case may be before starting, an Englishman expecting some trouble with his plates can have a friend (learned) write for him—in the different languages of countries he intends to visit—on a card the different objections to opening the packages, and this would probably settle most, if not all, difficulties. Now, I intend to bring this matter, if possible, before the French Societies here, and have this systematical *avoid France* ventilated somewhat; and when Englishmen do come over, this matter can be talked about specially, that foreigners will be cordially welcome here during the exhibition, and maybe these very *avoid France* will be foremost in accepting the invitations. Hoping again for fair play—I am, yours, &c.,
A. LEVY (Paris).

TRANSPARENCIES WITH ORNAMENTAL BORDERS.

To the Editor.

Sir,—I am much obliged to Mr. John Robertson for his kind wishes, and am interested in hearing of his experiments of eighteen or nineteen years ago. But let me hasten to assure him that there is nothing in my patent to prevent him producing "such pictures," so long as he continues to confine himself to *collodion*. If Mr. Robertson will kindly read the specification again, he will find that the claim is made for the use of *gelatine emulsions* only.

I of course knew nothing of Mr. Robertson's experiments, and had some idea of making a wider claim; but remembering the indefatigable industry of innumerable workers during the long reign of *collodion*, I thought it only too probable that from some "repository of exploded ideas" might come some ancient relic to drop upon me "like a ton of bricks." As, moreover, plates coated with *gelatine emulsion* were the only ones likely to be of me of commercial value, I restricted myself to the use of that material. Whether silver images in *gelatine* are or are not permanent when exposed to sunshine is a question I will not attempt to argue. It has already been pretty freely discussed in your columns.—I am, yours, &c.,
WM. J. WILSON.

Editing, London, W., April 13, 1889.

"SWEATING."

To the Editor.

Sir,—In your issue of April 12, I notice the letter of "Fair Play," calling attention to the above subject; but he will perhaps not be surprised when I tell him that in our district (Huddersfield) we have not

only a great many who supply *cartes-de-visite* at half-a-crown per dozen, but we have one in particular who is crowding the country with them at 1s. 3d. per dozen, and this has been going on for some years past.

"Fair Play" says they will hurt the profession in the future; but they hurt it now, and very much so. He also asks, "Can some one suggest a remedy?" I can suggest one which I think would help it a great deal, but perhaps it would not altogether stop it—that is, the abolition of Sunday work. A few miles from here, not long ago, a photographer was summoned and fined for opening his studio and taking photographs on a Sunday, so there must be a law against it, or they could not have fined this man. A fortnight ago I was on a visit to a friend at Hull, and there, the Sunday through, in one of the main streets, two or three men stood touting to every passer-by, people going to the different places of worship, and the most surprising thing to me is that these people do not inquire into it. If they did I think they could have it stopped. I enclose you a price list certifying to the accuracy of these charges, or your readers might think I was stretching it a little. Hoping to hear something further said upon the matter—I remain, yours, &c.,
DHARWAR.

April 15, 1889.

[Price list referred to has been received.—Ed.]

FLASH LAMPS.

To the Editor.

Sir,—I observe a notice in your *JOURNAL* of the 12th instant, page 260, wherein are these words: "Connecting pieces are also supplied by which two or more lamps may be ignited simultaneously." Such a direction-post may lead your readers to a bog, wherein they are likely to soil their reputation and upset their finances. To enable them to avoid such, allow me to quote from Patent, No. 356, 1888. The sixth claim is as follows: "In flashing lamps the combination of the multiple distributor, with air or gas under pressure, for producing two or more simultaneous flashes of light." The method recommended (in the same notice on page 260) for igniting the magnesium—also a species of plagiarism—I can leave to whosoever it may concern; but I should be surprised to learn that any one would reclaim or dispute with Mr. W. England the authorship of such an ambitious application for oxydising a metal as that of mixing it up with *heated hydrogenous vapour* or gas.—I am, yours, &c., F. W. HART.

P.S.—In looking through the same number of the *JOURNAL*, I notice Schirm's specification has a like misleading paragraph relating to distribution.

CRYSTAL PALACE EXHIBITION.—A CORRECTION.

To the Editor.

Sir,—In the list of awards published in the *JOURNAL* of April 5, amongst the Special Medals, I find my name given as "G. Gillard, Glasgow." It should be W. Gillard, Gloucester.—I am, yours, &c.,
W. GILLARD.

The Studio, Clarence-street, Gloucester, April 15.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Whole-plate rolling press, hot, offered in exchange for studio accessories.—Address, W. T. SMITH, 29a, Bold-street, Liverpool.

World type writer, value two guineas, for whole-plate dry plates.—Address, PHOTO, 4, Latham View, Wright-street, Egremont, Cheshire.

Will exchange Victoria camera with four lenses for first-class cornet, Besson's preferred.—Address, W. S. POOLSON, 30, Great Jackson-street, West Gorton, Manchester.

Wanted, apparatus and studio furniture, &c., whole-plate tourist camera, not less than three double dark slides, portrait lenses (Lerebours' or other maker's), posing chairs, &c.—Address, PHILLIPS, Oxford House, East Croydon.

Will exchange quarter-plate portrait lens and quarter-plate bellows-body studio camera by Lerebours & Secretan for half-plate portrait lens by same makers.—Address, W. CHADWICK, 82, Spring Bank, Higher Blackley, near Manchester.

Eight-inch burner with three feet india-rubber tubing, light background (cloth) on roller, portable head rest (nickel-plated) for use on ordinary chairs, all in good condition; will exchange for good wide-angle lens, half-plate.—Address, W. G. O., 33, George-street, Chesham-hill, Manchester.

JOURNAL ALMANACS, 1885-1888; News Almanacs, 1884-1888; American Annual, 1888; forty-one BRITISH JOURNALS, 1885-1889 (various); one hundred and eighteen *Photographic News*, 1884-1888 (various); fifteen *Photographer's Worlds*. Exchange for Ilford dry plates to value.—Address, S. WILLIAMS, Portrait Rooms, 181, Brighton-terrace, Hartorne.

Owing to our publishing one day earlier, several announcements and reports received too late must stand over till next week.

INTERNATIONAL AND INDUSTRIAL EXHIBITION, YORK.—We remind our friends who intend to exhibit photographs and apparatus that all applications must be sent in by the 5th, and all pictures delivered carriage paid before the 25th of May. Neither Oxford nor oval frames will be admitted. Application must be made to Mr. Joseph Davis, General Manager.

Answers to Correspondents.

•• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co., 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPH REGISTERED:—

J. Somme, jun., Oxford.—Photograph of a boy dressed in academical cap and gown, with two bulldogs, entitled "The Proctor."

STARK.—The payment of fare is purely a matter of arrangement.

R. L.—It is quite true that flash-light photography was tried in 1865.

M. M.—The negative has evidently been fogged by light entering at the end of the dark slide.

SHIKABE.—If your solicitor will write a letter to the firm it will probably have the desired effect.

FRITZ.—A six and a half inch condenser will be quite large enough for enlarging from a five by four negative.

RAPID.—If your flap shutter attracts the attention of children in the studio it can be fitted inside of the camera.

A. G.—We are unable to institute comparisons between the three lenses mentioned, as we only possess the one already described.

IMITATIVE.—To obtain a gloss on an unmounted print, pass it through a burnisher in conjunction with a sheet of cardboard.

T. writes: "I find that when a blue print comes in contact with ammonia it turns violet. Has this ever been published?"—Yes.

G. SINCLAIR.—Strengthen your alcohol by shaking it up with dry carbonate of potash and decanting the upper portion of the liquid.

SULLONE.—The Zentmayer photographic objective was introduced in 1886. It is a doublet of two simple crown-glass lenses, but of an unusually deep meniscus form.

B. (Tottenham).—Neutral chloride of copper can be made by dissolving the black oxide of copper in hydrochloric acid and the solution evaporated and crystallised.

PARSON & RAF write: "Can an 18×16 negative of a landscape be taken with a single lens? and, if so, what focus should it be?"—Yes; about twenty-six inches focus.

JAMES S.—1. The bottle came to hand; the name on it is done by means of the sand blast.—2. No, it is done after the bottle is made; any piece of glass can be lettered in the same way.

LEONARD WILKINS.—The negative has been returned. You can easily intensify the particular portion spoken of by mixing Judson's yellow dyes with gum senegal and applying it by means of a small brush.

WM. BETTS, JUN., asks what is the correct way of mounting stereoscopic pictures, the edges of the prints touching or by leaving a small space between them?—Trim the prints so that when mounted a small space intervenes.

W. C. J. sends some plates with wave-like markings on them, and inquires the cause.—The markings are due to uneven drying. If, when the plate begins to dry the drying be arrested, marks such as those shown are sure to be produced.

R. B. BULL wishes to know "which is really the best artificial light for portraiture, the electric or the magnesium flash light?"—Good portraits can be produced by the flash light, but for general studio purposes the arc light is infinitely superior.

ONE IN DOUBT.—If you have made use of any words imputing fraud to the tradesman in the transaction of his business an action will lie, even although no proof of special damage be forthcoming. To save trouble, you should at once tender an apology.

B. M. asks: "Where can I obtain a compound frame for negatives of various sizes, as shown on page 126 of Hepworth's *Book of the Lantern*? I cannot find one in any catalogue."—Such frames are not usually kept in stock, but have to be made to order.

J. E. WOOD asks which are the best pencils to use in retouching negatives, and by which maker.—The pencils most in use by retouchers are H, HH, up to six Hs. Sometimes a softer pencil, such as B or HB, is used, but very rarely. Many people prefer Hardtmuth's leads.

POTASH sends specimens, and would like to know if he has any chance of being taken as assistant at a moderate salary, 15s. or 17. per week. He does not know very much about portraiture.—The specimens are excellent, and doubtless many would be glad of his services at the price mentioned.

M. D.—There is nothing extraordinary in the print you send. The fact that it has bleached on that portion which has been exposed to the light, while that part which has been protected by the ink has retained its pink tint, is well known. The pink tint of all albumenised papers will be discharged by exposure to light.

NOVICE.—Proper lithographic transfer ink may be obtained from Winstone & Sons, Shoe-lane. It will be far better for you to purchase the small quantity that you will require than to attempt to make it yourself. Moreover, you will be sure that you have the right thing, so that you cannot attribute your failures, if you meet with any, to the ink being at fault.

X. Y. Z.—1. By selling the lens without any name no risk whatever is incurred; but if you engrave your own name on it without stating that it was made abroad you are liable to be proceeded against.—2. During the probationary period of a patent no manufacture can legally be marked as "Patented," but it is lawful to mark it as "Patent applied for."

R. WILMORA writes as follows: "I have a quantity of gold bead frames which have turned quite black in places. Can you tell me how to regild them, or is this an operation that is too difficult for a novice to undertake?"—The frames in question are doubtless common German bead, which is simply the moulding covered with silver foil and then lacquered. New bead is so cheap that it will not pay to do anything in the way of restoration to the old.

OPTICIAN.—1. We are not yet in a position to give plain working directions for staining brass black by the copper process, but enough has been already published by us to enable any one to work out details in practice for himself.—2. It is quite true that a solution can be prepared by which a black colour can be imparted without heat, a fact we have many times proved, although we have not yet got the process formulated quite so nicely as we desire.

A. J. C. says he has been sensitising some paper according to a formula a friend gave him of ten grains of citric acid to each ounce of a forty-grain bath. The paper, he says, keeps white for a long time, but it will not tone beyond a red colour with the acetate bath. He asks what toning bath will yield a browner tone.—There is always a difficulty in toning paper prepared in this way, whatever bath be employed. The best plan is to immerse the prints in a weak solution of common washing soda, say a crystal the size of a walnut in three or four pints of water, prior to toning. When this is done the prints are usually more amenable to the toning solution.

AN OLD PRINTER complains of mealiness and blue staining in his prints. Notwithstanding that he used different samples of paper, new toning baths made with different chemicals, and ringing the changes in various ways, the evil still exists. From the above information it would appear that the trouble arises solely from something in the manipulation. But what, it is impossible for us to indicate unless we saw the work in progress. One or two of the prints enclosed appear to have been toned in too strong a light, hence the whites have become degraded. May not too strong a light during the washing and toning of the prints really be at the root of the evil?

DATIVES writes: "I should feel obliged if you would kindly give me a few hints on carbon double transfer from flexible support to opal. I have been using gelatine rendered partly insoluble with chrome alum for immersing the opal before bringing the transfer paper into contact with it. After squeezing very firmly, I allowed the opal and support to dry, but when I attempted to separate the two some portions of the film refused to leave the support. I used the Autotype waxing compound—resin, three drachms; beeswax, one drachm; turpentine, ten ounces—for the support. Kindly tell me the proper proportion of gelatine and chrome alum to be used for the last transfer to the opal."—The difficulty appears to be due to the support being insufficiently waxed. Sometimes, however, if the print is over printed, and very hot water used in the development, there is a difficulty in transferring, particularly if the support is imperfectly waxed. In future, after treating the support with wax allow it to stand for half an hour or so and then wax it again; you will then, doubtless, experience no further trouble. For transfer solution: Nelson's photographic gelatine, one ounce; water, half a pint; dissolve, and add eighteen grains of chrome alum in two ounces of warm water.

RECEIVED.—No. 1, *Ueber Aehnlichkeit*, Weimar: Verlag der Deutschen Photographen-Zeitung (K. Schlier).

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, April 23, at 5A, Pall Mall East, at eight p.m.

At the annual meeting of the shareholders of Messrs. Norman, May & Co. (Limited), Malvern and Cheltenham, held on Tuesday, the 9th instant, a dividend of seventeen and a half per cent. for the year ending December 31, 1888, was declared.

TRIP TO THE CRYSTAL PALACE.—The Hastings Photographic Society enjoy themselves.—On Wednesday, April 11, twenty-seven members of the above Society and friends availed themselves of the arrangements made with the London, Brighton, and South Coast Railway, to visit the Photographic Exhibition at the Crystal Palace. The train left Hastings at half-past eight. A pleasant ride, so shortened by congenial conversation that the daily newspapers were entirely neglected, brought the party to East Croydon, where a change was made into the train for the Palace. Arriving there about eleven o'clock, a thoroughly enjoyable day was spent in examining the large and wonderful collection of photographic apparatus, and criticising the equally large exhibition of photographic art productions. Most of the party returned by the seven o'clock train, arriving at Hastings at a quarter to ten p.m.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1512. VOL. XXXVI.—APRIL 26, 1889.

PATENTS IN PHOTOGRAPHY.

THE attitude of the public towards a patentee is not unfrequently both hostile and unjust. This, in some instances, arises from thoughtlessness and non-recognition of the fact that a man has a right of property in his brain labour, a right entitled to be respected whether the outcome of the labour be a book, a work of art, or a mechanical invention. A patentee gives to the world something it did not previously possess, and thereby becomes a benefactor to his fellow-men.

In photography we honour and are grateful to the man who gives a present to his fellows of the result of his investigations and experiments, and very much that we possess has been acquired in this way; but are we to say that, because this is so, we can reasonably expect that all are to do the same? Were this the case, and were thanks—and sometimes not even that—all that was to be placed in the scale against the unremitting toil of months, nay, often years, accompanied by weighty pecuniary expenditure, how many inventions from which mankind are now receiving benefit might have been allowed to remain sealed up? It is only right and just that the inventor should receive remuneration commensurate to the value of that which he discloses. Of two men, the one who makes an important discovery and works it *sub silentio* and for his own benefit, allowing his secret, perhaps, to die with him; and on the other hand, the other who imparts to the Government and to the world the fullest account and most ample details of his discovery on the cheap terms that he himself shall have a monopoly of it for a limited term (and for which concession he has, by the way, to pay somewhat smartly), after which it becomes public property—of these two, which is the real benefactor?

The principles upon which patents are granted are most just and equitable. The Government says in effect to the inventor, Your invention, which is to benefit the public, will be secured to you for a term of years on payment of a fee, and upon condition that you divulge everything connected therewith, so as to enable the public to utilise it to the fullest extent on the termination of the period for which we will grant you a monopoly; but, it adds, this protection will only be granted if you make a "clean breast" of it. And this having been complied with, the patent is granted. It goes without saying that the invention must not only be useful, but must also be novel, in the sense of its not having been previously known by the public.

An infinitely greater number of photographic patents are shipwrecked by want of novelty than by lack of utility. An agent entrusted with the taking out of a patent for an invention, when making the necessary search in order to discover

whether it has not been anticipated, usually confines this search for the most part to the records of previous patents, instead of wading through the literature appertaining to the subject in hand, and we are aware of several patents that have had to be abandoned because of prior publication in these pages. It is held to be publication of a nature sufficient to invalidate a patent if a discovery of a similar nature has been divulged, not only before a photographic society, but before seven individuals, a fact which should render inventors chary of saying too much previous to an application for protection having been made.

As to utility, this constitutes a theme on which even "doctors" differ. We know of one photographic invention for which the patent authorities declined to grant a patent on the ground of its not being of sufficient importance, while a few years afterwards a patent was obtained by another inventor for precisely the same thing. As this happened when the custom prevailed of printing all provisional specifications, whether they were completed or not, it follows that the publication in this way of the former invalidates the latter patent. The invention here alluded to had reference to applying the adhesive paste to the mount instead of to the print. Again, inventions which are passed by the patent authorities are not unfrequently set aside by the judge, as being of too little importance, when a case of infringement comes to be tried. Of this class was Edwards's registering frame for double printing, a really useful contrivance, although Vice-Chancellor Malins held a different opinion. A patent to be good must be separated from anything previously known by a sufficiently broad line of demarcation.

We have hinted that the attitude of the public towards the patentee is somewhat hostile. This feeling is based upon the restriction in the manufacture of the new invention. If the antagonistic feeling arises from the fact of the alleged invention being already known, even if not brought prominently before the public, the objector has no real cause of complaint, because in that case the patent is invalid, although the previous knowledge of it by any one individual alone who works it in secret will not affect its validity.

While this is well understood, there is a certain excuse for the feeling of indignation that prevails when paltry, frivolous modifications or applications of things previously well known are sought to be secured by patent; and of this class there are, unfortunately, not a few in photography. Many of these would not successfully pass the test of a law-suit, were such brought to try their validity; but only an extremely limited number of them are carried beyond the provisional stage, after which they, so far as they are known, become public property.

It is quite astonishing to look over the patent list published weekly in these columns, and compare the numbers of "patents applied for" with those of them which are subsequently and before the year is out recorded in the patent books as having been "abandoned." Taking up the latest weekly issue of the *Patent Office Journal*, we find on one page, selected at random, that of twelve applications thereon recorded no fewer than five are notified as "abandoned." This refers to patents in general, but were a similar comparison made and confined to such as relate to photography, the proportion of those not proceeded with would probably be found to be much greater.

COMBINING TWO OR MORE NEGATIVES.

It frequently happens in taking a photograph that it would be much improved, as a picture, if it were possible to obtain a little more subject than the plate will include with the appliances at hand. For example, in taking a landscape on a whole-plate the amount of subject included vertically may be just eight, while that laterally would be infinitely better if it could be extended to ten or more inches. How is the difficulty to be overcome? One plan will at once suggest itself, namely, to take the picture with a lens including a wider angle of view. But this would not fulfil the conditions, even if such a lens were at hand, inasmuch as then more foreground and sky would be obtained than is wanted. If these were trimmed off in mounting, the picture would then be generally on a more diminutive scale than that desired.

The plan, under the above conditions, is to take the picture on two negatives and combine it afterwards. This is frequently done by making a print from each of the negatives and then joining them in the mounting—a very unsatisfactory proceeding at best, for it is seldom indeed that two or more prints can be so neatly united as not to show conspicuously in the finished result. Moreover, it is exceedingly difficult, simple though it seems, to produce prints from different negatives of precisely the same tone, and the slightest difference in this respect always renders the junctions the more pronounced. It is true that in dexterous hands it is possible to obtain the two prints on the same sheet of paper by double printing, so that the junction is almost, or quite, imperceptible. But to accomplish this requires an amount of skill and practice which the average amateur does not possess.

The best means for effecting the end is, undoubtedly, to combine the negatives themselves, be they two or more, into one, so that the print is secured on the same piece of paper at a single printing. Now if, in the first instance, flexible negatives be taken, such, for example, as those obtained with stripping films, the thing becomes simple enough, provided, of course, a few simple precautions be observed at the time of taking. For our present purpose we shall suppose that the stripping films are employed, and will, therefore, give the details as regards the combination, because the same principle is involved, whatever other method be followed.

In taking the different negatives, on no account must the position of the camera be altered between the exposures, otherwise than by rotating it horizontally on the stand. When arranging the camera it should be decided at which point the juncture is to be made. This should, if possible, be at some part where there is but little sky showing, as it is always much easier to hide joins in the darker than in the lighter portions of the picture. In deciding the amount of subject in each of the negatives, a good margin should be allowed for the joining,

inasmuch as if the portions to be united fall near the edges of the plates the difficulties are increased considerably. It is seldom that the film is really uniform near the edges of a dry plate. Furthermore, the illumination falls off towards the margin of the field with most lenses. Therefore, if the full amount of subject which would be included by two negatives be required, it will be found more advantageous to take three. Two junctions under favourable conditions are far more easily hidden than one under conditions less propitious.

The exposure for the different negatives must be identical as regards time, and the development must be conducted so as to secure them, as nearly as possible, of equal density. In this portion of the work there is nothing out of the ordinary course of procedure necessary beyond the precautions just indicated. As we are writing on the supposition that flexible films are employed, we will now assume that the operations have been completed and that the negatives—two or more—are ready for uniting, which we now proceed to do.

A glass plate, a little larger than the picture when finished, is placed on a retouching desk or in front of a window, so that a good light is seen through it. Next, one of the negatives is taken and adjusted in position upon it, and each of the edges, except that to be joined, secured to the glass with strips of gum paper. The second negative is then put into position, the duplicate and now overlapping portions in the two negatives serving as a guide to accurate adjustment. The edges of this negative are then firmly fixed with gum paper. The only thing that remains to be done is to cut through the overlaying portions of the negatives with a sharp penknife, making one clean cut and remove the liberated pieces. The edges of the negative will now fit exactly into each other, and if the cuts are neatly made the juncture will be quite imperceptible. In no case should the junction be made in a direct line through the picture, but in an irregular course, and, if possible, through foliage or buildings.

In the foregoing it has been assumed that flexible negatives are taken to begin with, but it may frequently occur that glass ones have to be utilised, then it follows that some modification of the method just described must necessarily be adopted. With glass negatives the films can be removed from the plate and transformed into a flexible negative by Plener's method with hydrofluoric acid. But here there is some little risk of the films, when removed, expanding, and that unequally. This, of course, would be fatal to a successful junction. But by employing Mr. Pumphrey's modification of the fluorine acid method this risk is reduced to a minimum. This modification is described on page 495 of our *ALMANAC* for the present year.

With valuable negatives, or such as cannot be easily replaced, it is, perhaps, better on the whole not to attempt to strip them from the glass unless the work be undertaken by experienced hands, but to proceed by way of reproduction. Details of this system must be deferred to a future article.

THE DEVELOPMENT OF TRANSPARENCIES.

In the treatment of wet collodion plates the character of the deposit forming the image can be greatly modified, so far as fineness is concerned, by varying the mode of development, because the metal forming that image is derived from the developing solution itself, and is deposited in a coarser or finer state in proportion as the rapidity and other conditions of development are varied.

But when we turn to dry plates and alkaline development the circumstances are altogether changed, since the image is formed by the reduction of the metal already contained in the sensitive film. It can, therefore, be readily understood that the fineness of the deposit will, in these circumstances, be mainly dependent upon the state of division of the particles of silver bromide formed in the emulsion, hence, in development, our power of influencing the character of the image for fineness is limited. It is true that in some cases of rapid or forced development, in which very strongly alkaline solutions are employed, an image of considerable coarseness is frequently produced upon plates not usually remarkable in that respect, but this has been set down to the reduction of certain coarser particles of bromide lying in the under stratum of the film, and not generally reached by a developer of ordinary strength.

So far then as an extremely fine deposit is concerned, where this characteristic is especially desired, the best, if not the only thing to do, is to select a plate that is known to possess a film of that quality. Many of the specially made commercial lantern plates, though not all, present this feature, which usually accompanies a film of only moderate rapidity, and such plates are to be preferred on all grounds to the more rapid kinds for transparency work. It by no means follows that a slow plate necessarily gives a fine image any more than, as many suppose, that an extremely rapid plate must give a coarse deposit; the rule can only be accepted as a general one. But in our own case, given two plates identical in character as regards deposit, but of different degrees of rapidity, we should for transparency purposes prefer the slower, because in ninety-nine cases out of a hundred, it will give a better result with the same amount of trouble.

Starting on the assumption, then, that the fineness of the image is a matter over which we have practically no control in development, we may confine our attention to securing the most perfect gradation possible from deepest shadows to highest lights, placing the colour or tone of the picture as a subsidiary, although still important consideration. We have already said, with regard to the gradation of a perfect transparency, that its range should extend from perfect clearness—"bare glass" as it is technically called—in the very highest lights to a depth in the strongest shadows, which, while sufficient to give force and value to the picture, falls still far short of opacity. Where anything approaching opacity in the shadows of a transparency is reached, not only is the general character of the picture heavy, but the gradations become imperfect since the half tints and lighter shadows begin to merge into adjacent tints. It is impossible to give any definite rule as a guide to the proper degree of density, for this will vary not only with the subject, but also with the purpose to which the transparency is to be put, while personal or individual taste will perhaps prove the most variable condition of all. In this, as in most other affairs, experience must be the principal guide, but certain chief rules may be held in view. These are, that lantern slides as a rule require the least density, though this may vary in proportion to the strength of the light with which they are to be employed, the oxyhydrogen light requiring a more vigorous picture than an oil lamp. Stereoscopic transparencies may have more strength than an average lantern slide, but still delicacy rather than vigour should be the aim, care being of course taken to secure sufficient force to give value to the deepest shadows and provide harmonious contrast. Greater density is required in transparencies for ordinary decorative purposes, for hanging or glazing in windows and screens, or

in lamp shades, and the strength should increase with the size in order to give the requisite boldness of effect. Thus a degree of density that would give a perfect result for a picture of, say, quarter-plate size, would look weak and flat if repeated on the scale of 12×10 or 15×12 , while what made a harmonious result in the above sizes would prove wholly unsuitable for smaller work.

It is the securing gradation which forms the chief art of development in transparency work, more, perhaps, even than in the case of negatives; the mere production of clear lights (or shadows) and pleasing tones forming technical details which present no difficulty to the practised worker. We speak, of course, within the limits of the possibilities of each kind of plate, for clearly no plate with which we are at present acquainted possesses the capability of giving an unlimited range of tones at will, and few gelatine plates will give the utmost clearness of lights desirable in a lantern slide.

In securing the proper range of tints, experts differ in the methods they adopt, some applying a developer of full strength, which brings up the picture rapidly to full strength in, so to say, a single operation; while others work on a gradual or "tentative" system, employing a weak developer well restrained, and strengthening it gradually as the necessity arises. There is much to be said both for and against both methods, and it would be unwise to adopt either one or the other without properly considering the why and wherefore.

For instance, the first plan, the "straightaway" method, recommends itself on account of its apparent simplicity, and the rapidity with which the operation is performed. The very rapidity is often an important element with some kinds of gelatine plates, as there is less chance of staining the film, and undoubtedly, when time is an object, this will be preferred to the slower process. But obviously, in order to be successful in the principal object—the production of a precisely correct gradation from clear glass to just sufficient density—it is necessary to hit the exact exposure with extreme accuracy; in fact, with this method of development, nearly everything depends upon the accuracy of exposure, the development being, comparatively speaking, a cut-and-dried operation. Hence, except with plates that are thoroughly well known, an illuminant that is completely under control, and negatives themselves of perfect gradation and well-judged density, this method is not likely to give generally satisfactory results except in thoroughly experienced hands. It becomes proportionately more difficult of application with the more rapid kinds of plates, though with the slower descriptions comparatively easy.

Latitude there is practically none when this plan is adopted, for the solution first applied being of the full strength that can be safely applied, it is of little avail to add further alkali in the case of under exposure, as either that course or the mere prolongation of the application would be almost certain to result in the degradation of the lights, if not in general fog. In the case of over exposure the energy of the solution might certainly be checked by the use of a liberal addition of soluble bromide, but as this acts more energetically on the least-exposed portions of a film, the lights and shadows would suffer disproportionately, and the general result would tend towards heaviness and excess of contrast instead of correct gradation.

All things considered, we are inclined to look upon the tentative method as the preferable one, in spite of the greater length of time consumed in the operation. That seems to be the chief objection to its use, though some kinds of gelatine

employed in the formation of films will not stand the prolonged application of pyro solution, however weak or restrained, or whether protected by sulphite or not. When plates are met with possessing this bad quality, the tentative method of development will therefore have to be relinquished or considerably modified.

On the other hand, this method enables us to utilise to the fullest the advantages of such a degree of latitude as exists both in exposure and development. This will be especially valuable to those who only practise this kind of work at irregular intervals, and who are consequently comparatively unfamiliar with the power of their light, and are perhaps not intimately acquainted with the peculiarities of their plates. The power of varying the development is also useful in dealing with negatives of irregular or incorrect gradation, whether excessively dense, too thin, or presenting too much or too little contrast. Such may frequently be "dodged" into giving a fairly good result when developed in the gradual manner, but would prove hopeless failures with the "straightaway" method.

On the whole, therefore, we give the preference to this latter plan, especially in the case of those who have had but little experience in the work. In a future article we shall give the full details of both methods as applied to pyro, hydroquinone, and ferrous oxalate.

A CORRESPONDENT has lately suggested, *apropos* of paintings with a photographic basis, that it might be an excellent plan to prepare the photograph for painting upon by pasting or glueing over its surface a sheet of the fine unvarnished tracing paper, more like superior "tissue paper," which is sold by some dealers, so that all colours employed would be removed from actual contact with the chemically produced photographic image underneath, yet would have presented to them a suitable surface to work upon. Those of our readers who are familiar with artistic processes will best know what value to attach to the suggestion. From a chemical standpoint, if it be only granted that a photograph must be inimical to the permanency of the pigments laid upon it, there is no doubt that when once the painting was dry no mutual chemical action could occur.

This is no light question to many professional photographers who are in the habit of employing artist painters of very considerable skill. We now refer not to the low-priced monstrosities which have invaded the land like a pestilence, and almost destroyed the belief in the public mind that a combination of photography and painting of some degree of merit might be obtained, but to the highest class of this kind of work which is obtainable.

We have had the opportunity of examining a large number of portraits so painted upon silver, upon carbon, upon platiotype prints, and we have come to the conclusion that the durability of such pictures is by no means a matter of the photograph only; it is closely interwoven with questions of mediums employed and particular colours selected.

We by no means wish to raise a discussion upon the special suitability of any particular kind of photograph chosen to work upon, for common consent has it that silver prints are unsuitable, and carbon and platinum are by their advocates deemed perfect. But we do have to say that as we write there is before us a very beautifully executed water-colour upon a silver print, executed over thirty years ago, which has faded little more than an average water-colour would have done in the same time. At the same moment we turn to another equally well-painted portrait upon carbon, which, painted about fourteen years ago, is faded to a great extent.

Not for a moment must the inference be drawn from these facts that silver is a better base than carbon, for the reverse is incontestably

the case. It is here clearly a case of badly selected colours, or of a chemically impure medium used with the colours. For proof of this, we have noted that where some flesh tints had been introduced, painted-in upon the paper itself where no photograph lay, the fading was equally conspicuous, as upon those parts where the carbon print lay underneath the paint.

THE remedy is obvious, though one that will not always be taken. It is to change the scheme of colours chosen. There are many fairly permanent pigments to be bought with a reputation ready made; there are others known to be fugacious, but which yet, because of their cheapness, or fatal facility of working, are not banished from the palette of some artists. To call attention to these various points should be sufficient to the conscientious.

THOUGH of less importance than the Perseids of August, or the Leonids of November, the Lyrids, as the "shooting stars" usually seen at this time of the year are termed, are sufficiently numerous to occupy a prominent place in astronomical annals, and last Sunday or Monday large numbers of observers would be at work counting and noting the position of flight of the meteors then visible. When the number to be observed are large, it is scarcely possible for a single observer to do this correctly. We draw attention to the matter to point out how easily photography would give important help, even without any clockwork arrangements. A portrait lens would embrace almost the whole of the probable field of such star showers, and, we should imagine, would, with quick plates, register a very large proportion of the meteors seen, and give their direction infinitely better than any personal observations. A fresh plate, exposed at intervals not too far apart, would give the position by the fixed stars, and which would show as streaks instead of dots; indeed, a series of such observations made under systematic arrangements by observers at various parts of the kingdom would be of great value in another way. Such parallax would be exhibited, that a very close estimate could be formed of the actual distance from the earth of these celestial visitants.

WE had thought that the theory of actinism being confined to the violet part of the spectrum was a long-exploded fallacy, but in reviewing a recently published work upon light and heat, *Nature* draws attention to this old fancy being adopted in the book, saying, "The idea that the actinic rays are confined to the violet part of the spectrum is rather old-fashioned, and is scarcely likely to be credited by a student who may have happened to experiment in the direction of orthochromatic photography." This, of course, is quite true; but it has long since been pointed out that decomposition under the action of light was rather a function of the particular substance than of a particular ray of light.

PHOTOGRAPHERS themselves, however, are as often ignorant of the physical properties of light as painter artists are of colour; witness the cloud monstrosities often perpetrated by the former and the meteorological impossibilities of the latter, who often, if they cared to do so, might take a lesson from photographers. An advantageous step in an educational direction in regard to the latter is about to be taken at the Bedford College for ladies, the art students of which are having arranged for them a series of lectures on light and colour by the Professor of Physics, M. Wornack. It goes without saying, that in order to obtain a proper knowledge of art the physics of light and colour should be studied.

ON THINGS IN GENERAL.

I MUST congratulate the proprietors of THE BRITISH JOURNAL OF PHOTOGRAPHY upon the latest step they have taken in popularising photography—by reducing the price of its leading literary organ. It is to be hoped that this will lead to such an increase of subscribers as to entail no real loss; though I may say that it is only those who are familiar with newspaper enterprises that can understand how much is involved in such a pecuniary change. It is very interesting to compare the JOURNAL of the present day with the Liverpool-

Manchester JOURNAL of, I am afraid to say, how many decades ago? To many modern photographers it would be almost as Greek to the unlearned. Yet in those early days, and later, up to the introduction of gelatine, what beautiful negatives were produced! We had not the rapidity of modern plates, but there were, instead, a richness, a depth of shadow, a combination of vigour and softness that is rarely seen nowadays in the negatives on "ready-made plates." I have heard of one amateur, whose work has always been of the highest class, and who had fought all the battle of processes himself, being so disgusted with the ease of present-day photography as to contemplate flinging it up entirely. I do not know if he will carry out his purpose, for it is a fascinating pursuit to those who have once mastered the processes—the "operation of chemistry, more or less directed by taste," as Mr. Brett, A.R.A., terms it.

Those who have not read it should by all means peruse the shle paper by that artist, read at the Camera Club Conference and reported in the April 5 issue of this JOURNAL. It gives in a few pithy sentences an excellent epitome of what it is desirable for an artist to learn and to cultivate to attain to a sufficient amount of skill; but it is touched with the usual inconsequential dicta, and defective logic of those painters who will not permit the association of fine art and photography. Thus, we are told, "It is only after long training that the observing faculty becomes so keen and active that a good photograph can be confidently expected. Most operators never outlive the fluking stage. The cultivation of this faculty is no simple matter. . . . You have to consider your subject, first, as a group of masses of light and dark; then you think of the arrangement of line caused by the coincidence of the boundaries of these masses; then you have to study the distribution of the accent or emphasis in both elements; and until you have become in this way a trained analyst, all your endeavours will be empirical, or shots in the dark. . . . practice with the camera will compel him to learn composition and *chiaroscuro*," &c. &c. How could a better epitome of an artist painter's educational needs than is here given be portrayed? It is lucid and to the point; yet if a photographer to whom this advice is given, be it observed, cultivate his faculties to the requisite extent, he can only exhibit "good taste," not art, in his works. I ask, is not this toying with words, especially when we find the same writer admitting "there is another resource of pictorial art available also to the photographer, though only to a limited extent, and that is sentiment?" Sentiment, composition, light and shade, *chiaroscuro*, may be displayed, and yet nothing but "taste" is shown. Why cannot the painters say boldly, "There are possibilities of flights of genius and capabilities of expression and of *technique* in painting that photography cannot dream of; but, to a limited extent, photographs may exhibit qualities of fine art sufficient to command both respect and admiration, when executed by hands directed by a trained and educated mind?" For this is true, and they will have to admit it sooner or later.

In the same week's JOURNAL I read an article on lenses by an American writer, in which he speaks in terms of respect of an English optician, Mr. Wenham, whose inventions, applied to the microscope, have done more to popularise it than all others put together—his name is on almost every microscopist's lips. I see also in the journals of the day a list of names far less familiar who are to be decorated with the blue ribbon of science—the title of F.R.S. I make bold to say that scarcely one of them is better entitled to the distinction than the gentleman named; yet he is no F.R.S. Why?

There can be no doubt that the majority at the Photographic Society's meeting recommending the grant of medals at future exhibitions represents the feeling of photographers at large upon this question. The next exhibition, if I mistake not, will show by its quality that medals do help to bring about the exhibition of good work, and thus improve the general level by showing what can be done. I should like to ask one question. "What about the unfortunate exhibitors of last year; may not they send their works again on the chance of receiving a medal?" The chance ought to be offered, and then there would be a fine opportunity for the hanging committee; they would be compelled to reject a large number of works, and thus improve the whole tone of the show. I present the Society with these hints.

Those who have not read Mr. Lionel Clark's letter on platinotype printing should do so. It is an excellently well thought-out com-

munication, with a thoroughly practical ring, and, I think, bears promise of a really practical process. Should it in practice be found to give results equal to the old platinotype, it would revolutionise that class of printing, and would also have the advantage of permitting any kind of paper to be used for obtaining an image upon. The Platinotype Company have done a great deal in the direction of supplying papers of various kinds and surfaces, but Mr. Clark's method would give us all surfaces from rough Whitman's paper downwards.

There are some processes which, at a first glance, strike us as good and practical, while others have just the reverse effect. Mr. Clark's letter belongs to the first; in the second I should place the developer whose formula is given in "Foreign Notes and News," page 270 of this JOURNAL. Given in full (as used where frilling might be anticipated), the mixture for developing consists of pyro, sulphite of soda, oxalic acid, carbonate of soda, yellow prussiate of potash, metabisulphite of potash, bichloride of mercury, and water!

At the London and Provincial Photographic Association an interesting discussion lately took place upon the topic of cloud negatives, and attention was called to an article in which it was stated that dwellers in towns could not obtain appropriate negatives because of having to tilt the camera to an unsuitable portion of the sky. Now there is a great deal of absurdity in this very common idea. Let any one go to any exhibition of photographs and ascertain how many of them have clouds down to the horizon, and how many at such altitudes in the sky—showing above the other objects, houses or trees, &c., as to be well above the angular distance from the horizon of the chimney-pots—as a cloud negative taken from an attic in an ordinary dwelling house. The latter would be five to one of the former.

FREE LANCER.

ECHOES.

"Good old printer!" I give you the credit, and not Mr. D. Bachrach, jun., of having added one more to my list of photographic chemicals. "Yellow prussic of potash" looks well, but what is it in less scientific terms? I must, however, do Mr. Bachrach himself the honour of attributing to him the discovery of a new use for bichloride of mercury, and of making it exhibit in a character I should not have given to it.

In brief words, to prevent frilling in summer-time he recommends the addition of bichloride of mercury to the pyro and soda developer, in order to "harden the film and prevent decomposition." He naively remarks that it is "the best thing to use, being without any effect on the action of the developer." Quite so! But what about the action of the developer upon it? Perhaps, however, as it is only used in the proportion of ten grains to each ounce of *solid* pyro, no very visible effect will be produced. But then—another "but"—what about its *hardening action* when the ten grains are diffused throughout perhaps a couple of gallons of developer? However, great discoveries do not always strike the world at once.

I do not quite know why the recent performance of M. Bloch, in exhibiting to a whole class, by means of the lantern, the development of a plate, should be designated an "ingenious arrangement," since it is acknowledged to have been well known to old collodion workers. From the mention of "red" as the colour of the developing trough, I imagine the novelty, if any, consists in the application of the arrangement to gelatine plates; but, if so, what am I to think of the developer mentioned as being used in the experiment? This is said to have been composed of pyrogallol, gallic, and acetic acids, with "a few drops" of nitrate of silver—acid development in fact, which is certainly not usual with gelatine.

In the same column of foreign news I find mention of a new method of giving "a good brown colour" to platinum prints, consisting in the addition to the developing solution of more or less mercuric chloride, according to the tone desired. Of course the modification in colour is produced by the substitution of a certain quantity of mercury for platinum in the formation of the image. What Mr. Willis and other supporters of permanency in photographic prints may think of the "improvement," I, of course, do not know, but I can form a good guess. I myself should class M. Tueschala-Signa's process along with a "new" method it was attempted to introduce

many years ago for toning silver prints. In this, chloride of gold was partly replaced by chloride of copper, and very pretty tones were produced, but, like the "good brown colour" of the new platinum-mercury print, they were scarcely permanent, since the hypo removed every trace of the copper tone.

There is plenty of room for the introduction of improvements in developing dishes, and the utilisation of thin enamelled steel seems to promise to be a step in the right direction, since it will combine strength and rigidity, especially in large sizes, with lightness. But it is not encouraging to find that one of the "special features" claimed for the new dish by the makers is, that if dropped on the floor it don't break, because it is apt to make one think they have misunderstood the use of developing dishes generally. We don't purchase these to throw about, but to use carefully, and if the makers have gone equally astray in other important points, perhaps it will be wiser to stick to glass, ebonite, or porcelain.

This is unmistakably an age for giving or offering prizes for any and everything, but it is seldom we find so curious a result chronicled as that in connexion with the Gaillard prize, in France. It seems M. Gaillard offered a prize of five hundred francs for an original process for the rapid production of positives, leaving the adjudication in the hands of the Photographic Society of France. From the official report just made public, it appears there was one solitary competitor—if he can be so called—who put forward the gelatine bromide process, which he neither "invented" nor "discovered," and which could not, therefore, in his case, be original. However, though the committee could not award him the prize, they gave him just three-fifths of it as "an encouragement." It reminds me of a somewhat similar award made in this country some years ago, when the committee reported that they did not consider any of the competing processes worth the prize, but as it had to be awarded they had given it to the "least bad." This was, at any rate, a more straightforward way than keeping back a part of the money.

It is only a few weeks since I had to allude to the suggestion of automatic development, and now the matter seems to have cropped up again in a slightly different form. I read in the report of the Photographic Society of France that M. Tondeur has been experimenting with self-developing plates, with results that are sufficiently noteworthy to be considered in connexion with the general subject. The method adopted was to saturate the film with developing solution before exposure, and the experimentalist proceeds to say that if sufficient exposure be given the negative is fully developed during exposure; if not sufficiently exposed it must be left until the details appear.

I think these facts will bear a good deal of looking into, though I must confess there is a little ambiguity about them, especially with regard to what constitutes a proper exposure. I don't think, at any rate, that existing "exposure tables" will be of much use. Thus, if sufficiently exposed, development proceeds simultaneously, and is complete with the exposure. Hydroquinone is the developer recommended, and this I hear on all sides is very slow in its action. I have heard of an amateur, of sabbatarian views, who places his plates, exposed on Saturday afternoon, to "soak" on Saturday evening, and removes them from the developer before starting for business on Monday morning. If this be anything like the period occupied in developing M. Tondeur's images, what must a sufficient exposure be?

But, on the other hand, if a plate is not "sufficiently exposed," i.e., what we should, under ordinary circumstances, call "under exposed," it is only necessary to leave it until "all the details have been brought out," or, in other words, as it seems to me, there is no such thing as under exposure, or, for that matter, over exposure either. I am all the more willing to accept this view as correct, because it is only under such conditions that automatic development would be possible; indeed, it is only those who are utterly incompetent to judge an exposure who would dream of such an absurdity. We have heard of uneducated men writing poems and painting pictures while unconscious or asleep, but their excuse has always been that they were under psychic or some other influence. But, judging from what I have seen of the artistic or even technical qualities of so-called "spirit photographs," I question whether the automatic development amateur will improve his pictures by taking on "psychic force" as chief assistant.

The same gentleman introduced to the society a "minocle," or eye-glass, possessing wonderful properties, if we are correctly informed. By the way, I know what an eye-glass is, and I have heard the term "monocle," or "monocular," but "minocle" is new. However, the instrument in this case consists of a disc of ebonite pierced in the centre with a very small hole, and is to be employed in order to judge the colour of the light and its actinism when out photographing. In fact, it forms the long-wanted reliable actinometer. Thus, when the light is really of bad quality, though apparently bright, upon applying the little instrument to the eye the light takes a yellowish tint, and the faces of the passers-by a red colour. Again, the inventor has been surprised on an apparently dull morning to find surrounding objects, when viewed through his "monocle," assume a "bluish white tint," suggestive of actinism, and a very short exposure followed by a magnificent negative has proved the prognostication to have been accurate.

I think it is possible that imagination may have assisted very materially in establishing a certain faith in what may be, undoubtedly, a useful little contrivance, but I think also that the variations in colour must be confined to the imagination and not allowed to tinge surrounding objects. The aperture in the ebonite disc will have to be so extremely small, if it is to produce any breaking up of the rays of light and assist in analysing their colour, that very little chance would remain of distinguishing adjacent objects. But if sufficiently large to permit objects to be viewed without the disturbing influence of extraneous light falling on the eye, it is very possible that a better judgment can be formed of the relative value of the illumination of different subjects. Many years ago it was customary to employ a piece of yellow glass for a similar purpose. If a landscape be viewed through such a piece of glass by absorbing a portion of the blue and violet rays, the darker parts of the subject are intensified, and a better idea can be formed of the contrasts of the picture and the length of exposure desirable. But, after all, it must be "judgment" that does the work, for I verily believe an automatic actinometer is as impossible as automatic development.

M. Schaeffner's new varnish for negatives looks and sounds very well in description, but there is nothing about it that does not agree with the ordinary aqueous shellac solution. It is transparent, can be applied to the wet negative and without heat, it takes the pencil, it permeates the pores of the film, and is not confined to the surface, all of which descriptions apply perfectly to shellac dissolved in aqueous solution of borax. But the latter has not "the advantage of never cracking when dry." It is easily applied, soaks into the gelatine film, and gives a most delightfully even surface. But if heated or moistened after drying, it is "all up" with the negative. It cracks all over, and, what is worse, the cracks cannot be obliterated by any kind of treatment that I have tried.

JUNIUS.

AN EASY AND ECONOMICAL METHOD OF MAKING LANTERN PLATES.

NO. II.—PREPARING THE EMULSION.

WE shall require an earthenware jar or tin with a cover, about six inches in diameter and seven or eight inches high, a hot water thermometer, a clean four-ounce bottle, and a kettle of boiling water.

We will suppose that eight ounces of emulsion are required, which will be sufficient to coat six to seven dozen lantern plates. Weigh and measure out carefully the following (hy-the-by, it is better to put a piece of clean paper of equal size and weight in each pan of the scale):—

No. 1.

Bromide of potassium	18 grains.
Gelatine	2 drachms.
Water	1½ ounces.

No. 2.

Nitrate of silver	24 grains.
Water	2 ounces.

No. 3.

Iodide of potassium	1 grain.
Water	½ ounce.

It is a good plan to keep the iodide of potassium in a ten per cent. solution, and instead of attempting to weigh one grain use ten minims of the solution.

Put the bromide of potassium into a clean, half pint drinking glass, or similar glass vessel, and add the one and a half ounces of water; when thoroughly dissolved, put the gelatine in and let it thoroughly swell. I have been using Coignet's silver medal gelatine, and find that it gives a clear film, but I expect that Heinrich's or Simeon's will do as well. Fill the jar or tin with the hot water from the kettle to the depth of about three inches, and then plunge the glass containing the gelatine, &c., into it two or three times, to avoid it cracking by the heat, then leave it for the gelatine to dissolve; assist this by stirring with a glass rod, or a strip of glass about three-quarters of an inch wide.

After the gelatine appears thoroughly dissolved, keep it (the gelatine solution) at a temperature of about 90° for ten minutes; stir it well every few minutes.

While the gelatine is dissolving put the nitrate of silver into the four-ounce bottle and add two ounces of distilled water (it is better to use distilled water for all the solutions; it is cheap enough). When the silver is dissolved add ammonia (equal parts of ammonia 880 and water) a few drops at a time, just sufficient to dissolve the oxide of silver first formed. Shake the bottle between each addition: have a good, clean cork to the bottle. Stand the bottle in the jar of hot water to slightly warm the solution. The rest of the operations will have to be done in the dark room, or with a non-actinic light.

Stir the gelatine and bromide solution in the glass, and at the same time slowly pour into it the nitrate of silver solution; then add the iodide of potassium and water and stir well. We shall now obtain an emulsion with the particles of silver bromide in a very fine state of division, and if we put a drop or two of the emulsion on a strip of glass and find, on looking through it at a candle or gas jet, that it appears of a bright ruby colour, the operations have been correctly carried out.

Now get the water in the jar to a temperature of about 95°, not more than 100°, stand the glass containing the emulsion in it, put on the cover, and a teapot coxy or cloth over all for twenty minutes. It is as well, however, to stir it up once or twice during that time, and see that the water does not get below 90°.

At the end of twenty minutes pour the emulsion into a dish (a soup plate will do very well), and as it sets break it up into small pieces to allow a greater surface to be exposed to the cool air. This can be done with a small strip of glass. Then put it away in the dark for at least three or four hours, or it can be left until the next evening.

The next operation is to pour about half a pint of distilled water over the broken-up emulsion and stir it up well for five minutes, pour the water off and repeat the operation with some fresh water; after the water is strained off put the emulsion back into the glass (have the glass clean) and remelt it by standing the glass in the jar of hot water at about 110°, when melted add three-quarters of an ounce of alcohol—good colourless methylated will do if procured from a photographic material dealer, but it is hardly safe to depend upon what is obtained from a country chemist. Then add sufficient slightly warm water to the emulsion to make it up to eight ounces in bulk and stir well.

It is a good plan to make a mark on the outside of the glass at eight ounces, and then one has only to pour the water in up to that mark. The emulsion is now ready for filtering and coating the plates.

HERBERT S. STARNES.

HINTS FOR THOSE USING NON-HALATION GROUND GLASS PLATES.

Fixe ground glass, such as used for microscopic focussing, and technically called "smoothed glass," might be used for negative work, and had on reasonable terms from patent plate glass makers. It would give an admirable "tooth" for the *retouching pencil*. Ordinary "sheet glass" might be made with a similar surface by submitting it to the action of weak fluoric acid. If one side only is required, the other side can be protected from the action of the acid by coating it over with tallow or grease.

Printing from negatives so prepared may be quickened by rubbing over the back with the varnish now sold by dealers, called "Protective." I find this article well suited for reviving old faded prints, and protecting brasswork and other metals from rust and corrosion.

JAS. ALEX. FORREST.

PHOTO-MECHANICAL JOTTINGS.

V.

THE REVERSING MIRROR.

NEGATIVES for printing upon zinc or for colotype must be reversed, that is, the image must be in its right position as regards right and left when viewed with the film next the eye, instead of, as in the case

of an ordinary negative, the glass being between the eye and the film. Reversed negatives are obtained (1) by stripping or turning, (2) by exposing through the glass, (3) by using a prism in front or behind the lens, (4) by using a plane mirror in front of or behind the lens.

(1) Stripping or turning the film has been treated of already in one of the earlier "Jottings," also by Mr. W. K. Burton in the issue for March 22. (2) May be at once dismissed, as at best it is only a makeshift method, and never yields perfect results. (3) The prism is too costly a piece of apparatus to ever become generally used, as it has no advantages over the plane mirror, to be obtained at so much less price.

There is a great deal of misconception as to what a reversing mirror is. Some operators trying a piece of ordinary plate glass and finding the resulting image distorted are disgusted. A reversing mirror is a piece of thick plate glass, the surface of which is ground *perfectly flat*, then coated with a film of pure silver, which, taking a high polish, will, when mounted in front of or behind the lens, reflect the image upon the sensitive plate without the slightest trace of distortion.

The size of the mirror must correspond in height with the diameter of the lens, and be a little longer than the diagonal of a square formed by such dimension; for instance, if the diameter of the lens be three inches, the mirror should measure five inches by three. It is not necessary to have a separate mirror for each lens in daily use, as a small lens can be used with a large mirror, but a small mirror, if used with a large lens, will curtail the field.

Reversing mirrors are mounted for use in two ways, viz., in front of the lens and behind it, the latter method being the best, the mirror being protected from extraneous light, also from dust, and from deleterious fumes, besides the box being much smaller and lighter. The base of mirror box should be made square, so that the lens may be used sideways or pointing down—a very useful position in photographing objects unsuitable for fixing on the copying easel.

For silvering these mirrors various formulæ have been given in back volumes of both JOURNAL and ALMANAC, the two best being by Dr. Common and Mr. H. J. Burton. But the best plan is to get a mirror ready silvered from the Autotype Company.

A mirror requires to be managed with care to preserve the silvered surface from damage or tarnish. At the end of each day's work remove from the box and warm slightly in front of the fire (not over a gas stove), then wrap in a piece of fine velvet, also warmed, so as to be free from all traces of damp, wrap this again in a piece of mackintosh, and put away in an air-tight box. By using these precautions, and carefully avoiding touching the surface, a mirror will last for years without re-silvering, an operation which costs sixpence a square inch, the original cost, including mirror and silvering, being one shilling per square inch.

If the surface gets tarnished, the exposure will be prolonged, so the mirror must be re-polished, which is done with a piece of perfectly dry chamois leather, *dry jewellers' rouge*, warming the mirror slightly first and polishing gently and without much pressure. This polishing may be repeated when requisite until the film of silver is worn away. After that the mirror will need re-silvering. W. T. WILKINSON.

CAMERA CLUB CONFERENCE PAPERS.

III.

A COMPARISON OF DEVELOPERS.

By LYONEL CLARK.

NATURAL historians will tell you that whenever a new species is introduced into a new country it begins to multiply and increase to a most alarming extent, but after a few generations nature reasserts her ordinary law, and the new settler settles down to its ordinary and normal rate of increase. In photography we find somewhat of a parallel; the advent of any new process is received with a burst of enthusiasm, its application is universal, and its merits or faults are extolled or condemned with as much exaggeration as any unpopular Government measure in Parliament; and it is not until the first effervescent exuberance of its disciples, or the deep anathemas of its opponents have subsided, that it is possible for the still, small voice of reason to make itself heard, and allow the new comer to be judged strictly on his own merits.

Our latest advent from other climes is quinol; this is, however, not of foreign origin, being no other than an indigenous species, which, under the name of hydroquinone, was first proposed and introduced to the photographic world by our worthy President, and that in this very room, and from the rostrum that I myself am now occupying. On its first introduction, however, it did not meet with any general favour, and it was not until, like old brown sherry, it had made a voyage across the seas and back that it was found good enough for the palate of our connoisseurs.

Slight as was the enthusiasm with which it was first received, its re-

storation to the land of its birth was, however, attended with the most fulsome flattery, and all that exuberance of expletives for which our Gallic brethren are so justly famous. The new developer was to do everything and anything; a very conjurer's bottle, out of which could be got the restrainer of over or the accelerator of under exposure—a very panacea for all our photogenic woes or maladies. One loquacious apostle of hydroquinone, carried away by his own enthusiasm, actually went so far as to style it an "automatic" developer, thus abolishing at one fell swoop all the science and beauty of development, and all the power that chemistry has put into our hands to compensate for its own shortcomings or the unwillingness of nature, and to enable us to relieve our beloved pursuit from the reproach that it is a mere mechanical process.

But these furious atmospheric disturbances have now subsided; we have left the roaring forties of exaggeration for the quiet doldrums of reason, and quinol, as I prefer to call it, is on its trial at the bar of the photographic world. The case was opened by Mr. Swan, in the Photographic Society's rooms, but a short time back, when this gentleman, in a most able lecture, very fairly stated its merits. But, on the principle of an old proverb, if I may venture to say so, I do not consider that Mr. Swan carried his investigations far enough. Development is a fairly complicated phenomenon. There is something besides the mere bringing out of detail or getting density; there are the gradations, or intensity scale of the negative, to be looked after, and this I consider the real secret of universally successful development.

A photograph of nature is made up of not only high lights, half tones, and shadows, but of every gradation or *nuance* between these salient divisions. However white the paper we make our prints on may be, it will always be less so than the bright high lights, and the deepest blacks of the print will be behind the dark shadows of nature. We have then to compress the scale of tones of nature into the short gamut that our printing processes give us; and it is therefore evident that the developer that can give the greatest range to this gamut will, *ceteris paribus*, be the most useful.

To make this point clearer, a certain light intensity will give the least appreciable deposit after development on the sensitive film, whilst the darkest deposit that we can admit—this point depending on the particular printing process we intend to use—we will assume to be obtained by a light one hundred times as intense. In exposing we must expose long enough for any desired detail in the shadow to impress itself on the plate. We will take this amount of light as our unit. Now any light one hundred times as bright as this unit point will then be represented on the plate by the maximum amount of deposit possible; and therefore any lights that in intensity are superior to this figure must all be represented by an equal amount of deposit; that is to say, they will all give the same appearance on the print, and we shall lose all detail in the high lights. Now suppose that, by some modification of our developer, we could so manage that our maximum deposit was only attained by a light two hundred times as intense as our standard minimum, I think it will be allowed on all hands that this is not only a valuable but an essential property.

It is to ascertain what are the capabilities of quinol in this direction, as compared with pyro-ammonia and ferrous oxalate, that I have undertaken the following experiments. I have not sought in any way to find out the developer that will give the most detail on a plate. From a very exhaustive series of experiments that I made last year, I was led to the conclusion that no alteration in the constituents of the developer in any way affected the amount of detail that was brought out, provided that sufficient time were given. I believe Mr. Cadett has also come to the same conclusion, and as my present set of experiments show the same result, I think we may consider it as an axiom, that the action of light on a dry plate is absolute, and no strengthening of the developing agent can bring out what does not really exist.

Mr. Swan, in his experiments, made a comparison by means of ordinary negatives. I have seen these negatives, but I found it most difficult to make any very reliable deductions from them, and even Mr. Swan was obliged to acknowledge that it required a long and careful examination; I therefore in my experiments decided to use a graduated sensitometer screen, which may aptly be described as a negative reduced to its simplest expression. The plates used were the Castle Brand, the same as those used by Mr. Swan; they were all exposed to a uniform light behind ground glass for equal periods of time. The time was taken from a pendulum beating half seconds, and every care was taken to ensure the negatives being equally exposed.

The developers compared were:—Pyro and ammonia; quinol and caustic soda; quinol and carbonate of soda; quinol and carbonate of potash; quinol and ammonia; ferrous oxalate. The pyro used was sulpho-pyrogallol, and the quinol was Byk's, and was made up the same as the pyro with four times its weight of sulphite of soda, acidified with sulphuric acid. The caustic soda was the fused, in sticks. The carbonate of soda was the anhydrous salt, and the carbonate of potash the ordinary one of the pharmacopœia. The ammonia was the ordinary so-called 880°, but I cannot guarantee its strength. The ferrous oxalate was made up of acidified saturated solutions of potassium oxalate and proto-sulphate of iron. The restrainer used was invariably potassium bromide.

At the risk of being prolix, I will again state exactly those points in development I was investigating. Some little time back I saw some photographs of Captain Abney's; they were of snow scenes in the Upper

Alps, and although the range of tones between the bright reflected light on the snow and the deep shadows of the fir-trees was enormous, yet they were all proportionally represented in the photograph, both as regards the details in the shadows of the trees and in the high lights of the snow. These plates were developed by pyro and ammonia, and Captain Abney was kind enough to make known the particular formula he used for these views, which will be found on page 24 of vol. ii. of the *Camera Club Journal*.

In my own mind, I set this result down as the standard of excellency that any developer must attain in order to come into universal use.

How far quinol was capable of doing this the following experiments will, I hope, show. I will not weary you by going through them *seriatim*, but rather give you my deductions.

Commencing with pyro, we find the following laws:—By decreasing the quantity of pyro, the alkali remaining constant, we get loss of detail and also loss of density in the high lights; if, however, we continue development long enough to bring out all the detail, then the density in the high lights has also increased, and the result is what I call normal. If, however, whilst keeping the pyro down, say, half a grain (all quantities are in grains per ounce of developer), and increase the ammonia up to four or six minims, we find that now we can get out all the details before the high lights gather any great density, and, therefore, we get a long, low curve. This is precisely what we require; we have brought out the detail in the shadows, and the high lights have not yet assumed any over density, although by the suitable addition of more pyro we can at any time get any amount that we may desire.

Now, as to the behaviour of quinol under such circumstances, I am sorry to have to admit that it totally fails; its action is very distinct from that of pyro. If we decrease the quinol we lose detail, just as in pyro, but if we increase the alkali, unlike the pyro developer, we get no increase in detail, or, what is the same thing, no increase in the speed with which it appears, unless we add the alkali to a most enormous and impracticable extent, and this is practically the same whatever alkali be used. Ammonia appears to promise the best results, but it has to be added to an enormous extent, and then green fog makes its appearance with as much vigour as in any pyro and ammonia-developed negative.

To recapitulate the salient differences between pyro and quinol. The attainment of a low curve of intensity practically means that the detail, or less exposed portions, must be brought out rapidly before the high lights, or more exposed portions, have had time to gather density, and this may be said to depend on the speed with which those details can be brought out. Now, when a small quantity of pyro is present, increase of alkali means increase in the speed with which the detail appears; but with quinol, on the contrary, increase of alkali, in reasonable quantity, does not mean increase in the speed of development. In order to obtain this the quinol itself must be increased, in which case the development can be made most rapid, but, unfortunately, it is attended with an equal increase in density. The experiments show this most conclusively. Potassium bromide remains constant throughout. As its action is always to increase density, and as I was striving to keep density down, it became unnecessary to take this salt into account, although I found that a little is necessary to prevent a general slight reduction of the presumably unexposed portions of the film.

I found no practical difference in results when using the fixed instead of the caustic alkalis; development was undoubtedly more slow, but the gradations were practically the same.

With ammonia I found the greatest difficulty in getting any sort of an image, unless both the ammonia and the quinol were increased to a very great extent. I find one note, that with half a grain of quinol no image showed after ten minutes, although twenty-five minims of pure ammonia were added. The whole of the results with ammonia give green fog and metallic fog in a most virulent degree, and prove, I think, pretty conclusively that quinol is just as prone to fog as pyro, when used with the same alkali.

Passing now to the negatives developed with ferrous oxalate, we see that the rate or speed of development increases with the amount of the potassium oxalate present, so that it is possible to somewhat vary the gradations of the scale; one curious note, on diluting the ordinary developer with water, increases the density of the negative very considerably, being directly antagonistic to the result of having the oxalate in great excess.

From the above series of experiments I am led to deduct that, as far as regards the getting out of detail, pyro, quinol, and ferrous oxalate are all equal. As regards density—that is, the getting of the greatest amount of deposit for a given time of exposure—quinol and ferrous oxalate have, perhaps, the advantage over pyro, but my pyro series of experiments do not obtain any specimens specially made with the idea of getting density, so that it is quite possible that pyro may hold its own even in this, in most cases, very undesirable respect.

With regard to getting a low intensity curve, pyro is a long way the best, ferrous oxalate comes next, and quinol last. I am, therefore, led to believe that for negative work quinol will never oust pyro, to which I consider it decidedly inferior. It is, of course, difficult to make any statement as to the anti-fogging tendencies of quinol, but I am inclined to believe that this is simply a question of the alkali that is used; with ammonia, even with small quantities, quinol gave me green fog as badly as any pyro developer ever did, and I therefore consider that it is not altogether

so successful in this direction as one has been led to suppose. Quinol is not as soluble as pyro, and therefore presents a certain disadvantage from the point of view of ready carriage; and, lastly, quinol is more expensive than pyro. Therefore, taking all these considerations into account, I do not think that quinol is destined to survive long as a developer for photographic negatives. As a developer for lantern plates, owing to the great beauty in the colour of deposit that can be obtained by it, it may possibly live long and prosper, but as a developer of negatives its restoration to the country of its birth will be as short as the historically famous restoration of the Stuart dynasty.

FIFTY YEARS' PHOTOGRAPHY.

We have already alluded to Poitevin, and we think we may safely say that what is known as photo-lithography was to a large extent worked out by this Frenchman, and here again the alteration brought about by light on gelatine in presence of a bichromate is made use of. In this case, after damping the gelatine and going over it with a greasy ink, it was found that where the light had acted there the ink would adhere. The inky picture thus obtained was originally transferred to the stone, and subsequent impressions could be taken in quantity from this transfer. Drawing an ink impression from the surface itself constitutes what we now know under the names of collotype, lichtdruck, heliotype, and various other cognomens. The carbon image, as you are aware, is a true relief, and a photo-mechanical method was founded on this by W. B. Woodbury. The presence of the colouring matter always present in carbon tissue prevents the light penetrating to the depth it otherwise would; but if we do away with the colouring matter or reduce it to a minimum, we get, on development, a very marked relief indeed. Woodbury obtained such a picture, and by forcing it into a lead plate by means of suitable apparatus, an intaglio or mould of the original was secured. Impressions were drawn from this by means of a special ink—viz., gelatine—holding a colouring material to resemble the tone of the silver. It was run into the mould hot, paper was laid on the top, and the whole was tightly pressed in a press of a peculiar construction. When cold, the paper had the gelatine picture attached to it, and the mould was then ready for a repetition of the process. Woodburytype, as this mode has been called, may be said to have come into existence in 1864. It was duly protected by patent. In 1880 a modification of the process was brought forward by Woodbury, where the relief itself, protected by a layer of tinfoil, was employed to draw the prints from. It received the name of Stannotype. Many other photo-mechanical processes were devised by Woodbury, who has been—appropriately, I think—styled the *Carton* of photography. The title is certainly well-deserved, when we see first-rate likenesses of celebrated men and women retailed in the shops for the modest sum of one penny. Woodbury died in somewhat straitened circumstances on September 5, 1885.

We have already referred to Poitevin, who may be reckoned the Woodbury of France; but we wish at this point to refer to a process worked out by Poitevin, and one which can be made to give good results. Organic matter in the presence of a bichromate again forms the starting-point; but another property which light induces, founded on the hygroscopic nature of the substance employed, dextrine and sugar for the most part, is made use of. After exposure a fine impalpable powder is dusted over the plate, and it adheres in those parts protected from the light; hence, a negative gives a negative reproduction reversed as regards right and left. From the nature of the operation involved, the name of the "powder process" has been given to it. The salts of iron have been found to give similar results to the bichromate usually employed. Photographic research does not seem to be one of those things which tend to benefit financially the men working at it. Like Woodbury, the Frenchman whose process we have been considering died unrewarded. He seems to have all his life worked at photographic reactions and photographic applications, and I know of no more suggestive book than Poitevin's *Traité des Impressions Photographiques*. Louis Alphonse Poitevin was born at Conflans in 1819, and died in his natal town on March 1, 1882. We cannot go further with his career, but France, mindful of its distinguished men, has erected a commemorative bust to Poitevin in the town of Conflans.

We will simply refer to one other photographic process, and one, perhaps, which has been made to suffer through being protected by patent, although this no longer applies, for all are now free to use it—I refer to the platinotype process. The merit of discovery of this mode of printing is due to an Englishman, Mr. W. Willis, jun., who took his first patent out in 1873, although subsequent patents followed in 1878 and 1886. The nature of the chemical reaction involved is, however, one of those discovered as far back as the days of Herschel, and is due to the action of light on a ferric salt, reducing it to the lower state of oxidation. The ferric salt is mixed in the first instance with a salt of platinum, and paper coated with this mixture, after exposure, say behind a negative, is floated or drawn over a hot solution of potassium oxalate. When the light has reduced the ferric salt to the ferrous state, then metallic platinum is deposited. We may simply add that a direct printing on platinum process has lately been devised, but it would appear that the printing is a very tedious affair.

• Concluded from page 232.

We have not time to go into all the various salts which from time to time have been brought forward, and on which light has been found to have a decided influence. Salts of uranium have been largely experimented with, and their behaviour seems to be very much the same in character as that of iron. The salts other than iron, the chromates and those of silver, affected by light, would require a paper to themselves. I feel I have trespassed sufficiently on your patience as it is, but perhaps you may allow me to conclude with a quotation I have, on a previous occasion, given, and one which shows how photography was regarded by one who knew nothing of the practical working of it, but who looked only at its influence. I refer to what Jane Welch Carlyle wrote:—

"Blessed be the inventor of photography! I set him above even the inventor of chloroform. It has given more positive pleasure to poor suffering humanity than anything that has cast up in my time, or like to: this art, by which even the poor can possess themselves of tolerable likenesses of their absent dear ones. Mustn't it be acting favourably on the morality of the country? I assure you I have often gone into my own room in the devil's own humour, ready to swear at things in general and some things in particular, and my eyes resting by chance on one of my photographs of long-ago places and people, a crowd of gentle thoughts has rushed into my heart, driven the devil out as clean as ever so much holy water and priestly exorcism could have done. I have a photograph of Haddington Church tower and my father's tombstone in it, of every place I ever lived at as a home, photographs of old lovers, old friends, old servants, old dogs."

W. Lano, JUN.

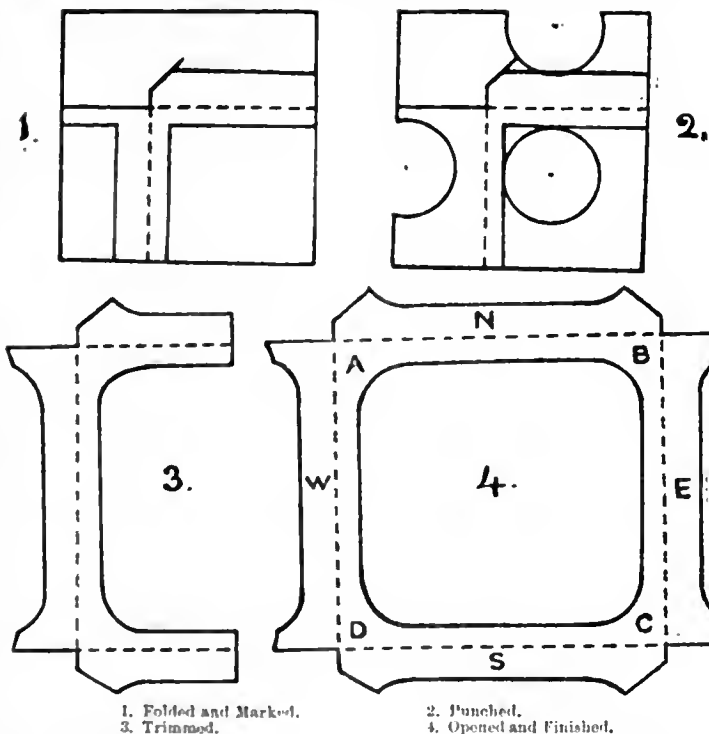
ON THE BINDING OR FRAMING OF LANTERN SLIDES.

[A Communication to the Edinburgh Photographic Society.]

In my early paper on *Stands for Viewing Transparencies on Glass* I advocated very strongly the merits of these, and would refer you to what is there said. That was twenty-six years ago. Lantern slides have since then, no doubt, gone on growing in favour, but not so rapidly as might reasonably have been expected. However, I quite recently heard that American visitors to our city were showing a decided preference for these to even the beautiful paper photographs now so easily procured, as the form in which to carry away *souvenirs* of their visit to Scotland; and I fancy the preference for the diaphanous photographs would become very much more decided and widely extended if instruments for viewing them satisfactorily without the lantern were readily procurable at moderate prices.

But though much may be claimed for the permanence of the pictures on the slides, what can be said for the durability of the paper bindings? Used even carefully I find they soon get into a frayed and loosened condition. Then what a troublesome business it is to gum on the four strips of easily torn paper; and these do not suffice, for, to give a satisfactory outline to the picture, it is necessary to insert a paper mask between the two glasses.

In *THE BRITISH JOURNAL OF PHOTOGRAPHY* for January 3, 1868, in a paper signed "Bivalve," I suggested the use of one piece of paper cut to a proper



shape, as there figured, to do in a firmer way all that the mask and four strips of paper performed.

Eighteen years later the same idea had occurred to Mr. Thomas Gulliver, as he describes and figures exactly such a mount in *THE BRITISH JOURNAL OF PHOTOGRAPHIC ALMANAC* for 1886, at page 150.

I show on the table the different stages of the system of mounting I now follow. It will be observed that both faces of the slide are now similarly masked. The form of paper to effect this for the commonest shape of opening is shown by Fig. 4; this, after the face has been well pasted, is placed on a loose piece of thick flannel; the transparency, with covering glass tacked on with thin layers of sealing wax inside the corners, is then imposed face downwards upon the mount and brought to coincide with the square A B C D. The sides marked W and E are then turned over upon it by lifting the edges of the flannel one after the other, and the operation finished by next turning over sides N and S.

Now, what are the caterers of photographic materials about that they do not provide these things? Why should I have to cut out each separate mount with gun-wad punch and scissors when one hundred could be stamped out at one operation, and in a few seconds, by means of a pair of proper steel cutters, after the fashion of envelope blanks?*

It is desirable that these paper mounts should be cut from a smooth, thin-nish, tough paper; in fact, a pure linen rag paper, if such can now be got; that there should be supplied varieties giving choice of differently shaped openings; and that they should be of some nice light colour, to allow of writing on them the titles and particulars in ordinary ink, for I believe the advantage of making the framings black is illusory. It will be observed that the blanks I use are such that at the corners the paper crosses well over upon itself, thus securing firmness of hold and also a mitre-like joint.

I confess that it is sometimes impossible to make with these single-piece mounts a very neat job at once. This arises from the glasses varying much in thickness, and often departing considerably from the exact sizes of $3\frac{1}{2} \times 3\frac{1}{2}$, but a little after-trimming with a knife will seldom fail to give a satisfactory finish.

R. H. Bow, C.E., F.R.S.E.

LORD RAYLEIGH ON EXPERIMENTAL OPTICS.

VI.

LORD RAYLEIGH, in the course of his sixth lecture at the Royal Institution on the above subject, said that some waves of a beam of light neutralise other waves, somewhat as in the case of waves of sound, as demonstrated in his preceding lecture, but that if a convex lens be placed in the path of the beam of light, the properties of the lens are such that it brings to a focus all the waves, including those which otherwise would have been neutralised. Although the waves passing near the edge of the lens have farther to travel than those passing through the centre, the central waves have to pass through a greater thickness of glass, and as light travels more slowly through glass than through air, the central rays are more retarded, so that all the rays passing through the lens reach the focus at the same time. The waves not previously in accord are brought into accord at the focus. In the case of a prism, the parts of the wave front which pass through the thick end are retarded more than those which pass through the thin end.

He then dealt with diffraction phenomena, saying that the first gratings were made by Fraunhofer, who fastened gold leaf to glass, then scratched it into fine lines by means of a machine. Later on it was found that diamond scratches on glass would make a more permanent grating, and later still it has become common to rule lines upon speculum metal, because glass, being of unequal hardness, perhaps from the presence of uncombined particles of silica, is found to injure the diamond points, and good diamond points for the purpose are difficult to obtain. From 3000 to 15,000 or 20,000 to the inch are about the range of lines in gratings, and speculum metal being softer than glass, is less trying to the diamond point. Gratings do not behave precisely alike, because of peculiarities in the ruling. He here projected upon the screen an image of the carbon poles of the electric lamp, and by the use of a grating showed how the latter projected a central image of the points, and on either side thereof a succession of spectra, with spaces between some of them; the spectra most distant from the central image overlapped each other. Next he repeated the experiment, but substituted an image of the slit of the electric lamp for the carbons; more perfect but less brilliant central image and spectra were the result. A diffraction spectrum has about one-tenth the brilliancy of the ordinary spectrum; the central image gets the lion's share of the light, the rest of which is divided among the total number of spectra produced. The blue end of a diffraction spectrum is always nearest to the central image. Although a diffraction spectrum is lower than the ordinary spectrum in brightness, it resolves fine lines better, and affords a direct and the most accurate method of measuring wave lengths. The prismatic spectrum varies to a certain extent with the angle of the prism, and the substance of which it is made; it is a spectrum depending upon the properties of the material used; it also dilates the violet end of the spectrum; the diffraction spectrum is more properly treated as the standard.

In diagrams of the distribution of the energy of the prismatic spectrum, a great hump in the invisible region beyond the red end denotes the position of maximum heating effect; this hump is due to a peculiarity of the prism, and is much lowered when a diffraction spectrum is used; altogether the diffraction spectrum is the best to use in stating scientific results. A difficulty about the prism comes in in experiments with the invisible heat rays; you must first make sure that it is transparent to

* Were this done the mounts could either be supplied without any opening, which could afterwards be cut of any size or form desired, or, provided the shape given by the folding-over margins was a square of sufficient area to ensure that its outline would not trench in any way on the other opening, a choice might be afforded of square, circular, oval, oblong, or dome-shaped apertures of various dimensions.

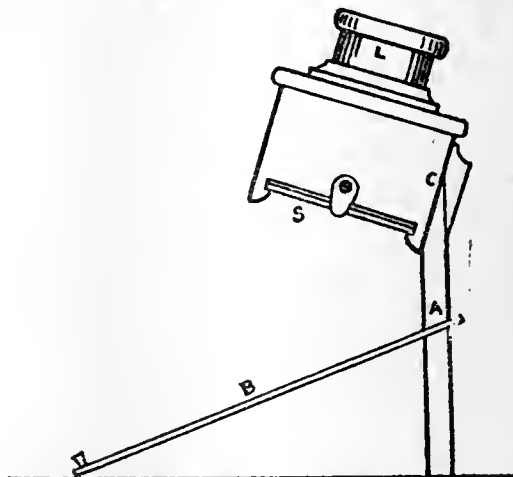
them, or must ascertain its degree of transparency. Professor Langley has discovered that glass with no green tinge is much more transparent to the red and the ultra-red rays than other kinds of glass, and in the more refined experiments with ultra-red rays glass must be abandoned and rock-salt substituted as discovered by Melloni.

Lord Rayleigh said that he did not think the scale of wave-length the best to be used in research with the spectrum, and that he believed Mr. Johnstone Stoney was the first who raised the question whether the velocity of vibration should not be used as the scale. On theoretical grounds the scale of frequency of vibration is best to employ, but that of wave-length is the most convenient.

A SECOND NOTE REGARDING STANDS, BY MEANS OF WHICH LANTERN SLIDES MAY BE SATISFACTORILY SEEN.

[A Communication to the Edinburgh Photographic Society.]

As indicating the diaphanous character of the lantern slides, &c., I would suggest that the instrument for viewing them should be called a diaphanoscope, or this shortened into diaphascope.



The "Diaphascope," a Menoclar Form of Stereoscope. (Seen in profile.)

In the earlier form of the stand, which I described before this Society twenty-six years ago,* I gave the preference to ground glass as an illuminating background for the transparency, but placed several inches further away, so that the appearance of grain would be lost by being thrown much out of focus. And for the denser transparencies, at least, I still think this background the best, as giving a stronger illumination.

Shortly afterwards I had several instruments made, with paper substituted for the glass, not as being better, but from allowing a more portable form to be adopted. This is shown by the figure. The slide is at S; on B is laid the cardboard to form the background; the lens, L, is fitted to a draw-tube, which can be adjusted to suit different sights, being pushed further down for near-sighted persons. B has a dovetailed connexion with A, and A with C, so that the whole can be easily taken to pieces and packed in small compass.

Two constructive details of the instrument in either form are, first, to provide a lens capable of giving a comparatively flat field over the extent of a lantern slide, and that with a considerable magnifying power; and, second, to enclose the transparency, so as to get rid of the bad effects of light being reflected from its face.

As to the lens, I have usually adopted a simple plano-convex one of about three and a quarter inches focal length, and one and a quarter inches or more in

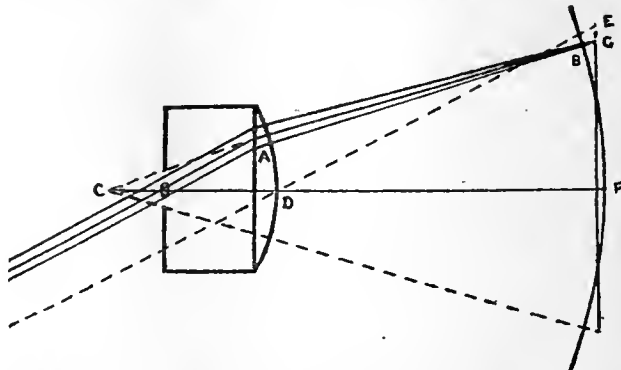


Diagram illustrative of the Optical Principles involved in the Construction of the Diaphascope.

diameter. This gives a fairly good result, and the picture is seen in the instrument much more perfectly, I think, than it ever is on the wall screen. I

* THE BRITISH JOURNAL OF PHOTOGRAPHY for March 2, 1863, page 101.

may here offer a few remarks upon the conditions under which a plano-convex lens acts. First, let us proceed as if to take a photographic view with such a lens. The best position for the stop (see figure) for the margined pencil of rays, S A, will be at S, arrived at thus:—C is the centre of curvature of the face A D, and A S is taken = $AC + \mu$. Now the pencil of rays S A will pass into and out of the lens in the radial direction C A B, and will consequently have the longest possible focal distance A B. And for intermediate pencils this is nearly correct. The curvature of the field will have C for its centre, and therefore a radius of curvature equal to the focal length, augmented by the radius of curvature of the convex face of the lens.

On the table I place a transparency printed from a negative taken by such a lens.* It is better than might be expected, especially when we consider that little advantage can be got from using a very small stop. A very small stop would reduce the aberrations at the middle region of the picture, but would have very little ameliorating effect upon the chromatic confusion at the margins. The stop used in this instance was equal to one-twentieth of the focal length. Radius of convex face = 1.75, focal length = 3.3, radius of curvature of the field fully five inches; angle of view embraced by three-inch width of negative = 52°.

In a paper I read before this Society on May 6, 1883,† I described my plan of mapping down the curvatures of the field, and insisted that it was quite as important to keep the curves given by the primary and secondary foci from separating very far as it was to approach to an average flatness of field. Now I attribute much of the comparatively good effects got by this simple lens to the fact that with it the primary and secondary foci are united, and consequently there is no astigmatism.

Let us now consider the action of the lens when employed to view the photograph. Suppose that an eye is substituted for the stop in the figure, the centre of the eyeball should coincide with the point S; and let us now regard the pencils of rays as travelling back again from the picture. Thus the rays of the divergent pencil from point B are rendered parallel by the lens at A, and entering the eye at the same angle they had when in the first operation they were received from the landscape, they next become focussed on the retina. As the eyeball oscillates in its socket it receives in succession the other pencils, and thus the picture is viewed in perfect perspective, the distortions (as E G) being corrected by the reverse action of the lens on the same principle as I explained in a paper read before you on October 21, 1883.‡

I prefer using a high magnifying power in the diaphoscope, even when this runs counter to the theoretical rule, which prescribes the adoption of a lens of the same focal length as was used in taking the negative in the case of equal or contact printing; or if the transparency be a reduced copy from a large negative then a focal length reduced in the same ratio. Two advantages are gained by using the powerful lens—we see the minutest details more perfectly; and from the larger apparent angle of view the picture gives a feeling of expanse.

I have placed on the table two diaphoscopes with lenses equal to 3.3 and five inches respectively. In these are shown identical transparencies, and I think any one on examining these, one after the other, will be struck with the contracted character of the view as seen by the five-inch lens. The apparent angles of view will be about 52° and 34° respectively; the actual view as taken on the negative was, I believe, 37°.

In taking negatives specially for the purpose of printing lantern slides by contact, it would generally be advisable, for several reasons, to use a view lens of short focal length, and so do away with any objection on the score of false perspective.

And although the non-achromatic lens as applied to the diaphoscope behaves fairly well, it would no doubt be better to use an achromatic one, and the cost of such, if made in numbers, should not be great. The focal length I should prefer would not much exceed three inches; and there is this to be said in favour of the plano-convex, or moderately meniscus achromatic, that the eye may be placed very near to it, and consequently the diameter might be reduced to an inch or less.

Before concluding, I would call attention to the differently coloured papers or carbonisers that may be used as backgrounds. For ordinary pictures the best effect is, I fancy, got by using a warm stone colour, or orange. For wintry or moonlight scenes a good effect is produced by the pale lilac, and for sunset effects use the crimson or red.

R. H. BOW, C.E., F.R.S.E.

THE CAMERA IN SWITZERLAND AND ON THE ALPS.

[A Communication to the Dorned Amateur Photographic Association.]

SWITZERLAND, "the playground of Europe," as it has been happily called, is so easily reached, and its attractions are confined within such narrow limits, that it has become to many Englishmen more familiar than the holiday resorts of their native land; and it is certainly more easy within a limited time to carry away with one a good general idea of its beauties than of some other European countries. The picturesque nature of its scenery, which gives it interest in the eyes of the general traveller, makes it a happy hunting ground to the photographer, and yet, though books innumerable may be found which describe Switzerland and its scenery for the traveller and tourist, there are none, so far as I know, written for the amateur photographer, giving him hints as to light, exposures, points of view to be chosen, and points of view to be avoided. And it is too trying to the patience and temper of the enthusiastic amateur to have to waste precious sunshine in hunting for picturesque spots which when found are useless for photography. Have any of you gentlemen ever been told of a splendid view to be obtained from a certain hill, and, after a hot walk up a steep hill for a couple of hours heavily laden with your photographic impedimenta, you have reached the spot and found a fine panorama stretched out before you but quite useless except to the man who is provided with a 24x18 camera or a lens like a telescope? What would the panorama from the Rigi or Mont Blanc look like on a quarter-plate? There might be plenty of magnificence in the panorama, but there would be little of it on the quarter-

plate. "Oh," said a friend, "I always look at the photographs in the shop windows, and find out through them what there is to take." It is always useful to examine the photographs in the shop windows, and there is always something to be learnt from them, if it is only what to avoid, for it is not every good manipulator who has the eye of an artist.

It would be a convenience to photographers if a kind of photographic Swiss *Baedeker* were compiled, giving particulars of the principal views in the locality—how they can be reached, the best hour of the day for photographing them, the lenses, with length of focus best adapted for taking them—with a note of the most picturesque spots within a reasonable distance, to which should be added a list of hotels in which dark rooms are provided. I have not the presumption to suppose that these conditions will be perfectly fulfilled for the places named in the short lecture I have the honour of delivering before you, even so far as it goes, but I hope the remarks I may have to make and the lantern pictures by which they will be illustrated may be useful to any one who contemplates photography in Switzerland and has had no previous experience in the country.

I took six dozen plates with me, and lost only six—two through over exposure, four by double exposure; there were three duplicates which I have not printed, and I brought back six plates; the other fifty-seven pictures will be exhibited on the screen.

As to outfit, portage is cheap in Switzerland; it is, therefore, more easy to use a large camera than in some other countries; but I prefer to employ porters when I please, and to be independent of them when it suits my purpose. With a big camera you are tied to a porter; you can move nowhere without him. I should, therefore, even in Switzerland, prefer a camera I could carry myself rather than be entirely dependent on others; and I have no cause to regret having taken a half-plate camera, especially as the enlargement of pictures is so readily effected.

This half-plate camera had four double backs, the whole packed comfortably into a waterproof canvas case, leather bound, to the top of which the legs were strapped; the whole was carried by means of a broad woollen web (not leather strap), which was passed down the sides of the case and underneath the bottom, giving good support, and loose enough at the top to sling over the head and one shoulder. As regards lenses, I took but one, a Dallmeyer rapid rectilinear; had I taken another lens I should have preferred a long-focus to a short-focus lens; the latter might have been useful in some of the towns, though I managed well enough without it, the former would certainly have been very useful on the mountains. As I stated before, I took six dozen plates. I tried films, but in my hands their action was not sufficiently certain to induce me to depend upon them. The rest of the outfit consisted of a folding lamp, two trays, a light-tight plate box, a small wide-mouth bottle containing pyro sufficient for the plates in twenty-four-grain packets (the pyro compressed took up very little space), a bottle of ammonia and brouide, and a bottle of bromide in solution for over-exposed plates.

I anticipated some difficulty at the Custom houses, as the Swiss have lately put a duty upon imported plates. I found none anywhere; the officials were everywhere most considerate and courteous. I was asked on the Swiss frontier what number of plates I had and the size, the officials accepted my statement, and charged a small duty, and allowed the baggage to pass without examination.

The only addition to the outfit I could suggest would be to include a second front carrying two lenses, with a loose partition for the half-plate camera, so as to make it available for views either of half-plate or stereoscopic size. Undoubtedly photographs of Swiss scenery can be best enjoyed in the form of stereographs; only in that form can distance be represented and a natural relief obtained. Some pictures I have of glaciers two miles distant and mere look, in the single picture, close at hand, and therefore insignificant; in the stereograph they would have appeared in their right proportions.

One very important point to be observed on photographic expeditions generally is to develop test plates from time to time to correct the exposures; had I omitted to do this I should have had very few pictures to show you, for it was very evident that I was over exposing on the other side of the Channel with exposures which would have done very well on this side. I found out my fault on developing one or two plates early enough to correct it before reaching Switzerland. In some few of the hotels dark rooms are provided, but as a rule the amateur who wishes to develop must either do so in his private room at night or obtain permission from, and make fair compensation for disturbance to, some local photographer to develop in his dark room at an hour when he will not be using it. Pursuing the latter course led to my introduction to some professional men of standing and repute in their own neighbourhood, and excellent fellows I found them; and through them I obtained some insight into the practice of the Continental studios. Everywhere oxalate development appears to be the method employed. On informing one gentleman that I used pyro he smiled and evidently thought I was to be pitied; they had given up pyro long ago, he said. On seeing the negatives produced by pyro, however, his opinion underwent a change. One, *Hagmaling in the Alps*, he was pleased to style "magnifique." He particularly remarked the extreme delicacy and sharpness of the image, the latter due partly to a favourite Dallmeyer rapid rectilinear, but, undoubtedly, in no inconsiderable degree due to the ammonia developer; for on comparing with his oxalate negatives I found some of the finer detail obliterated, if I may so express it, by the piling up of the lights, which seems necessary in using an oxalate developer if great contrast and pluck are required, for the deposit being of a blue-black colour it is much less actinic than the yellow brown of the ammonia and pyro. His negatives had the qualities and very much the appearance of good negatives of the old collodion type.

A dark room is, of course, not a necessity for the changing of plates; my cardboard folding lantern, with its window of ruby material, a candle end inside, and a bit of tin plate on the top, gave a safe and sufficient light for changing plates at night.

If the route to Paris is taken via Chalais and Dorn, Amiens will be passed. A night can be profitably spent there. The Cathedral is well worth a few plates. Good views of the exterior can be obtained: of the south-east, from the street running south from the east end; of the south porch; of the west end, from the south-west; and of the great west doors. The first three can be taken in the morning, the two last named at two in the afternoon; the sun will be round sufficiently by that time to throw up in good relief the carved work, and there will be sufficient time to take the fast train for Paris. The exposure in June with Hford ordinary or Miall's plates will be one second or less, with f/34. There are some interesting old figure subjects carved in high relief which are well worth a plate or two; they will be found inside the church, on the walls of the choir, but outside of it.

There are interesting views to be obtained in Paris, but the difficulty is to know from whom permission can be obtained to photograph them; half a dozen different officials may have to be interviewed for permission to take as many pictures. To take

* On the Management of Non-achromatic Lenses. See my remarks in THE BRITISH JOURNAL OF PHOTOGRAPHY, 1886, page 221.

† THE BRITISH JOURNAL OF PHOTOGRAPHY, 1883, pages 224 and 234.

‡ To Make an Absolutely Correct Camera Copy of a Chart by means of a Single Distorting Lens, THE BRITISH JOURNAL OF PHOTOGRAPHY, 1883, page 421.

them without leave is to court trouble. If the views are worth it, three or four days at least should be allowed for photographing them. There may soon be greater facilities for photographing in Paris if the members of the new amateur photographic society lately formed there act in a fraternal manner towards their *confrères* in the art.

Not many people stop at Pontarlier on their way to Switzerland, *à la* Dijon, yet the neighbourhood is interesting, in the midst, as it is, of the fine scenery of the Jura mountains. In the town itself there is nothing particularly striking; the old gateway might be worth a plate, and a view may be obtained from the public gardens and one of the bridges, but there are good views of forest scenery with a mountain stream a mile or two out of the town, and of mountain scenery at greater distances. We happened during our stay there to come in for the *Fête Dieu*, a spectacle which, in its setting of a little old-fashioned French town, was worthy of any painter's brush. Some of the groups were most interesting and picturesque. Unfortunately the sky was exceedingly dull and overcast, and shutter work was entirely out of the question. The photograph before you of the funeral party headed by the priest and acolytes, &c., was taken on the following day; the light was better, but still very poor. The picture, however, such as it is, was secured by a drop shutter and lens stopped down to *f*-11.

On the way from Pontarlier to Neuchâtel, the train winds in and out, first round one spur of the Jura mountains, then round another, giving in great variety some exquisite views; not many, so far as I could judge, would lead themselves to photography from the spots from which we viewed them; there was, however, one exception—a little valley bounded by mountains with a brawling stream running down it, near, I think, the third station before reaching Neuchâtel. I intended to go back for it, but the trains ran inconveniently and I could not spare the time. The first view taken in Neuchâtel was the photograph of the market-place, which was taken in the early morning with the *f*-11 drop shutter Ilford extra rapid; it would have been much improved if the people had been in national costume, but here, as well as in Italy and elsewhere (Dorset included), the national costumes are fast disappearing. The building with the towers in the background is of great antiquity and is worth a plate to itself. Whilst waiting for the people to move on from the front of the lens, a pretty-looking Swiss girl came up and modestly asked, "Does Monsieur take portraits, and how much would he charge for taking hers?" Monsieur inwardly thought he would be only too pleased to take half a dozen for nothing if only Mademoiselle had been in costume, but what he said was hypocritical: "Monsieur regretted that he was only a landscape photographer, and he feared that no photograph of his would do justice to Mademoiselle." Mademoiselle retired looking pleased, though with a shade of disappointment.

The chief interest of the place centres in the Schloss, the palace in ancient days of the kings of Neuchâtel, now converted into Government offices; built on an eminence it dominates the town, and is a prominent object when seen from any part of it. The best view of this fine group of buildings is obtained from the railroad, a few yards from the pointsman's cottage. Ask the way. You will have to mount an innumerable number of steps, but the view a few yards along the line from the cottage will well repay you—the chateau towering up high above the town, and in the background the lake with the plain beyond ending in the range of the snow-capped Alps. The view should be taken either in the early morning or in the evening; by day the mountains are capped or totally obscured by mist; the exposure will be very short, one or one and a half seconds, with plate of ordinary rapidity, stop *f*-32, time half-past six in the morning, June 12. You will have to descend and remount to reach the Schloss; two views at least are worth taking there, the entrance and *façade* of the palace, and the cloisters of the chapel. The former should be taken between half past eleven and twelve, exposure one and a quarter seconds in June, *f*-33, the latter three seconds, same stop. The chapel is not worth a plate, it has been so mutilated; but there is a curious monumental group inside of the twelfth century, consisting of fifteen life-sized figures.

(To be continued.)

W. MILES BARNES.

INTERNATIONAL PHOTOGRAPHIC EXHIBITION, CRYSTAL PALACE, S.E. LANTERN DIVISION. LIST OF AWARDS. Section A. Amateurs only.—*Class I. British Landscape*, Seymour Conway; *Class II. Foreign Subjects*, W. A. Greene; *Class III. Seascapes*, A. R. Dresser; *Class IV. Architecture—Exterior*, J. B. Hilditch; *Class V. Architecture—Interior*, T. M. Brownigg; *Class VI. Animals*, Lewis Medland; *Class VII. Figures in Motion*, Henry Little; *Class VIII. Microscopical*, F. H. Evans; *Class IX. no award*; also medal to F. Brighlman for his exhibit in *Class III.* Section B. Open to all (forty-eight slides).—*Class I. British Subjects*, G. W. Wilson & Co.; *Class II. Foreign Subjects*, Cyril Frith; *Class III. Slides produced by Mechanical Processes*, The Sciopticon Company.

AMERICAN EXHIBITION. AWARDS.—The Board of Judges appointed to make the awards of diplomas for work at the Joint Exhibition of the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, and the Boston Camera Club, fully make the following awards:—*Diplomas for Special Excellence*.—1. For landscape or marine views.—Harry Tolley, Nottingham, England, No. 524, *On the Lonely Shore*. 2. For portraits.—Frederick Gutekunst, Philadelphia, No. 303, *Miscellaneous Portraits*. 3. For genre subjects and figure compositions.—W. W. Winter, Derby, England, No. 608, *My Mammy*. 4. For work by ladies.—Mrs. S. M. Cleveland, Philadelphia, No. 311, *Entire Exhibit*. 5. For Enlargements.—William H. Rau, Philadelphia, Nos. 340 to 343. 6. For Lantern Slides.—Professor Henry A. Rowland, Baltimore, Md. 7. For applied photography, scientific or technical.—Prof. Henry A. Rowland, Baltimore, for photographic maps of the normal solar spectrum, second series, 1888. *Diplomas for Excellence*.—For entire exhibits.—Frank M. Sutcliffe, Whitby, England; William Parry, Shields, England; J. P. Gibson, Hexham, England; John Bartlett, Philadelphia;

Charles L. Mitchell, M.D., Philadelphia; George B. Wood, Philadelphia; Paul Lange, Liverpool, England; Robert S. Redfield, Philadelphia; Richard Keene, Derby, England; Harry Symonds, Portsmouth, England; S. W. Burnham, Lick Observatory, California; The Rev. F. C. Lambert, M.A., Cambridge, England; H. A. Latimer, Boston, Mass.; A. K. F. Trask, Philadelphia; George A. Nelson, Lowell, Mass.; R. T. Hazzard, Philadelphia; Clarence B. Moore, Philadelphia; Mr. and Mrs. W. J. Anckorn, Arbroath, Scotland.

Our Editorial Table.

FLASH LIGHT FAMILY GROUPS.

WE have before us a series of domestic groups taken by Mr. Wm. Taverner, jun., by means of Hart's patent magnesium flash lamp. We learn that two of these lamps were used in the production of each of these home scenes, which may account for their delicate softness combined with vigour, while free from heavy or harsh shadows. The grouping and general arrangements are not less artistically made than skillfully carried into photographic effect. They show the possibility of taking groups of a high order of excellence with a total independence of daylight. For these pictures Mr. Taverner was awarded, and most justly so, a medal at the recent Crystal Palace Exhibition.

AN IMPROVED FLASH LAMP.

By F. W. HART, Kingsland Green.

SINCE the time when Mr. Hart first exhibited at the North London Photographic Society the outcome of his experiments, made with a view to the further improving of the Hart & Bishop lamp, he has been assiduously at work in effecting still greater improvements than those first foreshadowed, until at last it is questionable whether any further room is left for improvement. The lamp, as placed in our hands, is of what we might designate the domestic order, in the sense that it is suitable for interior views, or small groups in the parlour or drawing room, in contradistinction to the powerful battery required for embracing the stage of a theatre, the dining tables of a restaurant, or a piece of architecture on the opposite side of a street—feats which we have placed on record as having been successfully effected. This "domestic" article consists of two lamps, capable of being separated from each other to any reasonable distance, to suit the exigencies of the lighting required. They are by rubber tubes connected with a metallic reservoir, in which is kept a store of compressed air, and which is thus charged when wanted by the action of the hand upon a pneumatic ball. The lamp itself differs in no essential respect as regards its burning qualities from that which we described in these pages over a year ago. Each having been charged with the few grains of magnesium powder required, the spirit lamps having been lighted, and everything in readiness for the exposure, the operator releases a tap at the reservoir, and simultaneously both lamps emit a dazzling sheet of flame.

It is very evident from the construction of the apparatus that simultaneity of flash would occur if there were twenty lamps instead of two. There are numerous ingenious appliances in the shape of valves, &c., connected with this elegant outfit, all of which have been protected by patent, particulars of which will subsequently be described in our columns devoted to patent specifications when their publication will have been matured.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6043.—"An Improved Photographic Shutter." G. DIXON.—*Dated April 9, 1889.*

No. 6047.—"An Improved Porcelain Tray for the Development of Photographic Negatives." T. W. GIMSON.—*Dated April 9, 1889.*

No. 6053.—"An Appliance to Effect the Mechanical Mounting of Photographs, Prints, and similar Pictures." R. W. BRIGGS.—*Dated April 9, 1889.*

No. 6082.—"Feeding Magnesium Flash Lamps." H. M. HASTINGS.—*Dated April 9, 1889.*

No. 6353.—"Improvements in Photographic Apparatus for Tourists and Travellers." S. A. DARIER-GIDE.—*Dated April 13, 1889.*

No. 6374.—"Improvements in or relating to Instantaneous Shutters for Photographic Cameras." Communicated by E. A. Werber. A. J. BOULT.—*Dated April 13, 1889.*

No. 6385.—"Improvements relating to Stereoscopes and Cameras." H. RANSOM.—*Dated April 13, 1889.*

PATENT COMPLETED.

IMPROVED BATH WITH CIRCULAR FLOW OF WATER FOR WASHING PHOTOGRAPHIC PICTURES.

No. 838. WILLIAM ROOKE, 290, Caledonian-road, Middlesex.—January 16, 1889.

THE object of this invention is a novel construction of bath in which photographic pictures can be washed by a travelling or moving flow of water, said apparatus having a siphonic draw-off.

For the purpose of my invention I construct a circular pan or trough and supply water at an angle at the top for a circular flow.

The side of the pan has a well in which is a turned-up end of a pipe, this being in connexion with a syphon. The bottom of the syphon pipe is in connexion with perforated screens provided at the lower periphery, so that the draw-off by the syphon is in excess of the inflow.

The short pipe in the well is for breaking the inflow when the water has reached the level, the pan then filling up again for a fresh syphoning.

The claims are:—1. The construction and arrangement of a bath for washing photographic pictures, in which bath an automatic siphonage is established for partially emptying said bath and for automatically breaking the siphonic action for a refilling of the bath as described and substantially as shown by the annexed drawings. 2. The improved bath shown on the annexed drawings, in which a circular or equivalent swilling or moving body of water can be maintained for washing photographic pictures, said bath being furnished with means for automatic siphonage for partially emptying and means for automatically breaking the siphonage for the refilling, all as set forth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 29	Bolton Club	The Studio, Chancery-lane, Bolton.
May 1	Coventry and Midland	The Dispensary, Coventry.
" 1	Edinburgh Photo. Society	Professional Hall, 3, George-street.
" 1	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 2	Bolton Photographic Society	The Baths, Bridgman-street.
" 2	Leeds	Philosophical Hall, Leeds.
" 2	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 2	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 2	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

APRIL 23.—Mr. William Holford in the chair.

Mr. C. WOLLASTON exhibited a piece of apparatus he had made for testing the speed of shutters working between the lenses, showing their speed at different portions of their path. It consisted of a short piece of tube which he substituted for the lens; the front of the tube was closed by a disc across which a few holes were bored in a straight line; the back of the tube was similarly closed, but the disc there pierced with a row of pinholes about one-tenth of an inch apart; close behind this arrangement was a disc, which, by multiplying gear, could be made to rotate accurately at a speed of five thousand seven hundred and sixty degrees per second, and was covered with a sheet of sensitive paper. This arrangement was exposed to sunlight, and on releasing the detent of his shutter, concentric curved lines were produced upon the disc, and appeared after development; they showed the time occupied while the shutter was giving an aperture of $f/32$, $f/16$, $f/8$, and so on. The greatest speed he had registered was one three-hundred-and-fiftieth part of a second. During the time of opening and closing of go-and-return shutters the most useful part of the lens is not in action for nearly half the period, and they necessarily do not give such good definition. He had recently applied Newman's brake to his shutter.

The CHAIRMAN remarked that with the temporarily small apertures of those shutters which first open at the centre of the lens the picture is sharpened all over.

Mr. FRIESE GREENE complained of the weight of Mr. Wollaston's shutter.

Mr. WOLLASTON replied that he could not cure that.

Mr. T. BOLAS remarked that it would be of scientific interest if Mr. Wollaston would obtain a diagram showing the speed at different portions of its path of a drop shutter while being drawn down by a piece of elastic.

Mr. FRIESE GREENE exposed a bromide plate, cut it in two, and placed one-half of it face upwards on a piece of zinc larger than the plate and covered with water containing a trace of sulphuric acid. A current from one large cell of a bichromate battery was passed through the zinc. After two minutes or so of this treatment it was taken out and placed with the other half of the plate in a quinol developing solution. An image came out on the latter half, but none on the half which had been over the zinc. The latter half was then again exposed and afterwards placed direct in the developer, when the last image impressed came out. Although, he said, one would suppose all the current to have gone through the zinc, yet by induction, or otherwise, some of it seemed to have acted on the film and "extracted" the latent image. He had found that platinum would do as well as zinc, but in all cases the metallic surface must be large.

Mr. A. COWAN would like to see the experiment repeated without the zinc or the battery.

Mr. GREENE had no more solutions, but he had tried what Mr. Cowan suggested and had not obtained the result.

Mr. BOLAS said that he and Mr. Arnold Spiller thought it likely that some electrolytic decomposition of the acid, despite the zinc conductor, released some oxidising agent at one of the electrodes and thus produced the result.

Mr. SEBASTIAN DAVIS said that it was understood that if a film were oxidised in any way the latent image thereon was destroyed; he remembered that

Captain Abney had used peroxide of hydrogen for the purpose. In reply to a question, he said that he still preferred development by putting plates in the alkaline solution first, and then adding quinol as required to bring out the desired class of image.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 18.—Mr. F. P. Cambrano in the chair.

Mr. J. H. Fulton was elected a member of the Association.

Mr. J. R. B. WELLINGTON read the rules drawn up by a sub-committee for a competition among the members for the production of the best contact prints on paper from three selected negatives; the competitors were to be allowed to introduce clouds from their own cloud negatives if they so desired, and to use what process they liked.

"Competition (No. 2) for Prints on Paper.—The undernoted rules to be adopted by competing members:—1. The three varnished negatives selected by the sub-committee to be the only ones used in competition, with the exception that competitors may use their own cloud negatives or portions of any other negatives. 2. All the competing prints are to be by contact. 3. Each competitor to be entitled to retain the negatives for printing purposes for a period not exceeding fourteen days, when they are to be handed over to the next competitor in rotation on the undernoted list. The last on the list to hand the negatives to the Hon. Secretary. 4. Each competitor before parting with the negatives to remove any markings, retouching, or other such marks which he may have made upon them. 5. A *nom-de-plume* to be placed by each competitor on his exhibits, and a sealed envelope containing his name to accompany them, with the *nom-de-plume* written on the outside. 6. Competitors are at liberty to print from each negative in one or more processes. The Hon. Secretary will give due notice when the exhibits are to be sent in to him. They will be voted upon by the members present at a weekly meeting of the Association, date to be duly announced by the Hon. Secretary."

Among those who will compete are Messrs. Cooke, Wellington, Cambrano, Brignshaw, and Cox.

The rest of the evening was passed in the exhibition of lantern pictures by means of the optical lantern. Mr. F. A. Bridge exhibited some interesting views of Bruges and Ghent, and Mr. J. J. Brignshaw some views of Treport and Antwerp, also some lantern slides of microscopic subjects. Views of home scenery were exhibited by Messrs. Wellington, Hastings, Cox, Pask, and Atkins.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

APRIL 16.—Mr. J. Traill Taylor (President) in the chair.

Mr. W. T. CORENTON passed round some bromide prints developed with both hydroquinone and ferrous oxalate; the whites of the former being discoloured.

Rev. E. HEALY advised an acid bath to remove the yellowness.

Mr. J. OAKLEY thought that hydroquinone gave much better negatives from over-exposed plates than pyro; he also considered it gave better results on bromide paper than ferrous oxalate.

Mr. F. G. READER had found it stain bromide paper.

Mr. L. MEDLAND showed a plate developed with hydroquinone covered with comet-shaped markings; it had also frilled.

Mr. W. FEW considered the spots to be the fault of the plate.

Mr. Freshwater handed round a set of bromide prints from the same negatives as the lantern slides he afterwards exhibited.

Mr. Newman showed his detective camera fitted with a changing box for twelve plates; it had an automatic cap for the lens, which it concealed; it was raised by the act of releasing the instantaneous shutter. The camera was also fitted with a focusing adjustment.

Mr. FRESHWATER then gave a lecture on *India*, illustrated by numerous lantern slides projected on the screen. Among these were several which showed the cultivation and curing of the well known Indian tea.

The next meeting will be on Tuesday, May 7, and will be a general technical meeting.

HOLBORN CAMERA CLUB.

APRIL 12.—A discussion was held at the headquarters, 100, High Holborn, on *The Relation of Exposure to Development*.

APRIL 13.—Field day to Richmond, in which a party of members, including two ladies, took part. About twenty plates were exposed with very good results.

APRIL 18.—Demonstration at the Club Room on *The Development of Plates and Making of Lantern Slides*. Several of the latter developed with hydroquinone gave the best possible results.

The following were elected members of the Club:—Miss Austin, Messrs. Lawrence and A. E. Powell.

Friday next, lantern display in the Club Room.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

APRIL 12.—Mr. WILLS read a paper on *Photographic Shutters*. He exhibited a number of different kinds of shutters and related his experiences in connexion with them.

On the 26th instant the usual monthly Social will be held.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

APRIL 8.—Mr. J. Humphries, F.S.A. (President), in the chair.

Mr. EDGAR CLIFTON explained and demonstrated the working of Carbutt's films. After passing round for inspection several films both before and after

coating, also some negatives made on the same one having had six times the proper exposure, the lecturer said that from the earliest dawn of practical photography down to the present time experimentalists have been unceasingly endeavouring to improve the support on which the sensitive compound has to be carried for the purpose of negative making. Starting with the calotype of Fox Talbot, we find that the discoverer of our art appreciated the advantages of a light and flexible film, and accordingly made use of what at that time was the most suitable material to be obtained, viz., pure paper, which he rendered transparent by waxing after exposure and development. This, however, though admirable for large, bold subjects, was soon found to be incapable of rendering the fine detail necessary in small portraits and views, and something more textureless had to be sought for. It may be mentioned that in this process the sensitive salt was formed on the fibre of the paper, which favoured the development of grain in the finished picture; besides this the smallest particles of metallic impurities gave rise to large and disfiguring spots. It is, therefore, not to be wondered at if photographers turned their eyes towards glass as a suitable support and tried various film-forming substances as a vehicle for the iodide of silver, the sensitive salt then mostly in use; of these albumen was the most satisfactory, and many magnificent negatives were made by its use. It had, however, one fatal defect—slowness. While it answered well for architecture and pure landscape, it was practically out of the field for portraiture and the delineation of waves, street scenes, and the like. In 1852 Frederick Scott Archer introduced the collodion process on glass, in which almost the delicacy of albumen was united with a degree of rapidity which (slow as the process now seems) was then regarded as simply marvellous. A contemporary writer said that the sun had merely to wink at the collodion film to impress an image perfect in every detail. But, after all, even collodion, wet or dry, had its disadvantages, and was, after a long series of experiments, displaced by gelatine, in fact by the dry plate of to-day. Collodion on paper had been tried and found wanting, the exceeding tenderness of the film rendering it very susceptible to damage, while its keeping qualities were far from perfect. The tough, horny gelatine film had none of these failings, and almost as soon as it was applied to glass it was applied to paper. The first gelatine emulsion paper of which I can find a record was introduced in 1873 or 1874 by Peter Mawdsley, of Liverpool. Why this did not become immediately popular it is difficult to say. Probably the inventor did not understand the art of advertising his wares as well as the enterprising company who some years later followed on the same lines and once more demonstrated the advantages of a flexible film. The later development of this process, in which the film is stripped from the paper before printing, thus entirely avoiding the appearance of grain, is too fresh in the minds of all present to need further notice, and I will now proceed to the subject which stands against my name on your syllabus to-night, feeling assured that if I do not demonstrate to you a perfect film process I am able to give you something very near it. The plain celluloid film which I now pass round is composed of cotton waste, which, after having been treated with mixed nitric and sulphuric acids, is dissolved with the aid of alcohol and camphor and formed into sheets of suitable thickness; these are then coated with emulsion in the ordinary way, one side of the film being slightly roughened to secure perfect adhesion of the sensitive coating. The emulsion used differs in no way from that ordinarily used, except that its sensitiveness exceeds any plate I have yet tried. There is no tendency to frilling and the coating is remarkably even. There are a few points in connexion with these films to which I should like to draw attention before proceeding to expose and develop a few which I have brought with me. In the first place, the ruby light used to work by must be as safe as it is possible to get it consistent with being able to work in comfort; a thickness of orange paper outside the ordinary ruby lantern will suffice. Secondly, the image must be fully developed or the finished negative will be lacking in density; the development may be watched from the back as with an ordinary dry plate, and the high lights must be plainly visible on the back if full density is required. Thirdly, care must be taken that the film is kept covered by the solution in both the developing and fixing baths or unevenness and stains will inevitably result. And, lastly, the films must be dried on a flat surface or suspended by clips, as the slight expansion of the gelatine may cause them to fall out of the draining rack during the process of drying. He then proceeded to take a portrait of the President, also one of a group composed of members of the Council, upon the films by means of a Hart & Bishop flash lamp, and developed them by hydroquinone.

In reply to several members who expressed surprise at the rapidity with which (for hydroquinone development) the image appeared, he said it was made according to Swan's formulae.

Mr. BRADLEY: There seemed in looking through a negative to be a slight grain; was that real or only apparent?

Mr. CLIFTON: That was the ground surface of the celluloid, which secured the film from frilling. It would not show in the print. He had never known a case of frilling with these films; even tolerably strong hydrochloric acid failed to detach them.

Mr. HINDLEY: Is it possible to print from the wrong side and still obtain the necessary sharpness?

Mr. CLIFTON: They were considered sharp enough when printed from the back, even for mechanical printing.

Mr. BEADLE measured eight films and found that together they occupied three-fortieths of an inch.

Mr. CLIFTON stated that it was necessary to use a glass front to the printing frame to avoid the film curving; he also mentioned that the plain film made a first-class focussing screen, but that, as they could not be bought in that state, anybody wishing to use one for that purpose would have to clean the emulsion from a waste negative.

Next meeting, members' lantern night, May 6.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 15.—Mr. H. Blandy, L.D.S. Edin. (President), in the chair.

Mr. G. A. BULL (Vice-President) gave an entertainment with his oxyhydrogen lantern, showing one hundred views of Paris, a description of the slides being given by Mons. M. Tuquet.

The attendance was large, there being about one hundred present.

EDINBURGH PHOTOGRAPHIC SOCIETY.

MARCH 6.—Mr. W. T. Bashford (Vice-President) occupying the chair.

Five gentlemen were elected members of the Society.

A note from Mr. Blanc was read, in which he regretted his absence, and stated that he was rather seriously indisposed; and in regard to the representation of the Edinburgh Photographic Society at the forthcoming Art Congress to be held in Edinburgh—a matter in which Mr. Blanc has much interested himself—he requested that the Society should furnish him with the names of three active members of the Society which he would send to the Town Clerk, with the view of their being put upon the list, in case photography might otherwise be unintentionally unrepresented.

The Society, acting on this suggestion, elected their President and Vice-Presidents as their representatives.

Mr. R. H. Bow, C.E., F.R.S.E., then read two papers, *A Second Note regarding Stands by means of which Lantern Slides may be Satisfactorily Seen* [see page 286], and a note *On the Binding or Framing of Lantern Slides* [see page 285].

At the conclusion of each paper, the Society took the opportunity to comment most favourably on the nature of the communication. A hearty vote of thanks was accorded to Mr. Bow, and the Secretary was authorised to illustrate the notes in the billet.

Mr. J. T. LEIGHTON followed with the exhibition of his recently designed "Photographoscope." Mr. Leighton thus described his invention:—"The 'Photographoscope' is a novel apparatus for displaying photographs or other pictures, giving them all the advantages of a frame setting, and at the same time allowing them to be changed at will. In appearance the apparatus resembles a handsomely designed frame and suitable mount laid against an ornamented shield. The design is capable of a large amount of elaborate and artistic ornamentation, and the apparatus forms a most attractive feature in the household, and is also particularly adapted for the studio or saloon of a photographer. By turning a small side knob or handle the pictures appear one after the other in endless succession, the one in view falling back and making way for another coming forward, and so on as long as may be desired, a fresh picture appearing at every revolution of the handle. The two designs shown were each capable of accommodating twenty-one prints, but the number of prints is only limited by the size of the apparatus. The 'Photographoscope' is very simple in construction, and not in any way liable to get out of order. By its use the photographs are completely protected from dust and the effects of the atmosphere, and also from the effects of handling and rubbing together, so destructive to valuable prints. The pictures in the 'photographoscope' being viewed one at a time, and in a frame, give them a fairer opportunity of having their merits appreciated than is the case when several are before the eye of the observer together.

The ingenuity of Mr. Leighton's exhibit was thoroughly appreciated, and he was heartily thanked for bringing his apparatus before the notice of the Society.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

APRIL 11.—Mr. John Robertson (President) in the chair.

Messrs. Harben, Valentine, and D. Owens were elected members.

The following were declared the prize winners in the lantern competition:—1st, V. C. Baird; 2nd, A. Wilson; 3rd, R. C. Henderson.

The American Exchange slides were exhibited.

Mr. J. ROBERTSON drew the members' attention to Patent, No. 1461, "Improvements in Photographic Transparencies," the specification of which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 29th ultimo, and which he stated was invalid and could be practised without fear of infringement, his argument being supported by the production of a transparency made by him on similar lines nearly twenty years ago.

A small committee was appointed to make arrangements for three outdoor meetings during the summer, the first to be held on the Queen's birthday.

Correspondence.

Correspondents should never write on both sides of the paper.

RAILWAY FARES AND PHOTOGRAPHIC SOCIETIES.

To the Editor.

SIR,—I would like to call attention, through the medium of your valuable paper, of the photographic societies to the advisability of agitating the railway companies for the granting to members of photographic societies fare and a quarter tickets. This privilege has been enjoyed by a fishing club for some years, and why not amateur photographers? I believe the Liverpool Society, some two or three years since, did take this question up, but do not remember with what results. If the Camera Club would now take the initiative, and invite the co-operation of all societies, sufficient influence might be brought to bear upon the railway companies as would induce them to grant the concession. Trusting some more able pen than mine will take this question up—I am, yours, &c.,

P. E. KNIGHT,
Hon. Sec. Notts Amateur Photographic Association.

NEW SOCIETY.—THE BRADFORD PHOTOGRAPHIC CLUB.

To the Editor.

SIR,—Will you kindly announce the establishment of a new society in Bradford, "The Bradford Photographic Club," which dates from the first of the present month, and state that our dark rooms and other

conveniences are at the service of members of societies of other neighbourhoods visiting this town?

The officers are as follows:—*President*: Mr. Charles Holmes.—*Vice-Presidents*: Messrs. G. D. Scorrab and C. W. Wade.—*Committee*: Messrs. N. Scott, H. Gibbs, E. Wade, J. S. Douglas, W. Judson, J. Cotton, M.I.M.E., and W. H. Hall Ward.—*Treasurer*: Mr. John S. Swithenbank.—*Hon. Secretary*: Mr. Frederick North.

The rooms are at 27, Kirkgate, Bradford, and the Hon. Secretary, having his private office at the same address, will be pleased to receive visitors there, where intending members may receive every information pertaining to the Club, and any of the photographic brotherhood being strangers to the town may find a haven.—I am, yours, &c.,
27, Kirkgate, Bradford, Yorkshire, April 17, 1889. FREDERICK NORTH.

THE YORK EXHIBITION.

To the Editor.

SIR,—I have for some time past taken great interest in the subject of photographic exhibitions, because I think they are destined to greatly influence the future of photographic art. And I regret to find, from the conditions and rules for the forthcoming exhibition at York, that the charges for amateur exhibitors are such as are, in my opinion, likely to deter some from contributing. I hope this may "meet the eye" of those "whom it may concern," for I should indeed be sorry if the exhibition at the capital of my native county should be in any respect behind similar gatherings of pictures elsewhere.

1. With regard to charges for wall space, I read the rules to mean one shilling and sixpence per square foot, with one shilling per frame for unpacking and repacking, &c. I take it that the amateurs' frame will average somewhere about two square feet, so that the cost per frame will be about four shillings. Suppose one to contribute half a dozen frames, scattered about among the six amateur classes; these would cost (when packing, care, and carriage were paid for) something not far short of thirty shillings; and I fancy that amateurs living at a distance will think twice before deciding that "the game is worth the candle." The professional exhibitor, perhaps, may be said to regain some part of his "charges" in the form of advertisement, and the longer the exhibition is open the greater the gain; but this will not apply with equal force to the amateur, who, on the contrary, may consider the length of time—June to October—as a disadvantage.

2. Is Class I., Division A., confined to pictures which have already gained medals elsewhere?

3. In Rule 5 (*re amateurs*) "the negative must have been exposed, developed, and printed by a *bona fide* amateur."

Does this include or exclude the retouching?—I am, yours, &c.,

Cambridge, April 20. F. C. LAMBERT.

VALUATION OF QUINOL.

To the Editor.

SIR,—In your abstract of Professor H. Foster Morley's paper on *Hydroquinone and its Uses as a Developer*, read before the University College Photographic Society on the 9th instant, the author is reported to have said that the quantity of potassium permanganate absorbed by a solution of quinol in an acidified boiling solution "corresponds to a consumption of eight atoms of oxygen by each molecule of the permanganate." This last word is evidently a mistake (possibly a printer's error) for quinol, while eight atoms of oxygen should read ten atoms.

I believe I was the first to publish (in my letter to you of the 25th ultimo) the fact that ten atoms of oxygen are absorbed by each molecule of quinol in a direct titration with permanganate in a boiling acid solution. As a matter of fact, Dr. Morley's figures confirm my own result, as he states that six milligrammes of quinol require 11.3 c.c. of decinormal permanganate, 10.9 c.c. corresponding to ten atoms of oxygen, and 5.7 c.c. to eight atoms respectively.—I am, yours, &c.,

I. H. SMITH, Ph.D., F.I.C.

Mawson & Swan's Laboratory, Low Fell, Gateshead, April 20, 1889.

FLASH LAMPS.

To the Editor.

SIR,—I do not know what I have done to Mr. Hart to bring down upon me his wrath. At first I had intended not to have noticed his letter to you, but I do not understand what he means by making me the author of such silly remarks as using heated hydrogenous vapours to oxy-lise metals. I never made any such stupid remark; in fact I do not know its meaning, neither does Mr. Hart probably. With regard to his multiple distributor, such a wonderful and costly apparatus is not at all necessary. An ordinary pneumatic ball will flash several lights simultaneously and quite as effectively. I have taken groups at several photographic meetings, some of which contained nearly forty persons, and never failed but on one occasion, and that was when Mr. Hart himself used his lamps and multiple distributor at a meeting at which I attended to take a picture. I may add, I had no idea at first of producing these lamps, but so many photographers were pleased with their simplicity, cheapness, and effectiveness, that I was induced to do so. Apologising for troubling you—I am, yours, &c.,
W. ENGLAND.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—In anticipation of a threatened attack upon my position here and in England as a photographer, may I beg of you to state in the columns of your valuable and widely-read JOURNAL that I *entirely* disclaim pretensions to "posing as an amateur?" I put my work on the open market, and am therefore a *professional*, though inexperienced. My name does not appear on the list of London workers as yet, but on my return to England this step will be taken. Thanking you, in anticipation, for inserting this appeal for fair play—I am, yours, &c.,

GEORGE J. S. GRAHAM-FOLER.

Santa Cruz de Tenerife, Canary Isles, April 4, 1889.

ILLUSTRATIVE PHOTOGRAPHY.

To the Editor.

SIR,—My attention has been called to your issue of April 12, containing an article on *Illustrative Photography*. The statement therein contained as regards *Punch* is incorrect. As the engraver for that periodical, I am in a position to declare that the whole of the illustrations are engraved upon wood, and always have been so produced.—I am, yours, &c.,
JOSEPH SWAIN.

6, Bouverie-street, Whitefriars, E.C., April 18, 1889.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, background in exchange for books by Professor Tyndall.—Address, J. B., 4, Carlton-terrace, Harrow-road, W.

Would exchange handsome tall-case hall clock, chimes quarters on eight bells, for modern large-sized camera and lens by good maker.—Address, WATERMAN, Photographer, Shanklin.

Will exchange two dozen bromide opals (half-plate) for contact printing by gas, in perfect condition, never been opened, for one dozen 8½ x 6½ Mawson plates.—Address, H. H. ARMSTRONG, Pelaw House, Chester-le-Street.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

H. R. Smyth, Weston-super-Mare.—Photograph of Thomas Palmer, only survivor of the battle of Corunna.

J. Stuart, Glasgow.—Photograph of the Right Hon. the Earl of Aberdeen.

Alexander Stuart, Clydebank.—Three photographs of the interior of the Iman and International Company's T.S.S. "City of Paris," and T.S.S. "City of New York."

A. FOSTER.—1. Any of the ordinary emulsions will answer for development printing.—2. The coating should be somewhat thin.

SENSITIVE.—Dissolve nitrate of silver in distilled water in the proportion of sixty grains to the ounce. Nothing more is required.

A. SQUIBB.—Tartaric acid has been found by some to be an improvement upon citric acid as a means of preventing the yellow discolouration of sensitive paper.

J. J. P. B.—We cannot throw any light upon the cause of these spots, which seem at the present time to be molesting photographers to a greater extent than hitherto.

Y. A.—The beveled-edge opal plates may be obtained of any glass merchant who makes photographic glass a speciality, also from most photographic material dealers.

H. B. HART.—1. The publishers of Burton's *Photo-mechanical Printing* are Marion & Co., Soho-square.—2. England Brothers, St. James's-square, W., publish Wilkinson's works.

CONSTANT READER.—The answer in question was not inspired by the gentleman named. You will, however, find him to be a most reliable mentor, and you cannot do better than follow his directions.

X. Y. Z. is anxious to learn where he can obtain photographs of natives of Africa to illustrate costume of the different tribes, &c. Perhaps some reader will kindly enlighten our correspondent.

WORK.—Sorry we cannot give you any information relative to the obtaining of copies of tracings in black lines on a white ground in one operation, such as that which can be effected in blue lines on a white ground.

J. H. G.—1. There should be no stain if the plates were properly washed, but there is no way of removing it now.—2. No stain should be produced with any of the recognised reducers. Stains are the result of careless manipulation.

LITHO.—You will have to get the drying closet made to order, as it is not an article of commerce. You will also have to design it yourself, as there is no recognised form; each worker has his own pet pattern and of a size to suit his requirements.

A. Z.—The reply you received is certainly very funny. The letter was evidently answered by a clerk who has no practical knowledge of the business. Better write personally to one of the principals. Comical as the letter is we cannot give it insertion in our columns.

C. G. K.—For retouching, Redmond Barrett's *Art of Retouching*, which was published in our pages of 1886, commencing with the number for August 6. It forms one of the most complete treatises on the subject that has yet appeared. For enamelling you cannot do better than adhere to the directions on page 477 in our ALMANAC for 1888.

GALWAY.—We have no idea where focussing screws for cameras are made, but, seeing that you require a number of them, would suggest that you place yourself in communication with some firm who supply mechanics' tools and order a set of die-stocks with double-threaded screws, by which you could make them yourself if you have a turn for mechanics.

WATTY says, in taking an interior the other day, a window at the side of the church is shown faintly in the negative, although this window could not be seen on the focussing screen, and he is sure that the camera was not moved while the lens was uncapped.—The second image is due to a minute hole somewhere about the camera which has operated as a "pinhole camera."

W. THOMPSON asks the proportion of benzole to be added to the solution of gums in ether to make a good matt varnish?—This all depends upon the opalescence desired. The larger the proportion of benzole the more opaque and coarse will be the film, and the less the finer and more transparent. The best plan will be to add the benzole in small quantities at a time, testing the varnish after each addition until the result desired is arrived at.

REV. J. C. BROWNE (Thurning Rectory, Oundle) writes: "Some time ago I bought a dinner service in Manchester; the shop is closed now and vendors gone. I am wanting more of the same pattern. One mark on plates (under side) is 'O. H. E. C. (L4)'. Can you kindly give me an idea of the meaning of these initials? If any of 'ours' can assist me I should be greatly obliged. And does any one know if this Company burns in photographs?"

W. H. WARNER.—Our correspondent directs our attention to a simple but efficient shutter introduced by a local optician by which clouds can be taken in conjunction with the landscape, and trusts that we may think well enough of it to recommend it.—Unfortunately, we are entirely ignorant of its nature or construction, nor can we find it in any catalogues of London dealers to which we have referred. Will Mr. Warner kindly send us an account of its construction?

J. SCGG says: "Recently I made up a toning bath according to the acetate formula, and it became turbid as soon as mixed, and the next day there was a dirty deposit at the bottom of the bottle. Although I used a fifteen-grain tube of chloride of gold it would not tone at all. What is the reason?"—The reason is that from some cause or other the gold has been precipitated; possibly from some impurity in the water, or perhaps from its being put into a dirty vessel.

STEREO writes asking how he can make paper photographs transparent, like some old French stereoscopic slides he saw many years ago.—The pictures can be rendered transparent by saturating the paper with wax; the bleached wax should be used. Place the print on an iron plate sufficiently heated to melt the wax. Rub the wax over the print until the paper is thoroughly saturated. Then place it between sheets of clean blotting paper, and iron with a tolerably hot laundry iron to remove the surplus wax. In place of wax solid paraffin may be employed.

GEORGE writes as follows: "I am erecting a studio in my garden for taking portraits. Ours is a private road, and my neighbours on either side are threatening to prevent me from commencing business there. Have they the power to do this?"—If there is no clause in our correspondent's agreement with his landlord prohibiting a business being carried on on the premises we do not think he can be stopped. Certainly the neighbours cannot interfere so long as the studio does not stop light and air from their premises, and the business is carried on so that it causes no annoyance.

N. S. D. writes: "1. I have a silver bath (sixty grains to the ounce) which I have not used for more than a year; I find that the nitrate of silver has found its way through the cork of the bottle (I used a cork, not a glass stopper) and crystallised, and there is a dark stain or deposit on the inside of the bottle, although the solution itself seems clear enough. If I filter it and strengthen the bath will it then be safe to use?"—2. Is a license required to retail chemicals (for disinfecting purposes), such as permanganate of potash, &c.?"—In reply: 1. The bath will doubtless work all right after being filtered. The probability is that it will not require to be strengthened.—2. No license is required.

E. J. W. inquires: "Is it possible to take quarter-plate negatives with a hand camera and to enlarge these to (say) whole-plate size, and obtain prints nearly equal in quality to those from negatives the size of the print? In other words, can such enlarged prints be made of a quality that one with a love of good photographs would care to put in his albums? All that I have seen have been flat and fuzzy, more or less; but I have few opportunities of seeing such things."—Reply: It is not only possible to enlarge from quarter-plate negatives up to whole-plate size, but it is done in innumerable cases. The quality of the enlargement depends, of course, upon the excellence and sharpness of the negative.

KODAK.—1. The lens named will answer well when the screen is a considerable distance away from the lantern.—2. The 2B of the same maker will answer better, because its focus is shorter, but for general work one of still shorter focus is preferable.—3. The flare spot in your portrait lens may be ameliorated, although not entirely got rid of, by placing the diaphragm in front of the front lens instead of its present position.—4. To ascertain the focus of the front lens, unscrew the cell and use it convex side out as a burning glass, then measure the distance between the outer surface and the solar spot. This, of course, will only give you a rough idea of the focus, but will be sufficiently near to aid in the construction of a camera. Unless we had the lens for examination we could not give you nearer particulars.

C. M. MAJOR.—Without answering your queries *seriatim*, we may state that your C.-D.-V. lens possesses too short a focus to reproduce a negative 12×10 from a transparency the same size, but if it were a case of making a small negative from that transparency it would answer admirably. The actinic triplet or doublet referred to would certainly answer better, their focus being so much longer. For ordinary enlarging or reducing the C.-D.-V. lens answers well, but to obtain the best effects when working with it, it is necessary that the back lens of the portrait combination must always point towards the image the dimensions of which are the smallest. When reproducing the copy on the same scale as the original (a thing we often do) we focus sharply with a medium stop, and then insert a stop sufficiently small to make the marginal definition crisp.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, May 1, 1889, will be on *Weights and Measures*. Saturday afternoon outing will be at Totteridge. Train from Broad-street at eight minutes past two.

We have received the *Photographic Annual and Catalogue* of Jonathan Fallowfield. This catalogue is replete with most of the varieties of photographic goods in the market and contains upwards of three hundred pages. It is an imposing volume and arranged with taste.

WEST LONDON PHOTOGRAPHIC SOCIETY.—The last ordinary meeting (for this session) of the above will be held at the Addison Hall on Friday, May 3, instead of April 26, as announced; and on Friday, May 10, there will be a smoking concert, at eight o'clock, in the Richmond Hotel, Shepherd's Bush-road. It has been arranged to hold outdoor meetings on the last Saturday afternoon of each of the summer months, commencing on May 25. Members are invited to suggest to the Secretaries suitable places in the neighbourhood of London.

ON April 16, at the meeting of the Photographischen Gesellschaft in Vienna (one of the largest and oldest photographic societies on the Continent), a large number of landscape pictures by Mr. Harry Tolley, of Nottingham, were on exhibition. The leading professional photographers closely examined them and agreed in declaring them to be some of the finest specimens of artistic photography, and well calculated to sustain the high reputation which English photography enjoys on the Continent. Professor Luckart, the Hon. Secretary, himself a celebrated artist, publicly expressed his admiration of their great artistic merit, and in so doing carried the entire meeting with him. On the same occasion was shown a continuation of a series of beautiful works by Messrs. Green Brothers, of Grasmere (the others had been exhibited at the previous meeting). These excellent platinotypes likewise received the praise they so well deserve. These pictures, the one set amateur, the other professional work, are here going the round of the societies.

DEATH OF MR. WARREN DE LA RUE.—The death of Mr. Warren de la Rue, D.C.L., Ph.D., F.R.S., &c., occurred on Friday evening, the 19th instant, from pneumonia, after a short illness. The deceased gentleman, who had attained the age of seventy-four, was born in the Isle of Guernsey, and was educated at the College of St. Barbe, Paris. Records of his many scientific labours will be found in the *Transactions* of the Royal Astronomical, Chemical, and other societies. The principal work in which he distinguished himself was the application of photography to the recording of celestial phenomena. The photographs, when measured by a micrometer which he invented, furnished exact astronomical data. He established a private observatory at Cranford, Middlesex, but it was dismantled in 1873, and the instruments presented to the University of Oxford, where they have been employed lately most successfully by Professor Pritchard in determining, by means of photography, the distance of sixty-one Cygni and other fixed stars. He held office in several societies. For some time he acted as Honorary Secretary of the Royal Astronomical Society, of which he was also President from 1864 to 1866. He was President of the Chemical Society from 1867 to 1869, and again in 1879-88, from which time he acted as one of its Vice-Presidents. For many years he was President of the London Institution. In 1878 he became Secretary of the Royal Institution, on the retirement of Mr. Spottiswoode, who was elected President of the Royal Society, but resigned the post in 1882. In commercial life he was a member of the firm of Thomas de la Rue & Co.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1513. VOL. XXXVI.—MAY 3, 1889.

THE STRENGTH OF ALKALINE SOLUTIONS.

THE gradual coming into favour of the carbonates of potash and soda, and, since the popularisation of hydroquinone, of those two alkalis in the caustic state, has rendered it more than ever incumbent on the photographer who wishes to keep himself acquainted with what he is doing to have some ready means of estimating the strength of the solutions he employs with at least moderate accuracy. This is the more necessary in view of the widely differing formulæ that are given with different plates, no less than of the equally varying opinions expressed as to the relative value and behaviour of the several alkalis. It stands to reason that any operator who is in doubt as to whether the formula he is employing is the one best suited to his plates should, in trying another against it, do so, as far as possible, under identical conditions, and this he can only do if he knows precisely the comparative alkalinity of his solutions.

The mere mention of the necessity for such care may perhaps raise misgivings in the minds of some of our non-chemical readers, whose acquaintance with the operations of quantitative analysis generally, and of alkalinity in particular, is of so limited a nature as to make the mere mention of the proposed task a terror. But the difficulty to be encountered in securing the degree of accuracy needed for our purpose is really not such as to deter any one from making the attempt who has sufficient intelligence to successfully accomplish the development of a plate.

Of course the work will be more easily performed and with closer accuracy when proper apparatus or appliances are at hand, though these need not be of an elaborate or expensive character; but a truer and more systematic acquaintance with the real value of some of the very variable compounds, such as sodium and potassium carbonates, than can possibly be derived from their theoretical composition can be obtained with no more elaborate apparatus than are to be found in every photographer's laboratory.

The method to be followed will be, whether with or without special apparatus, that known as the volumetric, in which a weighed quantity of the substance to be examined, or a given volume of its solution, is tested or "titrated" by means of a standard solution of any convenient acid whose saturating power is accurately known, a small quantity of tincture or solution of litmus, or other "indicator," being employed to determine the exact point of neutrality.

As regards apparatus, all that will be requisite will be a burette, preferably of the form known as Mohr's, which consists of a graduated glass tube, holding twenty-five, fifty, or one hundred cubic centimetres of liquid, each division being sub-

divided into five or ten parts, and fitted with a glass tap, or a specially arranged delivery tube with spring clip, to permit small quantities of the solution to be drawn off at will. A stand or holder for the burette and a glass flask or two in which to perform the test complete the outfit.

The test acids ordinarily employed are sulphuric, hydrochloric, or oxalic. The two first are objectionable to the inexperienced chemist, inasmuch as they themselves have to be accurately estimated before anything like a "standard" solution can be made. But oxalic acid, if obtained of the quality sold as "pure" and from a good source, is a tolerably definite article, and may be taken to be what it represents. A convenient strength to employ will be formed by dissolving one-tenth of a gramme-atom, as it is called, of the acid in 1000 grammes or one litre of distilled water. The "gramme-atom" is the number of grammes represented by the combining equivalent of the substance, and the standard solution of oxalic acid will therefore consist of 12.6 grammes of the pure crystals made up to a volume of exactly one litre with distilled water.

Grains and fluid grains, or "grain measures," may be used instead of grammes and cubic centimetres if preferred, and if the instruments can be obtained thus graduated; but the majority of burettes are divided into cubic centimetres. But as the actual size of the division is purely arbitrary, so many grains of the solid material may be dissolved to form one litre of solution, and the burette will then deliver it in accurately divided portions, each division on the scale representing one-thousandth of the whole quantity. In this case, owing to the difference between a gramme and a grain, it will be advisable to dissolve 126 grains of the acid in order not to have too delicate a solution.

The litmus solution had better be procured ready for use at one of the operative chemist's, as ordinarily supplied in the crude state it contains a considerable quantity of alkali, and requires very careful adjustment before it is of any use for our purpose. There are other more fashionable and newer indicators, but the one named will answer every purpose.

In order to make a test, let, say, one gramme (or ten grains) of the substance to be tried be dissolved in any convenient quantity of water, and one-tenth of this solution taken to be operated upon. Or if a stock solution of the substance be already made and require testing, take one drachm of it and dilute it to any convenient volume, again taking one-tenth for actual trial. This lessens the chance of error in weighing or measuring small quantities. To the solution to be tested add a few drops of the litmus solution, sufficient to give it a decided blue tinge when thoroughly mixed.

Next, fix the burette in the holder and see that the tap or delivery clip acts properly; fill it with the standard solution, and let this run back into the bottle to remove any traces of moisture. Refill, and carefully, by means of the tap, let the surplus run out until the surface is level with 0 or zero—the numbers, be it remarked, progressing in the downward direction. Arrange the height of the burette in its holder so that its delivery tube comes nearly down to the level of the neck of the flask containing the alkali. Now commence by allowing a few drops of the test solution to run into the flask, and mix thoroughly; at this stage probably no change of colour at all will be noticed, in which case a fresh quantity is added. It may be, however, that if the quantity of alkali is very small a red colour is produced, which, however, disappears again on mixing; when this occurs great care must be taken to make further additions very gradually, using at the critical stage a single drop only at once, and mixing the contents of the flask thoroughly after each such addition, continuing until a permanent red tinge is given.

But it is only in the case of the caustic alkalies that the procedure is so very simple. When the carbonates are in question the carbonic acid is expelled from its combination with the alkali part of it, escaping in the form of gas, and a portion remaining in solution and giving a reddish tint to the solution some time before the point of neutrality is reached. The colour is, however, quite different from the full red given by the faintest excess of oxalic acid, possessing more of a purple tone. To get rid of this disturbing influence the contents of the flask must be boiled, or at any rate heated for a short time over a Bunsen or spirit flame, when the blue tint will return, and more test solution must be then added, until after repeated heatings the full red tint becomes permanent. Turmeric tincture may be used instead of litmus, as, though not so sensitive, the sudden change from deep brown to pale lemon yellow is far more recognisable to inexperienced eyes, besides which it is inert to carbonic acid, and therefore obviates the necessity for boiling in the case of carbonates.

When the neutral point is reached it is only necessary to read off the number of divisions and fractions of solution employed, and from these figures the actual quantity of alkali can be calculated by the tables at the end of our ALMANAC.

In the absence of a burette a minim measure and a dropping tube may be used, filling the former to start with, and refilling if needful, deducting the quantity finally remaining from the total poured into the graduate.

PRACTICAL CONSIDERATIONS IN STUDIO BUILDING.

(Concluded.)

AFTER discussing the glass roof and sides, all the salient points of the subject will have come under review, and this last topic may be said to be one upon which as varying and contradictory views are held as upon any one part of the design of the fabric. Taking first the rafters or framework, they are made of all sizes and thicknesses and materials—wood, iron, zinc, &c.; but modern studios have radically different needs from those built over half a score of years ago. In those times advantage was sought to be obtained of every trivial gain of light possible, and metal, strength for strength, obstructing so little light in comparison with wood, was often chosen for that point alone, without regard to any other consideration. The rapidity of gelatine plates, however, has now completely altered the

case, and the photographer who builds a studio is able in most instances to disregard the actual space occupied by his skylight frames and to choose what will be substantial and useful rather than light. The best advice he can follow in this connexion is to have the woodwork of his skylight thoroughly strong and rigid, there is then less strain upon the cohesion of glass to frame, either through the action of weather and temperature, or the weight of the workmen when the services of the inevitable painter and glazier come to be required. To this end we perhaps need scarcely point out that depth rather than width of rafter is what is needed to give stability, though, unfortunately, where the amount of light is of moment the depth of the bar rather than its width is the chief obstructing element. A word of warning will be useful here. Thorough consideration should, before building, be given to the subject of ventilators needed. Glass roofs, at their best, are always most difficult to keep water-tight, and the most effective way of preventing their being so is the knocking and shaking always necessary when alterations have to be made to obtain additional ventilating conveniences, a state of affairs of most frequent occurrence. The size of the rafters must of course be governed by the pitch of the roof and the width of the sheets of glass it is decided to employ. Obviously the larger the sheets the smaller the number of these light-obstructors necessary. There is a limit here, except plate glass is employed—namely, the maximum size of the sheets as manufactured. Many of our professional friends prefer plenty of length rather than breadth, so as to avoid the unsightly streak of dirt that forms at the junction of the pieces. This, however, may be, and in at least one studio at present in use is, got rid of by painting a broad strip of the glass at the junction with some solid dark paint, which entirely hides the unseemly collection of dust and dirt and does not rob the studio of any practically available light. The effect of this is a great gain in appearance.

We do not propose to discuss such arrangements of lights as the “zigzag” or “alternate” form, which was patented some years ago, the object being to avoid loss of light by reflection of a considerable portion of the rays received at an oblique angle, as happens under ordinary conditions. The plan was more ingenious than useful, space was unnecessarily taken up, and the cost greatly increased. So far as regards the shape of the supports for the glass; next to consider is the glass itself. Sheet glass, plate glass, rolled, fluted, plain, or roughened on the surface—“obscured” or “smoothed,” as it is termed—white glass, ordinary green glass, and glass coloured pale blue by Cobalt, have all been used, and the superiority of each lauded; Cobalt glass is not now employed. Sheet glass is most commonly adopted, while polished plate is of rare occurrence on account of its great cost. Further, some samples are very liable to change in colour, as may be seen in many a shop window, panes of glass, originally almost colourless, having become purple or yellow after a lapse of time. Sheet glass when clear will, then, be most in demand, and in view of meteorological eventualities it should always be of substantial thickness; “fifteen ounces” or “twenty-one ounces” is certainly too thin, “thirty-two ounces” is costly but the extra outlay will be well spent money, one short half hour of hailstorm, such as occasionally visit these islands, being capable of doing more injury to the content of the studio than many times the cost of the glass would cover.

When, however, it is decided to use obscured glass, this

ribbed plate is as cheap, and far preferable on account of its freedom from the curvilinear shape so often characterising thick sheet.

The question as to whether obscured glass or clear should be used is one not capable of solution in a general way, though in particular instances there is no doubt. A more uniform light is secured by the use of roughened or surface ground glass; but with a clear sky-view there is on the whole much loss of light to the sitter. "Is the latter disadvantage counterbalanced by the gain in softness, &c., obtained by the even and regular illumination from obscured glass?" is the query that presents itself. The reply, as we say, cannot be predicated exactly. Clearly it is an advantage to have plenty of light; for if it be in excess it can always be diminished by screens, while if in defect at the outset the loss cannot be made good. That some operators prefer the softness and risk the loss of light is proved by the fact that studios are in use now in which the whole of the glass has been permanently covered with tissue paper by the photographers who work in them. Each photographer, then, will decide for himself, except in cases where the skylight to be glazed lies between a building or dead wall and the sitter. In that case an obscured glass is a very great gain, as a portion of the light received is by its means sent to the sitter instead of passing through and illuminating, and being almost wholly lost in the room itself instead of the sitter. It may here be pointed out that glass employed by grinding with sand, &c., has the disadvantage of gradually becoming soiled-looking and incapable of being brought to a state of pristine whiteness.

It does not form part of the plan of this series to describe the various modes of fastening the glass *in situ*, other than by the usual means of putty and paint; but as regards the latter, a wrinkle of great value may be given. Let the margin of every sheet of glass, before being bedded in its place with putty, be painted on each face with a thin strip of paint about half an inch wide, which is then allowed to set before the panes are placed in position. This done, and the rafters first coated with paint before glazing (and no glazing ought ever to be permitted before this is carried out), the chance of the everlasting "drip" in wet weather, common to so many studios, will be almost reduced to nil.

We now conclude this series of articles, merely observing that all the advice given is the result of the experience of many practical men whose knowledge we have not failed to draw upon to illustrate our own experience.

THE Paris Exhibition is being rapidly pushed forward, though it will, probably, be far from completed by the opening day. British photography will be well represented, though not on such an extensive scale as was at one time anticipated. English photographers visiting this exhibition will not find themselves so much behind their confrères across the channel as they did in the two previous ones. Both in the 1867 and 1878 shows the Continental portraiture was much ahead of the British, now the latter can hold its own against it. English photographic apparatus—both in optical and cabinet work—has always been in advance of that produced abroad, and the forthcoming exhibition will prove that this supremacy is still maintained. It is in the mechanical processes of photography alone that we anticipate England will appear at a disadvantage.

PHOTOGRAPHERS who desire to secure effects which can only be obtained at certain seasons should ever be on the alert. Missing the chance when it presents itself often means having to wait for twelve

months before the opportunity can possibly occur again. Last year spring, it will be remembered, so far as early foliage effects were concerned, was of shorter duration than usual. This year it promises to last longer, unless we happen to experience an unseasonable change, no unusual circumstance by the way in this variable climate of ours. In many parts of the country the trees and shrubs are already putting on their spring garments, so that those who desire to secure negatives of early spring effects should be prepared, or they may, possibly, have to wait another year before they will again have the opportunity.

THERE are many subjects which cannot be taken when the trees are in full leaf, except under great disadvantage pictorially. Notably is this the case with many buildings and ruins with trees in close proximity; either the picture must be taken from within the trees with a wide-angle lens, or we must put up with the most interesting portion of the subject being obscured by them. If the picture be taken when the trees are devoid of foliage, although the subject is fully shown, it always has more or less an unpleasant look. If, however, the picture be secured when the leaves are just budding forth the whole aspect is different, while the principal subject is fully depicted, the picture does not bear that dreary appearance as if it were taken under wintry conditions.

MANY excellent pictures may be obtained in glens, plantations, and woods while the shrubs and bushes are wearing their spring garb, which, later on, would not be worth taking. The tints on the delicate foliage when the sun is playing upon it makes a glorious scene, although there may be nothing particular in the subject, which is very effective in a photograph. Pictures of this character as lantern slides, when projected upon the screen, rarely fail to meet with approbation. There is another class of subject that can only be effectively rendered at this season, namely, certain trees with their knarled and rugged branches. If such subjects were taken when the tree is covered with leaves much of the picturesqueness would be lost, and if taken when the foliage is off the trees would have a barren and dead appearance. But if, on the other hand, the negative be secured while the leaves are still small and in a good light, life is given in the picture, while the most interesting portions are as clearly depicted as if the trees were entirely free from foliage.

A CORRESPONDENT, writing anent the "mysterious spots" which sometimes make their appearance on freshly made prints, says, in his case, he has traced them to the prints being sometimes dried in a room the walls of which have recently been papered with paper embellished with bronze powder. He imagines that particles of the bronze become detached and settle on the prints while they are wet. If this be the origin of spots, it shows what unsuspected causes may, and possibly often do, result in injury to the delicately constituted image of an albumenised paper picture.

THE Board of Trade inquiry now proceeding on the question of the electric lighting of London is one of some interest to the photographic profession, more particularly if it results in a greater extension of this system of illumination. There is no question that a large number of professional photographers in all parts of the metropolis, and indeed in most other towns, would gladly avail themselves of the electric light as an auxiliary to daylight during dark and foggy weather were it not for the cost of the plant for generating the electricity. In some parts of London the current can be had from mains, but the districts where it can be at present very restricted.

APART from the cost of an engine and dynamo, a current supplied like gas and always ready for use is far more convenient, and, we hear, some who have an installation of their own have discontinued its use and are now employing a current from outside sources. With the electric light much waste time on dull days may be profitably employed in photography, quite apart from ordinary studio work. It is to be hoped that the inquiry, now pending, will lead to a more general supply of electricity in all parts of the metropolis.

GREAT is the debt of gratitude owing by photographers to Mr. John Carbutt, of Philadelphia, for his application of celluloid films to photographic use. Soon after their introduction we received a sample packet from Mr. Carbutt, and were quite charmed with them. Transparent films are becoming an institution in this country, and, in addition to the quantities imported ready sensitised from America, are also now being coated here. Through one firm (the London Stereoscopic Company) the demand has been so enormous that the supply has temporarily fallen short, but we knew that Carbutt's factory is equal to any strain which may be made upon it, and that the equilibrium of supply and demand will be established without any delay. In a note from Mr. Carbutt this gentleman informs us that he has devised an effective film carrier for the camera, but not having seen any description of it, we are as yet unable to speak concerning this *desideratum*. From Messrs. Fry & Co. we have a sample of home-coated celluloid films which sustain their reputation. This firm works under the American patent, which is in force also in Great Britain.

It is a regrettable circumstance that many photographs are printed on paper which will ultimately change in colour. In the recent exhibition at the Crystal Palace there was a gigantic carbon enlargement which had evidently been made for a very long period, for the whites had become quite yellow, although the pigment composing the image was apparently unchanged. Many collotypes are printed on paper which, with exposure to light, will become discoloured, and, if they be of a photographic colour, they assume very much the appearance of fading silver prints. If, however, they are printed in an ink of an engraving colour the change in the tint of the paper is less objectionable.

A GREAT deal of the varnish used for glazing collotypes to give them the appearance of albumen prints turns yellow with age. When this occurs the pictures closely resemble silver photographs in a state of decay. A permanent image on an unstable base is a very undesirable condition in any photographic process.

THE deterioration in the colour of paper is due to the material used in its manufacture. At one time only linen or cotton rags were used. Now certain grasses, straw, wood, &c., are largely employed as a cheap substitute, all of which are liable to change in colour with exposure to light. It may not be generally known that if a piece of freshly planed deal board be exposed behind a negative to sunlight for a few days that a distinct impression will be obtained. A similar result will accrue with some of the commoner kinds of paper, most of which are extremely sensitive to the light's action. Notably is this the case with some of the wood fibre boards used for the middles of photographic mounts.

THE WHOLE ART OF PHOTOGRAPHY IN A SERIES OF EASY PROGRESSIVE LESSONS.

[THE series of *Technical Essays for the Inexperienced Photographer* published in our volume for 1887 caused such a run on the JOURNAL as to have placed it out of print. During the brief period that has elapsed since then so many new readers have been added to the previous large number, and so many advances have been made in the practice of the art, that a second and much more comprehensive series of lessons has been considered desirable, and one which, in accordance with the wishes of many readers, both young and more advanced, will embrace everything of a practical nature known in the art, including the departments of manipulation, chemistry, optics, stereoscopy, enlarging, artistic composition, retouching, engraving, &c. In brief, nothing will be omitted that will conduce to imparting to the careful reader the whole knowledge of the art.—Ed.]

CHAPTER I. APPARATUS.—CAMERAS.

In the selection of apparatus everything depends upon what intention is entertained with regard to the application of the art. It is very evident that the apparatus which would be best adapted for taking portraits in either a properly constructed studio or a garden will not necessarily be that most conducive to the tourist or traveller

in foreign lands, whose *impedimenta* must be of the most condensed nature, and whose desire is confined to the securing of transcripts of such scenes as will prove mementoes of his travels. Therefore, in selecting apparatus, it is well to do so with main reference to the object in view.

For the tourist the size of camera should by preference be small and as light as is consistent with rigidity. Happily there are many such now manufactured, so many indeed as to create a difficulty in making a selection. The quarter-plate ($4\frac{1}{4} \times 3\frac{1}{4}$), as regards size, possesses the advantage of lightness, while not too small to yield little complete pictures suited for lantern transparencies, albums, or for book illustration without subsequent enlarging, although, when sharply focussed, they bear being enlarged to the extent of two or three diameters—that is, to 9×12 inches approximately—without any serious falling off in detail or sharpness.

Another advantage lies in this size of plate; they are to be had almost everywhere—the quarter-plate, being one of our best recognised standards, is kept in large quantities by every dealer everywhere. If only one lens is to be carried, one having a focus of six inches will prove most suitable for the majority of subjects; but there is a great advantage in having two lenses, one of five and the other of eight inches focus. The reason for this will be more fully dilated on when we come to speak in a subsequent chapter on photographic perspective. A camera for 5×4 inch plates possesses, for some purposes, advantages over that for quarter-plates, mainly so for facilitating book illustration and for albums, this being in virtue of their slightly increased dimensions; but this size is not so universally procurable as the quarter-plate.

The tourist's camera should have dark slides enough to enable a day's work to be done without the necessity being experienced of seeking cover to replenish the dark slides. One may go a whole day without seeing more than two subjects worth photographing; but then, on the other hand, over a dozen desirable subjects may present themselves, and for these one should always be prepared. It is not desirable, therefore, to enter upon each day's career with less than one dozen plates, placed either in double dark slides or in one of the changing boxes now easily procurable. It is necessary, likewise, that the lens be fitted with an instantaneous shutter, for although it is not wise or expedient that it should be employed in season and out of season, yet do occasions frequently arise in which the whole value of the scene lies in its having to be secured by a momentary exposure. In this it is undoubtedly "well to have a giant's power," although it would be unwise to be always making use of it.

For those who desire to make photography a pastime for the morning, or for the Saturday or other holiday, a camera of dimensions larger than in the case of the tourist may be indulged in with advantage. The half-plate camera may here be most usefully employed; and, as in the former case, it is desirable to have two lenses, one being of much longer focus than the other. The possessor of a half-plate camera ought on no account to omit a pair of stereoscopic lenses from his outfit, this class of camera lending itself so well to the production of binocular pictures. Also arrangements ought to be made by which the plate may be exposed in either the horizontal or vertical direction, to suit the nature of the subject that is to be taken. For the special class for whom we recommend this camera three double dark slides ought to be included in the outfit.

For portrait photography portability in the camera is quite immaterial. Indeed, to any except a professional portraitist a portrait camera, pure and simple, is scarcely to be recommended, as a firm, rigid, portable camera serves both purposes of landscapes and portraits. Lenses of the essentially portrait class are not necessary, unless for those who have to operate under cover, or where the light is so weak as would necessitate an otherwise protracted exposure—a thing inimical to the obtaining of a favourable expression.

It is not at all probable that leakages of light will be found in any new camera, still it is well to test each one for it previous to accepting it finally. To do this cap the lens, expand the camera to its fullest extent, remove the ground-glass screen, and throw over the head a dark cloth in such a way that it shall permit of a proper examination of the whole interior. This examination must be conducted in bright daylight, and under such circumstances as to allow no portion of the body of the camera being covered by the dark cloth. If there is the

lightest chink of light visible, either through an abraded corner of the bellows, or through an imperfectly filled screw-hole about the flange of the lens, steps must be taken to have it stopped. The consequence of inattention to this will be a fogging of the image, or a faint duplication of the subject in the negative. No light whatever must be allowed access to the camera except that which passes through the lens.

Little need be said concerning the camera stand except this, that rigidity must be possessed by it at whatever expense. Portability is a good thing, but rigidity is far better. It is possible to have both combined, and for most purposes, especially for the tourist, this combination is best.

Our Portrait Gallery.

II.—A. L. HENDERSON.

THE subject of our sketch this week is so well known, in metropolitan circles at any rate, as to render our giving a portrait of him of limited utility to London readers, to whom no better man is known as an active living photographer than Mr. A. L. Henderson. Mr. Henderson commenced his scientific career in very early life, to which the fact of his father being a medical practitioner at Edinburgh lent every facility. His early history may be summed up in a few words. Born in Edinburgh, 1833, he was at an early age apprenticed to a dentist and druggist. He afterwards became connected with the Ordnance Survey, and was one of those who were balloted out on the order being received to reduce that staff. At the age of nineteen he turned his face southwards and came to London, and became dispenser to a surgeon in Hishopsgate.

Having for some years previous to leaving Scotland studied photography as an amateur, he resolved to turn his knowledge of the art to practical account, and for that purpose he, in 1853, forsook the dispensing of medicinal compounds and adopted photography as a profession, taking for this purpose the premises in King William-street, which he occupied for so many years with such financially successful results. Here he continued until the close of his career as a professional photographer, this termination to his professional labours having been hastened by illness, he having to take a voyage to Australia to recuperate. On this voyage he set out on the 5th of last month. The large number of friends, photographic and otherwise, who attended him to the port of embarkation attests the popularity which he enjoyed up to the last.

It is needless to say that Mr. Henderson possesses an excellent and full knowledge of photography in its technical bearings. His perseverance in any department in which his sympathies are strongly enlisted is certainly astonishing. As an illustration of this, we well remember how on one occasion we, along with him, were examining some ceramic photographs which had been burnt in on enamel plaques. Our friend found fault with one, and on our somewhat taunting rejoinder that it was better than he would ever achieve, he asserted that he would beat it after a week's trial, although he had not up to that moment ever made any attempt, or had any intention of trying ceramic work. Sure enough, within the week he called and showed us several really high-class ceramics he had on that and the previous day executed. The great success he achieved in vitrified enamels soon led to Mr. Henderson's being appointed photo-enameller to the Queen, for whom he has done much work.

He was, and still remains, a member of several photographic associations, and is ever ready to contribute freely of his great knowledge and experience. Of a manner somewhat brusque, he has a warm heart and a ready hand to help, as many of his less fortunate brethren are aware.

Our portrait is from a negative by Mr. John Stuart, of Glasgow.



LIGHTING THE SITTER.

II.

IN the previous article we have considered the side walls of the studio from the floor up to about eight feet above; this space we have made of a dark or neutral tint, with adjustable white blinds to act as reflectors. In a small studio the eight feet may be reduced to seven. This height has been selected because it is usually sufficient to cut off injurious reflections from the eyes of the sitter, as light coming from above cannot be reflected into the camera from the centre of the eye, unless the sight is directed upwards, which is an unusual position.

In studios where there is a single sloping skylight, the wall opposite the casement is of a considerable height, and there is a wide space above the line drawn on it horizontally seven or eight feet from the floor. This space may advantageously be papered or painted with a white or very light tint, to act as a reflector. The space above the background may also be made light, so as to give an all-round illumination from above, which will be very beneficial in softening wrinkles and giving a lighting devoid of harshness; in some cases it will prove sufficient to light up the shadows, so that the adjustable reflectors will not be needed.

The ceiling of the studio should also be white, and the rafters or astragals of the skylight may be similarly painted, the rule being to get as much diffused reflected light from above as possible. The size of the skylight is regulated by the dimensions of the studio; it is better to have it too large than too small, so far as the lighting is concerned, as it is always possible to modify and reduce the light by the use of curtains. On the other hand, a large skylight makes the studio too hot in summer and too cold in winter, and it is frequently a nuisance in wet weather, as leakage is more likely to occur than when a small skylight is adopted.

Strong top light coming from above and behind the sitter is apt to cause dark shadows on the cheeks, making them appear hollow and thin; the eyes are also in shadow, and look deeply set under overhanging eyebrows. Hence it is no use having glass directly over or behind the sitter.

It is found by experience that the best position for the skylight to commence is several feet in front of the background. In a studio having an average height of nine feet the distance may be three feet; with a higher skylight, fifteen feet from the floor, the blank space may be increased to five feet. The skylight may extend from the top of the casement or side light far enough to cover two-thirds of the studio floor. Thus, in a room twelve feet across the skylight may be eight feet

wide if the slope is gentle, but with a steep slope the width may be increased to ten feet, in order to cover the same floor space. The length of the skylight depends also upon the height of the studio. A good rule is to make the length of the skylight the same as the height of the middle of the glass space above the floor; thus, if the roof is eight feet above the floor on the casement side, and twelve feet on the opposite side, the average height is ten feet, and the skylight may accordingly be made ten feet long.

In a double-ended studio, where a background is placed at both ends, there will be two skylights needed, which must be reckoned separately. Probably it will be found that these overlap or come close together so as to form one large skylight. With such a top window, adjustable curtains will have to be used so that the superfluous front light is prevented from reaching the sitter. Too much front light causes the features to look flat, and there is a want of relief, of modelling, and of shadow in the photograph. The casement or side light may be made of the same length as the skylight, and it should reach to within two or three feet from the floor.

Having now settled the question of size of the windows, we come to the glazing. If the photographer sits down before the background in the place where the sitter will be, he will see at once if there is any obstruction to the light. If he can see nothing but sky through the top light he cannot do better than have it glazed with clear sheet glass. If there should be a building or other obstruction which cuts

off some of the sky which would otherwise be seen, then it will be advisable to use clear glass to cover that part of the window through which he can see the sky, and for the remainder to use ground or ribbed glass, fixed with the rough surface downwards. If the ground surface were put outwards it would soon become loaded with dirt; on the inside it rarely requires cleaning. If ribbed or fluted glass is used on the low end of the skylight, that is, above the casement, the ribs should run horizontally, and not be on the slope: but if they are used on the high end, then the ribs should run on the slope. The safest way is to put a trial piece of ground glass and another of ribbed in various positions on the skylight, and see which gives the most light from the sitter's point of view. When the skylight is glazed, it is evident that the sitter will be able to see clearly all the sky available through the clear glass, but he will not see the light-obstructing buildings on account of the ground glass intervening. The same system can be employed with the side light. If the sitter can see the sky through the upper part, then this part should be glazed with clear glass: below this, ground or ribbed glass, with the ribs running horizontally, is preferable.

Frequently the side light is rendered almost useless by surrounding walls, trees, or buildings. In such a case great benefit is obtainable by the use of long narrow mirrors, framed so that the rain-water will drain off the front of the mirrors without reaching the back.

These mirrors may be fixed outside the casement and arranged like the bars of a venetian blind which has been hung askew, that is, with one end much higher than the other, the glass being about six inches wide and four inches apart, and placed at an angle of forty-five degrees from the horizontal. They may be permanently fixed so as to reflect as much skylight as possible on to the sitter. The commonest quality of thin silvered glass, or of patent plate, is better for this purpose than the ordinary thick plate-glass mirrors. A projecting board, two feet wide, placed outside, at the top of the casement, will prevent a good deal of rain and dirt settling on the mirrors; this board should be placed so that only its edge can be seen from the sitter's position.

A casement filled with mirrors in this manner will give almost as much light as the skylight. When persons with sunken cheeks or overhanging eyebrows have to be photographed, it will often be found that the most pleasing portrait is a full front view, with the skylight completely covered with curtains and the illumination derived solely from the side light, the shadows being softened by the free use of the reflecting blinds. With this device a surprising appearance of plumpness may be imparted to a thin face. On the other hand, with a person whose eyes stand out prominently so that the eyebrows scarcely overhang at all, we may screen off the side light and front light altogether, and let the illumination be from the skylight above the sitter. A shadow may in this way be thrown over the eyes, and a pleasing portrait secured.

From these examples it will be seen that curtains or blinds should be provided for both skylight and casement, so that every foot of the glass can be covered when required. Dark green blinds with spring rollers are the best; they should be arranged so that a slight pull on a cord will cause them to roll and unroll at pleasure. The rollers should be fixed to the upper end of the skylight, the blinds being about four feet wide, and overlapping slightly to prevent light reaching the sitter from the space between the blinds. The coiled springs in the rollers will suffice to keep them tight, so that one cord to each will be sufficient, the cord passing through a ring or screw-eye at the top of the casement, and fixed by a turn or two round a little belaying pin on the studio wall.

ALBERT W. SCOTT.

ECHOES.

Two or three weeks ago I referred to the alleged difficulty experienced by dwellers in towns in obtaining cloud negatives owing to the angle at which they would be compelled to tilt the camera, and pointed out that such difficulties were apparently exaggerated. In last week's issue I see my fellow-contributor, "Free Lance," also alludes to the

matter as having had more made of it than necessary, but I am afraid his remarks may be read by some so as to mislead in a contrary direction.

His argument that very few pictures including clouds exhibit the latter right down to the horizon line is all right so far, but when he goes further and implies that, therefore, a town dweller may from an "attic window" meet all the requirements of cloud negatives for general purposes, I fancy most of those who have tried it will be inclined to dissent from him.

If the attic window artist merely wished to introduce clouds into a photographic transcript of the terrestrial scene before him, of course he could scarcely have a better point of view from which to do it, and the same negative would answer equally well perhaps for any such subjects whose sky outlines suited it. There lies the point. I said (April 12) "what is wanted is a tolerably unbroken horizon;" it is surprising how small a projection, in the shape of a chimney stack or tree top, will entirely spoil for use an otherwise good cloud negative. The fact is, the first few degrees above the "skyline" comprise the really "business portion" of the sky negative, and if these are spoiled by unseemly projections there is little left that is of use. I have seen a series of cloud negatives taken from an upper window and looking right out to sea, in which of course the clouds

reached down to a very low horizon, but they were utterly useless, because, unnoticed when they were taken, a signal pole or beacon of some kind projected upwards into the sky in the very centre of the field of view, and so rendered all the low-lying clouds unavailable for use.

I repeat, then, that a straight skyline is a *sine quâ non*, whether the point of view be an attic window or *terra firma*. Of course, in a situation surrounded by buildings or trees the attic window elevation becomes a valuable, if not indispensable aid, but out in "the open" it is quite needless.

Mr. R. H. Bow's method of binding lantern transparencies, in which the mat and separate binding strips are replaced by a single folding mat, is a very good one when the mats are properly cut and exactly suited to the thickness of the glasses; but if this be not the case endless trouble will be the result. It was very likely from Mr. Bow's description of this method a quarter of a century ago that I was myself induced to try it, but after doing my best in the way of cutting

the masks, I returned to the old way as being better and far less trouble. A friend of mine some few years back had a number of such masks cut for him by a professional maker, and though they cost him as much, or more, *per dozen* than the ordinary masks and strips *per gross*, he eventually put them from him and used the latter.

I have often wondered that no such instrument as the diaphoscope, also described in last issue by Mr. Bow, has been previously put forward commercially for the same purpose. Nowadays nearly every photographer possesses a lantern with the necessary stock of slides, and these form, independently of the lantern, quite as interesting pictures as those on paper. They are small it is true, and in order to see them properly, it is, under ordinary circumstances, needful to crane the neck at an uncomfortable angle in order to get them against the light. Even then a piece of ground or opal glass is necessary before they can be properly examined, for the lay individual is not usually up to the wrinkle of viewing transparencies by light reflected from a sheet of paper or other material. Hence, when the lantern itself cannot be brought out, its slides remain in their boxes, and much pleasure is thus lost to the world. With the diaphoscope, however, we have a new power, which we may place second to the stereoscope and far ahead of the graphoscope.

It has been the fashion for some years past now to look back upon the "good old collodion days" and to regard the "wet plate character" as the standard of excellence to be aimed at in our modern work. I do not know whether modern results are improving or ideas changing, but certainly I was startled somewhat in last issue to find some gelatine negatives described as of the "collodion type," as if that were something inferior.

Thus the Rev. W. Miles Barnes describes how he had exhibited to a French photographer some of his pyro-developed negatives, which the professional acknowledged to be superior in delicacy and gradation and all that to his own, which were developed with ferrous oxalate. These latter are described by the writer as having some of the finer details obliterated by the piling up of the lights while the pyro-developed films were in perfect gradation. The French artist's inferior negatives are finally described as having "the qualities and very much the appearance of good negatives of the old collodion type." Surely but a short time ago no higher praise could have been given to a gelatine plate.

By the death of Mr. Warren de la Rue we have lost one of the "old hands" in photography, one perhaps but little known to the present generation, at least among photographers, although he was one of the very earliest to successfully utilise the science in the wider field of astronomy. I am afraid to say how many years it is since I first admired his wonderful lunar photographs, especially those in stereoscopic form, showing in strong relief, not only the spherical shape of the moon's body, but also the hills, valleys, and craters on its surface. This result was obtained by taking the two dissimilar pictures at intervals of several hours, which, owing to the moon's motion during the time, was equivalent to taking them from points of view some thousands of miles apart.

Mr. De la Rue was like the late Professor Spottiswoode, a wonderful example of the English business man and scientist combined. Both of them while actively directing large commercial concerns found time to devote to scientific pursuits to such good purpose that both were Presidents of leading societies—Spottiswoode of the Royal Society, and De la Rue of the Royal Institution, the Chemical Society, and the London Institution, proofs that they were something more than the "mere amateurs" it is too frequently the fashion to deem such men.

JUNIA.

AN EASY AND ECONOMICAL METHOD OF MAKING LANTERN PLATES.

No. III.—THE DRYING BOX.

IN the preparation of gelatine dry plates the first thing required to be done is to make arrangements for the drying of the plates after they have been coated. To do this a drying box or cupboard will be necessary. This consists of a light-tight chamber, through which is passed a rapid current of air.

I think the easiest and most satisfactory way of doing this, for any one preparing plates on a small scale, is to cover up a fireplace and let the drying box containing the plates stand in front of it with its outlet for air connected with the chimney, by this means a rapid and constant change of air is obtained through the box.

My own drying chamber consists of a large box with a light-tight door, with an inlet for air near the bottom and an outlet at the top passing through the boards in front of the fireplace to the chimney.



For temporary use a large sheet of strawboard or brown paper fastened over the front of the fireplace will do as well as the boards.

The plates are laid face upwards on a series of shelves, and the current of air obtained by the draught in the chimney passes over each in turn, as shown in the above diagram.

This is a very good arrangement if one has plenty of room or only requires to dry a few plates, but if I had to make another drying box I would use racks to stand the plates in instead of laying them on shelves, and thus save space; and instead of having a door I would have a lid and put the racks into the box at the top.

There are many forms of plate racks, but I think the best for this purpose (because the film is not liable to get injured) is a strip of wood $14 \times 3\frac{1}{2} \times \frac{1}{2}$ inches, with twenty-six little wooden quarter-inch pegs about three inches long stuck in it two abreast and one inch apart thus—



The plates stand in the rack thus, face upwards.

If we purpose coating half a gross of plates at the time, we shall require six of these racks, which will do for larger sized plates as well, and are very useful for drying negatives in, as they do not rub up the film.

The drying box will require to be large enough to hold the racks without crowding them close together. In the lumber room of most households a suitable box might be found if some brown paper be glued over the joints to make them light tight.



A A are a row of holes at each end of box, about three inches from the bottom.

B, inlet for air.

C, outlet for air with tube connected to chimney.

D D, a strip of indiarubber draught excluder similar to that used for doors, or a piece of indiarubber tubing fastened round the edge of the box by a strip of black twill glued to each side of the wood thus—

E, the lid; this can be fastened down by hooks or a weight placed on the top, which would press down the tubing sufficiently to make it light tight.

F F are strips of wood fastened to the ends of the box to form a passage for the air and at the same time blocking out the light. The air space in the outlet requires to be rather larger than the inlet. Paint them black before fixing them to ends of the box.

If the lid of the box fits well, instead of the indiarubber tubing a strip of (double thickness) black twill eighteen inches wide glued all round the outside of the box about two inches from the top and then folded over the lid would keep the light out all tight.

Indeed, with a little ingenuity one can find various methods of making a small drying box. It will also be found very handy for drying negatives in after they have been fixed and washed, instead of having to leave them standing about in the racks to dry.

HERBERT S. STARNES.

GROUND GLASS SENSITIVE PLATES.

WITH the view of giving a further helping hand to the use of obscured or ground glass as a support for the sensitive emulsion, I wish to state that twenty years ago it was found, in decorating embossed glass, that a finer surface could be got by adding chloride of ammonia to the usual fluoric acid. This acid is bought in druggists' shops and sold in lump. As it is gradually added to the fluoric acid, the effect is to change the obscured portions to one of whiteness and less transparency. Hence it has become known as "white acid."

Glass, thoroughly cleaned (and kept from finger-marks), when placed for two minutes in the gutta-percha tray becomes white and opaque, very fine in texture, suited in a high degree for the retoucher's pencil; besides this, the emulsion adheres more firmly to the glass,

also increases the sensitiveness by the greater quantity of emulsion it holds, and is consequently freer from "frilling."

I see no reason why this process should add greatly to the cost in producing sensitive plates, when you consider its non-halative quality added to those I have already stated. JAS. ALEX. FORREST.

THE ART OF RETOUCHING.

[A Communication to the Birkenhead Society.]

THE value of retouching as an aid to the practice of photographic portraiture is now so universally recognised, that no effort of mine is needed in order to prove its practical utility.

The term retouching is somewhat a misnomer. It implies the *continuation* of some process or method of touching, which really is not the case. The words "photo modelling" would, I think, be far more suggestive and helpful to the uninitiated.

The object of retouching cannot be too clearly stated. It is not to make poor negatives good (though to a certain extent it will do this), it is rather to make good negatives perfect. Under-exposed or over-exposed negatives will always give unsatisfactory results even though they be worked on by a skilful retoucher. What is really needed is that portraits shall be well lighted, well timed in exposure, carefully developed, and judiciously retouched. The result will then be perfect.

I have hinted that it is almost impossible to get a truthful and pleasing portrait by purely photographic means. Unfortunately the art does not lend itself to the re-production of colour, a fact which accounts for many blemishes in the photographic negative. For instance, fair-complexioned people with ruddy faces have a tendency to photograph dark; other light-coloured skins are covered with freckles, which, being yellow in colours are invariably reproduced as so many black spots; temporary pimple, and blotches are reproduced in like manner; whilst wrinkles and facial lines are often so exaggerated as to appear most objectionable.

All these defects may be completely removed by the judicious use of a sharp pointed lead pencil. The transparent parts of a negative which indicate the ruddy cheeks of a fresh complexion may be filled up by carefully interweaving pencil lines until it is brought into harmony with the surrounding parts. Freckles, pimples, and blotches may be obliterated by light touches, and wrinkles and lines may be softened in like manner. This part of the work is generally known as "smoothing" the face, and is the least important part of the retoucher's work. That which exercises his skill in a far greater degree, and which requires more than ordinary amount of artistic knowledge, is what is called "modelling the face," by which means the high light, half tones, and deeper shadows are brought into harmony the one with the other, making the resulting portrait pleasing and effective, and in accordance with the artistic laws that govern light and shade. To do this effectually requires a close examination of the portrait negative previous to commencing operations. Should the high lights appear flat, it will be necessary to build them up with pencil until a natural effect is produced. A corresponding amount of attention must also be paid to half tones and shadows, the former being treated most delicately at all times.

The principal lights are the top of the forehead, over the eyebrows, the bridge of the nose, and the cheek-bone. The middle tints and deep shadows are indicated in every negative, and consequently do not need description.

The value of retouching in connexion with expression in photographic portraiture cannot be over estimated. It very frequently happens that a cross look is caused by knitting the brow, which produces lines between the eyes. The softening of these lines by retouching almost invariably produces a result that, compared with a print from the same negative before being so dealt with, is simply marvellous. Again, the lines of the mouth when drawn down very often causes a sarcastic expression, or if drawn up produces a grin; but, if these be carefully softened down by retouching, pictures which would otherwise be considered valueless will be carefully treasured as pleasing and truthful portraits.

The novice in the art will naturally desire to produce such results with as little delay as possible, and it most frequently happens that beginners endeavour to fill up *all* the lines in the face with a view of producing a clean, marbly effect, which, through want of knowledge, they consider the highest flight of the retouching art. A greater mistake could not be made. In no instance should the individuality of any portrait be lost. Perhaps this phase of our subject is the most important, for what *not* to do is even of greater moment than *what* to do in the endeavour to produce a faithful portrait. For instance, if the lines in an aged person's face were filled up, it would probably make them appear young, and only the

outline of the face would be recognisable; or, again, if the hollow cheeks of a thin-faced person were so worked on as to produce the effect of one in full flesh—as a portrait such a picture would be worthless. It cannot, therefore, be too strongly urged that in every retouching effort nothing should be done that will in any way interfere with the production of a truthful portrait. Tone down exaggerated lines, take away altogether such blemishes as are not permanent, build up the lights, and improve in every respect where faults are due to defective photography, but in no case endeavour to make the old look young, or the ugly pretty; for however much we may flatter ourselves or seek to flatter others, the truth is strong, and in the long run must prevail. W. WILKINSON.

COPYING PAINTINGS AND WORKS OF ART.

I.

THIS province of photographic work is one requiring training, aptitude, and attention; being rather out of the ordinary routine of the professional portraitist or landscape amateur, perhaps a few notes from a thirty-year record of work in this special direction may prove of some value, and be an addition to the knowledge of many of the readers of this JOURNAL in this, which is probably the most difficult problem in applied photography, with the exception of astronomical and microscopic work, if they may be excepted.

There is an essential difference necessary in the treatment of old and new, or rather ancient and modern, works of the painter's art, and the first-mentioned will receive the earlier notice. All old paintings that have passed through my hands in the course of a long experience as a cleaner, liner, restorer, and dealer in pictures, may be put down as having been at least once if not many times varnished, and this no matter on what they may have been painted—wood, canvas, metal, or other material—or which grounds they may have been painted on, or, on the other hand, in what medium they may have been executed. After having been varnished they are practically oil paintings, and through their protective coatings of varnish or other covering, they become amenable to the same treatment on being photographed. Such pictures, no matter on what ground they are painted, or on what material, after a life of, say, a hundred years, become more or less cracked all over, some of them more, some less; perhaps the most perfect I have seen having been small panel pictures painted by the reputed inventors of oil painting, the brothers Van Eyck—in the fourteenth century I think, without looking up the exact date. In photographing such pictures, which are generally to be found in collections, public or private, it may easily be understood that unless under special circumstances they must be photographed as they are, with all their faults and imperfections, as many of the foreign collections have been, thus affording not only the means of seeing them as they are, and the state of decay or preservation they may be in, but securing for posterity a record of their condition at the time the photograph was taken. In this connexion it may be mentioned that the collections of two members of the present administration have passed through my hands, I hope skilfully and think successfully. In both cases the pictures were photographed before being touched, and again after finishing, so that the most careful examination could be made and comparison instituted. This, more especially in the case of family portraits, is a most important matter, for no one would like to see or know of the similitudes of historical celebrities being injured or altered in any way.

In both cases an interleaved photographic catalogue (royal quarto-sized paper, the photographs differing but the sizes of all being recorded) was made of the collections for present use and future reference; and that this was necessary will be seen from the fact that in one of the cases there were two MS. catalogues of the collection of different dates, the earliest being over a hundred years old, and even with their aid, in many instances, there was very great difficulty in identifying many of the pictures which had been unmarked or had had the markings removed, some even lost altogether, others their places changed in the mansions, and other causes, a thing which need not again occur. The idea is made a present of to the profession, and ought to be of great value, as I believe that at the time it was initiated it was so for the first time, at least in a private collection, if not in a public as well.

The place where to photograph a picture is always a difficult thing to decide upon, to get the best light for the work, as old pictures may be put down as a rule to be very non-actinic, partly from the darkening of the colour and partly from the yellowing caused by oxidation of the varnishes and the gradual accumulation of what can only be called *dirt*, no matter how carefully a collection may be looked after; indeed, it is the worst thing for pictures to be constantly dusting, washing, and

wiping them, the continual doing so resulting in almost irreparable injury to many of them.

Most people are aware how readily polished mirror plates become first clouded, then tarnished, and ultimately obscured, in the cleanest of households, on the surface of the plates. This form of dirt is generally produced by the combined action of the decomposed products of artificial lighting and heating, the exhalations from the person, from the atoms floating in the atmosphere, and so on, and is made plainly visible on the polished mirror plate; but the same action and effect is taking place on the surface of every picture or other work of art. And, in addition, if the picture is painted on canvas, almost every time a window or door is opened and shut, especially if rapidly or violently, the canvas is shaken more or less on its stretcher and in its frame, and the colour and the ground on which it is painted becomes in time more or less cracked—first round the framework of the stretcher, and ultimately all over the picture, this being but the mechanical action, and is quite apart from the action of the paint itself and the varnishes used, which dry at different rates of speed, so to speak, the quicker drying contracting and rending the slower, till in some cases we have a perfect network of cracks, which become receptacles for all kinds of dirt, this being accompanied by the invariable relations of age—decay and destruction.

If such a picture must be photographed, say, in the "country," to save removal, or because the proprietor has objections to its removal to the studio, then the best method I have found in practice is to do it in the open air, and in the sunlight if possible, so placing the picture that the angles of incidence and refraction shall be such as to cause no useless reflections on the plate. This may be best arrived at by placing the picture opposite the sun, with grass or something dark below—a large black cloth being the best—and the camera with its back to the sun. I would on no account coat such a picture as is alluded to with any substance whatever, trusting rather to the full action of the light and long exposure to it; indeed, in the case of old pictures it is almost impossible to over expose them, and as I am now writing of the collodion times and practice, long exposures required special preparation of the materials used, a topic which will be treated of further on.

With the full liberty and permission of the proprietor of such pictures, I have, in order to get the best possible results, washed, as we call it, but what is really only damp-rubbing with a washleather or soft cloth, and polishing with an old silk handkerchief, after careful dusting, but on no account should soap be used. This, with any after treatment of what can only be described as temporary varnishes, I never trusted, and would not, in the hands of the ordinary photographic operator, who, whatever his photographic skill, can hardly be supposed to know much of the handling and treatment of valuable pictures. In such hands they are best left alone, but in the hands of, and under the supervision of, a person skilled in and accustomed to the treatment of such pictures it is quite a different matter.

Reverting to the "mirror" illustration given above, I have found in practice that the peculiar deposit is most easily removed by a very harmless material, namely, common white vinegar and water, or, what is practically the same thing, a few drops of acetic acid put into a tumbler of water; the thick tarry scum is quickly removed if the cloth be damped with this, and no harm accrues to the vitreous surface, which is afterwards finished with a cloth or washleather. Applying this idea to the varnished surface of pictures, I have found that much of the superficial dirt acquired in the same way has been most successfully removed without the slightest injury to the picture by the same treatment carefully carried out. Of course, the weak acid is not to be slushed on or allowed to soak through the cracks (if any), but lightly and skilfully done, and with "common sense."

If further cleaning up of the picture be needed, almost any of the methods suggested suit the purpose if carefully done. I believe I have used them all, from strong brown stout, through all varieties of syrups and water, or rather syrup thinned down sufficiently to become for the time a temporary varnish; but I have found that in summer-time if there are any or many flies about they are sure to be attracted by the scent presumed to the surface of the picture during protracted exposures. Glycerine has not this disadvantage—at least, in the same degree; and if a watery solution be used, or desired to be used, it will be found the best in practice when reduced to the proper consistency.

Some of the oils, where such a liberty can be taken, may be used with great advantage to the clearness and clearing up of shadows and dull portions of the picture, and bring the whole to a uniformity of surface more fitted for photographing; some of the oils only however, and those not of the drying kind, such as linseed for instance, or any of that class, but rather those which do not readily dry, such as lard, or sperm of the animal oils, and olive of the vegetable. Castor is too viscous for use.

All of these, however, must be most carefully removed, and in the case of severely cracked works it will be found extremely difficult to do so, although the remaining of an infinitesimal film may—indeed, can—do no possible harm, and on the whole they are safer and better than the watery temporary varnishes.

W. H. DAVIES.

LORD RAYLEIGH ON EXPERIMENTAL OPTICS.

VII.

In his seventh lecture at the Royal Institution upon the above subject, Lord Rayleigh said that diffraction phenomena can be produced without ruled lines, for almost any irregularity will produce the effect, and Brewster showed that the property can be transferred from one substance to another. If a solution of gelatine be poured over a glass diffraction grating, then allowed to dry, and afterwards be stripped from the glass, it will act quite well, and produce the main effects of the original grating; but good optical definition out of such a grating cannot be expected, because the surface is not flat, and some force is required to pull the gelatine film from the glass.

Another method of reproducing a grating is to throw down a thin film of pure metallic silver by reduction from a silvering solution upon the face of a glass grating; this very thin film will act as a conductor of electricity, so can be thickened by electroplating it with copper until it is strong enough to be self-supporting, and then it can be separated from the glass.

A method of making gratings, which he had himself introduced, was to multiply an original by means of photography. It has to be reproduced about the same size as the original, and no microscopic or other lens can be expected to give a sufficiently perfect image for the purpose—it is not in the nature of a lens that it should do so; but by laying the original grating upon a truly flat sensitive plate, and throwing a shadow of the lines upon that plate, it is perfectly possible to get very fine gratings, giving spectra quite comparable with those produced by the original. Lord Rayleigh did not say whether he used collodion or gelatine dry plates, or Daguerreotype plates. With gelatine dry plates especially, the question would arise as to the influence of different sizes of the solid particles in emulsions of different make.

The lecturer then said that the lines for the production of diffraction phenomena need not necessarily be straight. In years gone by, Barton discovered that if numerous fine lines were drawn by a diamond point upon steel, and the steel were subsequently hardened, the block thus prepared could be used as a die to reproduce the lines upon silver or other metal. In this way "Barton's buttons" were made; in sunlight or gas-light they glittered and gave a display of colours, something like those given by the diamond and other precious stones. He here placed a Barton's button in the path of the beam from the electric lamp, and its reflected image upon the screen displayed the colours of the spectrum in a complex image of elegant symmetrical form.

Lord Rayleigh said that the way in which Professor Rowlands manufactures the original gratings is a triumph of mechanical skill; in the intervals between the lines there is not a difference amounting to $\frac{1}{1000}$ part, and perhaps to not $\frac{1}{10000}$ part.

Diffraction may be produced by means of seeds, but the seeds or other particles must be pretty nearly of the same size. He here produced rings of colour by placing a piece of glass dusted with lycopodium in a narrow beam from the electric lamp, which was throwing a small spot of light upon the screen; a coloured halo upon the screen was the result. He said that these coloured rings are not the same as Newton's rings. On the same principle those halos are produced which are seen round the sun and moon in certain states of the weather, and it is possible from the size of the rings to calculate the dimensions of the particles which produce them, because halos of this class always signify that the particles producing them are nearly of the same size.

Lord Rayleigh then threw a small bright disc of polarised light upon the screen by means of the great Iceland spar prisms presented to the Royal Institution by the late Mr. Spottiswoode. In the path of the light he placed a vessel with glass ends filled with bisulphide of carbon, and surrounded by a coil of insulated copper wire. Whenever the current was sent through the coil, the bisulphide of carbon rotated the plane of polarisation, and rotated the blue rays more than the red; this fact was first discovered by Faraday, and in that place. When light passes through a solution of sugar the plane of polarisation is also rotated, and on this principle the saccharometer is made. By its use brewers, sugar-refiners, and others can tell how much sugar there is in any particular liquid, whatever other substances may be present. He (Lord Rayleigh) had utilised the phenomenon just described as presented by bisulphide of carbon, in the devising of an optical instrument for measuring electrical force.

Why is the sky blue? Brewster supposed the colour to be due to thin plates, as in the soap bubble, for it was once thought that all the particles of water floating in the atmosphere and forming mist or cloud were small, hollow bubbles. The blue of the first order produced by thin plates is, however, very faint, and not the rich blue of the sky; there is also no evidence that the particles of water floating in the atmosphere are hollow. It seems probable that the blue colour of the sky is due to floating seeds,

for minute germs are everywhere, also to other small floating particles of organic and inorganic matter. The light from the sky is polarised, and by pouring a solution of gum mastic in alcohol into water, a turbid mixture results which exhibits a bluish colour and a polarisation not unlike that of the blue sky. Professor Tyndall had proved in that theatre that violet light would precipitate certain vapours into clouds, which at their formation looked blue, and that their polarisation was not unlike that of the sky. The earth is not alone lighted by the direct rays of the sun, but to no inconsiderable extent by the light reflected from floating particles in the atmosphere, also by light scattered by the earth. The polarisation of the light from the sky can be seen on examining it with a Nicol's prism; observers standing upon mountains in a pure atmosphere see the polarisation more strongly. The problem of the blue colour is easier to explain than the polarisation, for if floating particles be present, comparable in dimensions with the wave-lengths of light, then the smaller particles might be expected to act upon the shorter waves more powerfully than upon the longer ones. The speaker here placed a solution of common hyposulphite of soda in a rectangular glass vessel in the path of a parallel cylindrical beam from the electric lamp, and added to it an exceedingly weak solution of some acid, so that a minute or two elapsed before any sulphur began to precipitate and to render the liquid turbid. When the particles first began to form, the liquid looked bluish, and the light passing through the trough and forming an illuminated disc on the screen became light yellow; in time the yellow deepened to orange and the orange to red, as with the setting sun. Lord Rayleigh said that in private it is best in this experiment to use acid so weak that five minutes elapse before the liquid begins to become perceptibly turbid; but so much time cannot well be occupied over it in a public lecture. The precipitation can be arrested at any desired stage by adding ammonia until neutralisation is effected.

Only a few weeks ago Professor Hartley discovered that ozone has a blue colour if you only look through a sufficiently long column of it. The observation in itself is interesting enough, and Professor Hartley tried to apply it in explanation of the blue colour of the sky; but Lord Rayleigh thought that view utterly untenable, because then the sun should be blue when gazed at, and the sky away from the sun should not look blue. Professor Hartley also tries to explain the blue colour by fluorescence, which does not explain the red colour of the setting sun, although it might explain the blue of the sky. Then, again, with fluorescent light there is no polarisation, and if there is one thing we are more certain about than another, it is that the light from the sky is polarised. It seems to be certain that the blue colour of the sky is due to diffraction—to the scattering of the light by small particles.

THE GLASGOW AMATEUR PHOTOGRAPHIC EXHIBITION.

(From our Special Correspondent.)

ALTHOUGH somewhat later than usual in the date of their fixture, the Executive of the Glasgow Amateur Photographic Association are to be congratulated on the success of their sixth annual exhibition.

As was the case last year, they have wisely, we think, again used their own commodious premises, situated at 180, West Regent-street, for their annual exhibition. In one or two matters the Executive have seen fit to depart from the use and wont of the past.

Looking over the collection we find a number of well-known local amateurs conspicuous by their absence, this is specially noticeable in the case of Mr. Hugh Reid, who took first honours in the Landscape Class last year. Messrs. George Murray, W. C. Hume, I. Ovenstone, John Parker, and W. Goodwin are not represented, but their places are well filled by new aspirants for honour.

We are pleased also to notice that several of the lady members of the Association have this year sent in pictures, among whom as specially deserving notice are Miss Robertson and Miss Lang; the former lady contributes a series of pictures representing a Scotch washing, and although in point of composition they are not altogether perfect, and would have been improved had they been taken in better light, still they are very creditable productions indeed.

In point of numbers the exhibits quite fill the walls of the large suite of rooms, and taken as a whole it must be said that the exhibition is a long way ahead of that of last year.

Perhaps the poorest class is the "Instantaneous," in which Mr. Snell Anderson is represented. We have seen much better productions from this celebrated amateur's cameras; somehow his pictures are too grey in tone and are somewhat spotty. His best picture is an instantaneous view of Regent-street, London.

In the Landscape Class M. Donald Dove takes first honours. He is represented with three whole-plate pictures; they are well composed, and perfect in balance and tone, and Mr. Dove is to be congratulated on his success.

In the Interior Class we were much pleased with the excellence of Mr. David Clark's picture of the interior of a mosque at Constantinople. Mr. Clark has quite recently returned from an extensive tour in the East, and this is one of the best pictures he secured; for delicacy and detail in the fine tracery we have seldom seen anything to equal this production, and the enlargement, which also takes the place of honour in its class, is from the same negative.

In Portraiture Mr. Berger takes first place. We must, however, confess to a feeling of disappointment in the exhibits of this class. There is a want of plasticity in Mr. Berger's pictures; but, taking all into consideration, perhaps the judges could not have done better.

Mr. David Clarke is also represented in this class. His head of a Russian peasant is a very fine bit of work; but his exhibit is somewhat spoiled by a companion picture in the same frame, which he titles *On a Tree Top*. This is a picture of two ladies evidently balancing themselves on a bough, and Mr. Clark has fallen into the error of turning the eyes in the opposite direction to the head.

The prize for the most artistic picture in the exhibition has gone this year to Mr. Archibald Watson, who secures the amateur medal for his *Babes in the Wood*. Mr. Watson is to be congratulated on his success. In this class he was, however, closely followed by Mr. Oliver with another of his charming little studies, like *Waiting for a Nibble*, which secured him the place of honour last year. Mr. Watson's picture, however, is a strong one, and is original in conception. It represents his little children lying in a wood covered over with leaves—like most of Mr. Watson's pictures it is nearly perfect in balance and tone, and reflects much credit on him.

The exhibition, which was opened on the 20th instant, is free to the public, and remains open till May 4. During its continuance the Executive have arranged for a series of lantern entertainments. The first of these was given before a very large audience on Wednesday, the 24th ultimo, when Mr. James Moore, a gentleman long and favourably known in connexion with the Optical Department of Mr. James White, optician, Glasgow, took charge of the lamps and gave a most excellent entertainment. The pictures were projected on an opaque paper and cloth screen, which has been kindly presented to the Association by Mr. John Morrison, jun. This screen, which is about twelve feet square, is run up on a roller just like an ordinary window blind, and will doubtless prove a great acquisition to the members. In its way it is about the best thing of the kind we have seen, and will save a lot of bother in the future.

The next limelight entertainment is announced to take place on May 3, when Mr. Moore will again take charge of lanterns, on which occasion he will show a collection of slides sent in by members of the Association.

In the Transparency Class Mr. W. Snell Anderson takes first place, but is closely followed by Mr. Watson, who exhibits three charming little transparencies taken on Mawson's plates.

Mr. Anderson's pictures are the most artistic however, and we think the judges did right in placing him first. His slides, however, are not toned.

The Executive arranged for the awards being adjudged by two professional photographers, who were assisted by an artist. These duties were kindly undertaken by Mr. William Allan, of Ayr, and Mr. James Paton, of Greenock, while Mr. Young this year again gave the weight of his artistic knowledge in the selection of the pictures.

Altogether, the Glasgow amateurs have this year brought together a very interesting collection of photographs, which the Glasgow public are not slow to appreciate, for the rooms are daily and nightly visited by large crowds of visitors. It is contemplated to wind up a most successful winter season with a smoking concert at the close of the exhibition. The enormous success which lately attended a similar meeting of the Parent Society evidently tending to encourage such a final to a most successful amateur exhibition in Glasgow.

We append list of the prize winners:—

Class I. Landscapes: first prize, Donald Dove; second prize, Archibald Watson; third prize, Thomas Taylor. (Small size): first prize, John Morrison, jun.; second prize, John C. Hutcheson; third prize, Charles C. Coulson. **Class II. Figure Studies:** first prize, Archibald Watson; second prize, J. C. Oliver. **Class III. Instantaneous:** first prize, T. Steven, jun.; second prize, J. C. Oliver. **Class IV. Portraits:** first prize, E. James R. Berger; second prize, David R. Clark, M.A. **Class V. Groups:** first prize, J. A. Blackie. **Class VI. Animals:** first prize, James Fleming; second prize, Charles C. Coulson. **Class VII. Still Life and Interiors:** first prize, David R. Clark, M.A. **Class VIII. Enlargements:** first prize, David R. Clark, M.A.; second prize, W. Snell Anderson. **Class IX. Transparencies:** first prize, W. Snell Anderson. **Class X. Developed Prints:** first prize, David R. Clark, M.A.; second prize, Charles C. Coulson. "Amateur Photographer" Medal for most Artistic Picture: Archibald Watson.

THE CAMERA IN SWITZERLAND AND ON THE ALPS.*

If time admits, it will well repay the trouble to take the steamboat which crosses the Lake of Nèuchâtel, and passing up the canal which connects the lakes of Nèuchâtel and Morat crosses the latter lake to the little town of Morat, which is very picturesque—quite a miniature Berne. A picture might be taken of the town from the landing stage (one-half of a second, f-34), no time must be lost if the passenger arrives by the twenty minutes past three boat, as the last boat leaves at four. Walk up the hill to the main entrance, take a view of the town from the archway, go up the one street and take a view each way from the centre (one second), go out the upper end, and following the road descending towards the lake and landing-stage you will find two or three hits on the way.

At the time we were at Nèuchâtel there was a Venetian fête on the lake; the

* Continued from page 288.

numberless boats decorated with thousands of coloured lamps fitting to and fro, the reflections of these and of the coloured fires and fireworks on the lake were fairy-like.

At Berne we were induced to try a German-Swiss hotel instead of the Belle Vue, to where we were going. Two ladies entered with ourselves. On asking the proprietor for rooms, he said he regretted he was unable to give us rooms on the first and second floors, as the members of the "ballet" had engaged them all for two months. One of the ladies overheard this and surprised us by the vehemence of her language. "Good gracious!" she exclaimed; "what a dreadful place! Let us go to another hotel. The members of the ballet, indeed! and all the best rooms in the house taken up by the hussies!" She was pacified on being informed that the members of the Palais—pronounced ballet by the Germans—were not ballet girls, and had nothing to do with the theatre, but were members of the Swiss Parliament, which was then in session.

A gentleman who sat next to me at dinner informed me that at the last hotel he was staying at an absent-minded gentleman sitting near the head of the table helped himself to a glass of fish sauce from the bottle standing near him, and did not discover his mistake until he had tasted it the second time. On being asked how it was he did not discover his mistake from the flavour, he replied that he thought the peculiar flavour was due to its being the wine of the country.

It is scarcely possible to say what should be photographed in Berne, there are so many nooks and corners where pictures may be obtained, but I suppose the view from the Schanzli would be one; the old clock tower, with its performing bears, old man, fool, and cock, another; and the streets on each side of it (one second for each); the bear pit might also be taken. On our first visit to the pit two old bears were prowling around, and four young bears were disputing themselves on the shortened branches of a tree stem which had been planted in the centre of the pit. I only regretted my camera was not with me then. On the following day, when the camera was on the spot, only one bear was to be seen, and no amount of bears would tempt him to a spot where he could be photographed. At last a young man standing near came to the rescue; he plucked some grass and leaves of a tree, tied them to a string, and let the bunch down on the sunny side of the pit; the bear caught sight of it, and whilst he was walking across after it this photograph was taken on a Carbutt plate with a shutter. Had I known what was to follow I should have waited, for the young man drew up the grass, and Bruin, to catch it, reared on his hind legs and reached out head and paws after it, when a first-rate picture might have been obtained. This will give a hint to any one who proposes engaging in a similar undertaking.

Take care that you do not fall over into the bear pit, as an Englishman did many years ago, and was so warmly embraced by the bear that he died on the spot. He was less fortunate than the prisoner who found himself *tit-for-tat* with the bear, to the mutual astonishment of both. The old bear pit was formerly in the town, adjoining the wall of the prison. One night a prisoner who had been condemned to death succeeded, by means of an iron tool he had secreted, in withdrawing some stones from the wall of his cell; he was working away assiduously when he heard, as he supposed, another unfortunate prisoner assisting him from the other side; this greatly encouraged him, and he worked with redoubled energy; one huge stone resisted his utmost efforts, but at length it gave way under the more powerful strokes of the other prisoner, and the way of escape was open, but, to his surprise and horror, the other prisoner proved to be the bear, who, led by the instinct of destructiveness, hearing some one breaking down the wall on one side proceeded to do the same on the other side. What was to be done? To remain was death, to go into the bear pit might be death likewise; he determined to face the bear rather than the executioner. The bear let him escape and then made his way into the prisoner's cell, and when the jailer paid his morning visit to the cell he found the bear resting comfortably after his labour on the prisoner's straw bed; he fled precipitately, leaving the cell door open, and the bear marched out up the street into the fruit market; sellers and buyers ran off in all directions, leaving the bear to roam at his own sweet will amidst the fruit and vegetables; selecting a stall which contained fruit suited to his taste, he regaled himself, and was too busily employed to notice the approach of two blacksmiths, who, each armed with a pair of red-hot pincers, took hold of him by the ears and led him back ignominiously to his pit.

I went out to photograph the market but exposed no plate. A few years ago most of the people attending the market would have been in costume, now the costume is seldom seen; more may be seen on Sundays than on market days. There are many pictures round the town which might be secured if time and plate admit. That picture of the fountain was obtained in a back street near the Museum.

Interlaken is easily reached from Berne via Lake of Thun. A day may be spent profitably at the town of Thun, where the castle of Kyburg deserves notice. The photograph of Oberhofen was taken with the shutter as the steamer passed it; not having a finder I have not the precise view I intended.

At Spiez, further up the lake, there is a picturesque cluster of buildings which compose admirably for an instantaneous picture from the lake; possibly an equally good one may be obtained from the land.

The panoramic view of Interlaken is taken from the Hohbühl (cap off and on, f-34); it is in two sections—you cannot otherwise obtain the complete view—embracing the ends of the lakes both of Thun and Brienz, with the intervening plain and the mountains behind. The Jungfrau was capped, but a good view of that mountain, with the Rügen and meadow in the foreground, can be obtained from the windows of the Schweizerhof, and possibly from other hotels. The great triennial *fête*, the *Tire National*, was going on whilst we were there, and the houses and streets were decorated with flags, arches, and greenery; this, though it might have enhanced the appearance of the place in the eyes of residents, ruined it for photography. Each town sends its contingent of marksmen to contest for the prizes offered by the committee; they march in—rugged and bronzed-faced mountaineers and the less hardy-looking but more polished inhabitants of the town—each with his rifle slung over his shoulder, each company headed by its band; that of the Berne contingent was preceded by a bear, or, rather, a man in a bear's skin, who caused much amusement to the spectators by his antics. The photograph of the fair, which is carried on close to the shooting-ground, was taken under poor conditions as to light, when a good photograph with a shutter was out of the question.

A street of old chalets near the new post-office should be visited, and the market place of the ancient town of Unterseen, which looks as if it had drifted from the middle ages into the nineteenth century, will yield an interesting picture or two. Interlaken was apparently a suburb of Unterseen before it grew to its present importance. There is plenty of work to be done in the neighbourhood of Interlaken, especially in the direction of Lauterbrunnen and Grindelwald. The Rügen should be visited; numberless pretty vistas into the Lauterbrunnen Valley can be obtained through

breaks in the trees from the road which encircles the Rügen; beyond these is an exquisite view of the Unspunnen Valley, with the castle on the right and the mountains rising one behind the other, and bounded by the snow-clad peaks of the range in the distance. As good a point of view can be obtained of this valley from the Unspunnen wayside inn as from anywhere, and the light in the afternoon is the most suitable. Not far from this, at Wilderswyl, the next picture, *Haymaking in the Alps*, was taken; we had some difficulty in making the persons who appear in it understand that we wished to group them in the picture and send them copies of it—for we could not speak German, and they could speak nothing else; both difficulties were, however, got over ultimately, and their post-card, addressed to "Mr. Monkton Rectory," acknowledging the receipt of the copies sent them, is quaintly and prettily expressed. The literal translation runs as follows:—"Honoured Sir,—We have received your picture quite safely, which has given us great joy, for which we speak out to you the highest thanks; the whole family greet you friendly."

The Giesback Falls, on the Lake of Brienz, is within easy distance of Interlaken; the best, indeed the only complete view of them is to be obtained from the terrace of the hotel. Owing to the deep shadows of the woods on either side, a much longer exposure is necessary than would be the case on an open landscape; one of the two pictures before you was taken in the sunshine, the other under a cloudy sky, on June 20, between one and two o'clock; the former is under exposed two and a half seconds, the latter fully exposed (five seconds, f-34). Under the fall (next above the lowest, I think), under a platform partly cut in the rock and made out with wood strutted against the face of the rock and reaching underneath the fall to the opposite bank, with your back to the rock, the water falls from overhead in front of you, dashing on to the rocks beneath with a deafening roar; a projection in the rock above causes the water to divide, leaving a narrow space, through which this photograph of the lake, with mountains on the other side, was taken; in the middle distance a portion of the Giesback Hotel, and in the foreground the bed of the stream broken by rocks and flanked by the woods (exposure four seconds, f-34), are seen.

The next picture, the *Eiger*, was photographed from the Lauterbrunnen Valley on the way to Lauterbrunnen from Interlaken; the pretty composition of the mountain stream with the bridge over it and chalets and trees on either side, and the noble-looking mountains in the background, is taken nearer Lauterbrunnen; you cannot miss seeing it and recognising it as you pass.

The young lacemakers, with their huts and the Stanback in the background, will be recognised as having been taken in Lauterbrunnen. There was some little difficulty in getting them to group themselves effectively, but by dint of purchasing pillow lace in quantities of five yards for one franc (how can it be made for the money!) and a free distribution of nickel this difficulty was got over, but when the critical moment came and the cap was taken off, round went all the eyes to the central point of attraction—the lens tube. The pleasure to be obtained from gazing at a lens seems inexhaustible.

The Stanback was taken from the field opposite the principal hotel at Lauterbrunnen; the falls were in magnificent condition, any amount of water; no one who has seen them in August and September after dry weather can form any idea of their magnificence earlier in the year, when the torrent is swollen by the melted snow from the mountains.

W. MILES BARNES.

(To be concluded.)

Our Editorial Table.

THE GEM PNEUMATIC DROP SHUTTER.

ALFRED DREWET, Sidecup, Kent.

We have before us one of the above-named shutters. The cut fully



explains its *modus operandi*. It is cheaply though effectively made, and answers the purposes well for which it is intended.

PHOTOGRAPHIC ANNUAL AND COMPREHENSIVE CATALOGUE.

JONATHAN FALLOWFIELD, Lower Marsh.

THE nature of this thirty-third *Annual and Catalogue* is fittingly expressed by the term "comprehensive," for greater comprehensiveness in any collection of photographic appliances it is difficult to conceive of. Of the 335 pages comprising the *Annual*, no fewer than twenty-nine are devoted to lenses alone, these including the productions of all manufacturers of recognised high standing. As with lenses, so with cameras, detectives, enlarging apparatus, stands, shutters, and apparatus of every nature. There is no difficulty in finding within its pages anything one wants, or is likely to want.

Its compilation implies a great deal of labour, as everything is so well classified. We can very readily believe what is stated in the preface, that "it has been the result of several months of careful study." Most profusely illustrated, there has yet room been made for many practical hints and instructions in matters of interest in the art.

Much credit devolves upon Mr. Fallowfield for compiling such an excellent work of reference—a work comprising not alone goods made by this firm, but, as stated above, those of other eminent makers. The *Annual* sells at one shilling.

SIR DAVID SALOMON'S PHOTOGRAPHIC SLIDE RULE.

THIS is really an admirable little pocket companion, for, unlike so many other slide rules, it measures only eight inches in length. By its agency several useful photographic problems connected with lenses and diaphragms can be readily solved. Various values are represented on the scales; for example, one is devoted to the equivalent focus of lenses, another to the sizes of the aperture, a third shows the ratios, a separate one being devoted to the ratios in the Dallmeyer or decimal standard. The Photographic Society's standard is also given.

The slide rule is beautifully and accurately made by W. F. Stanley, Railway-approach, London Bridge, by whom it is also sold.

THE FACILE DETECTIVE CAMERA.

F. MIALL, Clapham Junction.

A DETECTIVE camera of an entirely new nature has recently been patented by Mr. F. Miall. In it no dark slides are used, but the plates are placed in a grooved box by means of an opening in the top of the camera. By simply turning a knob at the side the various plates drop, one after another, into another grooved box in the lower chamber, the knob racking one box in one direction, and the other the opposite way, thus ensuring the plate which is ready for exposing being always at the correct distance from the lens. After the plates (twelve) have all been exposed, they can be withdrawn from the grooved reservoir at the lower part of the camera. In external appearance the "Facile" resembles a well-made box, and, as we have said, the sole operation consists in turning one knob and pushing another, by which a plate will have been placed in position and exposed, the one previously exposed being, by the same movement, also removed and stowed away.

In our estimation the problem of the extreme of simplicity of action, coupled with efficiency, is solved in this "facile" detective. Indeed, simplicity is reduced to a minimum.

Foreign Notes and News.

PROFESSOR DR. HERRMANN of Königsberg is at present occupied with important experiments on the human voice. He employs for this purpose highly sensitive bromide of silver gelatine paper, on which the fluctuations of tone are recorded, the paper being moved forwards by a mechanical appliance. This method is not in itself new; but the curves traced by a thin ray of light are so delicate that they resemble a copper engraving, and at times are only visible under a powerful lens, although the curves to begin with were very much magnified.

THE *Photographisches Wochenblatt* has recently received from Herr H. Goltzsch a piece of orange-yellow glass which appears to cut off the blue rays just as well as dark-red glass. For his dark chamber, Herr Goltzsch causes the light in addition to traverse a solution of aniline yellow and some mandarin red, which appears to form a splendid light-filter. Such a solution cuts off the blue-green rays much better than the orange-yellow glass does, and the blue-green is a colour that has a very considerable effect on bromide of silver emulsion paper. Of course, in the case of all these light-filters, it is assumed that one is not working with plates artificially rendered specially sensitive to the light which they transmit.

THE little state of Weimar has agreed to offer prizes to the amount of three hundred marks, to be paid out of the Grand Ducal exchequer in connexion with the visit of the German Photographic Society to that town, which is to take place during the summer.

AN extensive photographic exhibition will also be held in Hamburg during the coming summer. The Hamburg Photographic Society recommends June as the most suitable time for paying a visit, as the exhibition will be then in full swing, and Hamburg and its neighbourhood appear to best advantage during that month.

AT its last meeting, on April 5, the Photographic Society of Dresden chronicled the completion of the fourth year of its existence as a society. This Association has this year been successful in establishing an Institute for the use of its members, where, in addition to the advantages of being able to attend lectures on photography and allied sciences, an extensive library and other conveniences are to be placed at their disposal.

MM. CARQUERO & GUILLAUMONT have arranged a chair in which a person may seat himself and, by pressing a button, be photographed instantaneously. The objective is placed in front of the chair and the portrait is delivered a few minutes after the sitting.

SWEDEN already possesses a publication devoted to photography, the *Fotografisk Tidskrift*, and though its life has not as yet been a long one, it has at any rate managed to reach its seventh number; its circulation is steadily increasing, and its popularity, since its adoption as the official organ of the *Svenska Fotografiamätföreningen* has received a considerable impulse. The current number contains an account of the last meeting of the above-named Photographic Society, under the presidency of C. G. V. Carleman. A proposal was made and adopted that the Society should establish a number of dépôts throughout the country, especially designed for the purpose of assisting amateurs.

THE current number of *Les Inventiones Nouvelles* gives an interesting account of a method recently invented in Russia for producing a photo-engraving direct on wood. The block employed requires, of course, previous preparation. Its pores are first filled with insoluble carbonate of copper, which is effected by boiling it in a solution of sulphate of copper and then in carbonate of soda. The block is thus dried and one of its faces polished, the back and sides being covered with a varnish of asphalt, the polished face being finally coated with sensitive gelatine. After photographing the subject to be engraved, the soluble remaining portions of the gelatine are removed by washing. The remaining portions, that is to say the design itself, is then coated with a layer of asphalt varnish, and the block immersed for an hour in concentrated nitric acid, and after that for another hour in sulphuric acid. By this means the wood is eaten away wherever it was left unprotected by the varnish, and on brushing it with a hard brush the design appears in relief. On drying and removing the asphalt with a little benzene, the block may be at once employed for printing.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6678.—"An Improved Apparatus for the Delivery of Cards, Photographic and other Pictures and Prints on Prepayment." H. HUTCHINS and T. F. BRICE.—Dated April 18, 1889.

No. 6686.—"Improvements relating to Photographic Cameras and Lenses." T. R. DALLMEYER and F. BEAUCHAMP.—Dated April 18, 1889.

No. 6749.—"Improvements in Shutters for Photographic Cameras." Complete specification. C. A. HOFFMAN and R. D. CLEVELAND.—Dated April 20, 1889.

No. 6771.—"Improvements in Actinometers for Photographic Purposes." P. SWANSON.—Dated April 23, 1889.

No. 6789.—"An Improved Process of Frosting, Colouring, and Decorating Glass and like Material for Optical Purposes." P. WARD.—Dated April 23, 1889.

No. 6999.—"Improvements in Magic Lanterns." C. GRAY and H. KEMP.—Dated April 26, 1889.

No. 7060.—"An Improved Coin-freed Apparatus for Exhibiting Pictures and Playing Tunes." E. JEANRENAUD.—Dated April 27, 1889.

No. 7229.—"An Improved Developing and Washing Dish for Photographic Purposes." H. M. SMITH.—Dated April, 1889.

SPECIFICATIONS PUBLISHED.

No. 5140.—"Taking Photographs, &c." HINES and Others.—Dated April 27, 1888. Price 1s. 6d.

No. 8193.—"Photographic Cameras." MADER and ORTEL.—Dated April 27, 1888. Price 11d.

PATENTS COMPLETED.

IMPROVEMENTS IN AND RELATING TO PHOTOGRAPHIC CAMERAS AND DARK SLIDES.

No. 6814. SAMUEL MARK CLARK, 54, Cheapside, London, E.C.—May 8, 1888. This invention has for its object the construction of photographic cameras in such a manner as to ensure strength and portability combined with the highest efficiency, at the same time that it shall be self-contained.

The device, according to my invention, comprises a box or case serving as a camera perforated centrally in front to receive the object lens, and furnished at the back with a closely-fitting hinged door and suitable fastening. A metal-flanged collar is secured within the perforation above referred to, into which takes the object lens, and which is held firmly in position preferably by a bayonet joint forming part of the lens tube.

In the roof of the box or case forming the camera is an opening in which is fitted a ground glass screen, beneath which is an enclosed chamber provided at the back thereof with a mirror fixed preferably at an angle of forty-five degrees. A second auxiliary object lens is inserted in the front of the camera immediately above the object lens proper, and centrally with the enclosed chamber aforesaid. A flat cover having folding side walls shuts down upon the ground-glass screen, and is held in position by a suitable bolt, catch, or equivalent, and in order to ensure a rapid opening of the cover a spring or piece of elastic is secured to the box and to the cover aforesaid.

An instantaneous shutter, which is pivoted within the box or case, is actuated by a slide, bolt, or equivalent passing through the side thereof, which, being drawn out against the tension of a spring, is caught and held back by a suitable spring catch, provision being made to vary the tension of said spring and thereby the speed at which said shutter closes.

The dark slide devised to be used in combination with the improved camera, according to my invention, consists of a frame having a central partition of any suitable material, preferably a web of woven fabric treated with any convenient substance to render it light proof. By this means I am enabled to enclose two plates in one slide, said plates being held rigidly therein by suitable clamps, bolts, or equivalent. An enclosing case or envelope is provided which accurately fits and encloses the dark slide, and is held firmly upon said slide by two small springs inserted in the sides thereof.

When packed for travelling, the object lens is secured in the interior of the camera by suitable clamps, and the auxiliary lens, in its telescopic tube, pressed in so as to lie nearly flat with the front of the camera. Three dark slides are provided, two being placed in the camera, one on each side, and held in position by suitable guides, the third slide being at the back of the camera in the position it would hold when an object is to be photographed. A suitable handle is attached to one side for convenience of carriage.

In using the apparatus, the object lens is removed from the interior and secured to its collar by the bayonet-joint-like attachment and the shutter and cover in the roof opened, the object being now projected upon the two ground-glass screens, the lenses are adjusted and the apparatus is ready for use, the sensitive plate being exposed by the withdrawal of the enclosing case of the dark slide from beneath the camera.

The auxiliary lens and enclosed chamber in the upper part of the camera is devised to ensure accuracy of the focal adjustment, it follows therefore that after the first adjustment of the lenses no further adjustment of the object lens is necessary, if the object projected by the mirror upon the screen in the roof of the case exhibits a sharp, well-defined outline.

The claims are:—1. In a photographic camera the adaption thereto of an auxiliary dark chamber and auxiliary lens substantially as and for the purposes set forth and shown. 2. The combination with the auxiliary dark chamber and auxiliary lens of a mirror for reflecting the image or object upon a focussing screen substantially as described. 3. In a photographic camera the combination therewith of the instantaneous shutter substantially as herein described, and the mode of and means employed for actuating same substantially as and for the purpose herein set forth and shown. 4. The utilisation of the interior of the box or case serving as a camera for depositing therein the various accessories for the purpose of transport substantially as herein set forth. 5. The improved photographic camera and arrangement of the various parts and accessories substantially as herein described and illustrated in the accompanying drawings.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 8193. HEINRICH MADEN and FRIEDRICH OERTEL, Augsburg, Bavaria.—June 5, 1888.

Our improved camera is rendered collapsible, and provided with special devices for regulating the position of the object glass, both as regards its elevation and as regards its distance from the sensitive plate.

The camera comprises a frame or main body, to the rear of which is hinged at the bottom the glass plate holder. The latter contains springs for retaining the glass plates by exerting a slight pressure, or for securing the slide which contains the sensitive plate. To the front of the camera body is secured the bellows, carrying in front the lens board or frame. For setting the lens at the required distance from the body we employ a special mechanism. This may consist of a toothed pinion and a rack sliding between two straight guides, and provided in front with a socket or nut for holding the spindle or post, carrying at the top the lens; or it may consist of a pair of lazy tongues or an expandible trellis work, the end of which is attached to the end of the bellows, and a double-threaded screw spindle held in suitable bearings and passing through a pair of screw nuts attached to the rear end of the said tongues. One end of the screw spindle carries a button for turning the same.

For adjusting the vertical elevation of the object glass or lens the post or spindle carrying the same is provided with a mechanism adapted to operate in any position of the bellows. This mechanism comprises a telescopic shaft provided near the front end with a pinion and near the rear end with a pivotal bearing. The pinion is in contact with a friction disc mounted on the lower end of the lens supporting spindle and provided with a screw nut through which the said spindle passes. The button which serves to turn the double-threaded screw mentioned above, and that which turns the telescopic shaft, are placed near together on the side of the camera.

The sides and the bottom of the apparatus are formed by hinged pieces of sheet metal.

For fastening the stand the apparatus is provided with two socket pieces on two sides at right angles to each other, so that the apparatus may be erected in two different positions.

AN IMPROVED PHOTOGRAPHIC "DETECTIVE" CAMERA AND CHANGING BOX.

No. 7942. THOMAS KERR, 52, Grosvenor Park-road, Walthamstow, Essex. May 31, 1888.

The sensitive plates are placed in the lower division of a changing box (which consists of two chambers communicating) in separate cases of metal or other suitable material, and pushed to the front vertically by a coil spring, and are thus exposed in rotation. Each plate after exposure is raised to the upper chamber by means of a vertical slide with catch at base, the slide being worked by lever arms on a shaft from the front of camera. The plates on reaching the upper chamber are kept in position by a second coil spring.

The plates are moved by the operator from one chamber to the other by a lever attached to the lever shaft, which may be kept inside or brought outside the camera case (preferably inside) as desired, and fixed to this lever is a handle passed through a slot in the side of camera case. A lock is adjusted to secure the lever handle when not in use.

For the purpose of registering the exposures a ratchet wheel, lever, and pawl are attached to the lever arms on the side of camera, so that simultaneously with the movement of each plate into position a numbered disc rotates and shows the number of exposures that have been made.

The object of the aforesaid improvements is to enable the operator to dispense with opening the camera when in use.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 6	North Middlesex Club	The Iron Room, Stroud Green.
" 6	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle.
" 7	North London	Myddelton Hall, Upper-st., Islington.
" 7	Holmfirth	
" 7	Sutton	Society's Rooms, Sutton, Surrey.
" 7	Sheffield	Masonic Hall.
" 7	Bolton Club	The Studio, Chancery-lane, Bolton.
" 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 9	Birkenhead	Free Public Library, Hamilton-st.
" 9	Cheltenham	
" 9	Manchester Photo. Society	36, George-street.
" 9	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 10	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 25.—Mr. T. E. Freshwater in the chair.

The HON. SECRETARY drew attention to the prospectus of the great exhibition at York, in which photography will have a place.

Mr. F. P. CEMBRANO, in response to an invitation to speak on local development, stated that when he was in the south of Spain five or six weeks ago he photographed many specimens of Moorish architecture, and in the case of interiors the contrasts were usually excessively great; the foreground was often in deep shadow, with a brilliantly-lighted exterior seen through an archway or window. He tried less pyro and found some advantage in the negatives, but nothing proved truly effective until he adopted local development. He diluted his normal developer with from two to four times its bulk of water, at a temperature of 60° or 70° Fahr., and when the image showed he washed the plate under the tap; then he applied the developer to the shadow parts of the picture with a camel's-hair brush, whilst holding the plate slantingly that the surplus might run off and without flowing over the high lights. Every three or four minutes he washed the whole plate under the tap, and recommended the brush development; occasionally he flooded the whole of the plate with the developer. By these means he brought the different parts of the negative to the relative intensities required, occasionally also he treated parts of the plate with as much ammonia as the developer would bear. He had tried simple over exposure with this class of subjects, and found flatness and loss of detail to be the result. Applying restraining bromide to the high lights was not a method of local development which had answered in his hands. His pyro solution was made with sulphite of soda, four ounces; citric acid, two drachms; pyro, one ounce; water, ten ounces. He was from an half to three-quarters of an hour developing his best negatives. He handed round results in platinum type prints representing interiors in the Alcazar in Seville, the Alhambra, and other places of interest.

The HON. SECRETARY said that they were the finest prints he had ever seen of such subjects.

Mr. CEMBRANO, in reply to various questions, said that he had had no experience with orthochromatic plates; they would force him to develop in such a bad light. He used the quickest plates he could get, and extra thickly coated; he found that he could develop them all right in a proper bright yellow light. He preferred overcast, even rainy days for the photographing of interiors. His negatives were whole-plate size, and the size of the brush he used was a little bigger than the end of his thumb; the hairs gradually hardened under the action of the solutions. He had tried quinol several times but always went back to pyro, perhaps because he was most used to the latter.

Mr. J. R. K. WELLINGTON called attention to a published statement that prints could be toned with acetate of lead and hypo, and that some exist toned in that way which are now thirty years old.

Some members expressed the opinion that it probably amounted merely to sulphur toning.

Mr. Cox remarked that occasionally sulphur-toned prints were permanent.

SHAFESBURY PHOTOGRAPHIC SOCIAL.

APRIL 26,—Mr. Bull in the chair.

The evening was of a social nature, nothing technical being introduced.

HOLBORN CAMERA CLUB.

APRIL 26,—Mr. E. J. Wall in the chair.

About five dozen lantern slides were exhibited on the screen.

The CHAIRMAN, in reply to a query as to the best method of reducing over-printed silver prints, advised immersion in a solution of two grains of cyanide of potassium to the ounce of water, and then wash well; he also gave other methods, and finally agreed to give a demonstration at the Club Room on May 3 on the subject of *Ischromatic Plates*.

Miss Powell, Messrs. Edwin Hodges, Alfred Hodges, and Jones were elected members.

BURNLEY PHOTOGRAPHIC SOCIETY.

APRIL 24,—Dr. Brumwell (Vice-President) in the chair.

Messrs. V. Dunkerley, H. Jackson, and Dr. Stuart Hallows were elected members.

The CHAIRMAN read a paper entitled *With Poets, Artists, and Antiquaries at Bolton Abbey*, in the course of which he described the Abbey when standing in its full grandeur and beauty, as surmised by the antiquaries from what remains of the ruins and from ancient manuscripts. He also mentioned the visits of poets to it, and quoted from Wordsworth, Rogers, &c., and finished with a description of artists' visits to it, describing their pictures and locating their standpoints.

At the end of the lecture illustrations were projected on the screen, the pictures comprising several from negatives by members of the Society.

The next monthly meeting will be on May 29, when the Hon. Secretary (Mr. William Sutcliffe) will give *A Few Days at Scarborough with the Camera*.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 25,—Mr. A. W. Beer in the chair.

Messrs. Percy Allman, J. W. Ashurst, George Bredding, H. J. Bromilow, John S. Brown, Oswald E. Brown, G. L. Burton, John Byrne, H. Cunningham, Edward Edwards, W. M. Faltin, E. Gibson, Richard Hartley, Frank Howard, D. A. Hunter, Thomas T. Irvine, S. H. Johnson, A. J. Keay, Thomas S. Lamb, George F. Mason, Charles W. Mayne, J. R. Moir, G. Banner Newton, Charles B. Reader, J. Sheard, Isaac Smith, James S. Webster, and Mrs. J. T. Smith, were elected members.

The PRESIDENT announced that Mr. W. Hughes would lead the excursion to Rossett on May 4, also that a second Smoking Concert would be given on Thursday, May 2, at which the musical arrangements would be under the charge of Mr. Nicholls.

The HON. SECRETARY read letters from the Hon. Secretary of the Paisley Photographic Society, offering exchange of lantern slides, and from Mr. Thomas Comber, J.P., regretting absence from Dr. Paul's demonstration, and sending for exhibition a transparency of a diatom, *Pleurosigma angulatum*, magnified eighteen hundred diameters.

A question from the box on cloud negatives was answered by Mr. Beer and several other members. The general opinion was that it was best to use slow plate, small stop, and rapid exposure.

Mr. F. T. PAUL, F.R.C.S., gave a demonstration on the mode of making micro-photographs, showing how the apparatus can be adapted from an ordinary camera and microscope. He remarked that he thought the value of micro-photography had been exaggerated; that for low powers it was invaluable, but that when very high powers were employed he preferred making drawings. He employed a microscope of the Continental construction with short body, removing the eyepiece, and advised the use of the lower powers, gaining magnification by increased length. The one inch and half inch objectives answer well, the quarter inch and higher powers require a condenser, but then the light begins to fail. He employed an ordinary long-focussing half-plate camera, placing it with the microscope and illumination upon a large board, upon which is placed a beading to keep the camera straight, also another to fix place of the microscope. Focussing is effected by means of a long rod, with a blind-roller wheel at the end and a catgut band driving the fine adjustment of the microscope. The microscope and camera were connected by a box, and light prevented from entering by velvet cloth. As regards the correction of the object glass, there were special apochromatic objectives made by Zeiss, but these were very expensive and for low powers unnecessary. He had not found isochromatic plates to work very well, and preferred a fairly slow ordinary plate. The light employed was an ordinary blow-through lime jet and a very small diaphragm. A paraffin light takes from several minutes to half an hour. Sunlight is best, but requires a heliostat. He placed a microscopic slide on the stage and exposed for thirty seconds, using one inch objective. The resulting negative was developed by Mr. J. H. Day, and proved quite a success.

Mr. V. C. DUFFIELD then read a paper upon the "Actinograph," an instrument invented by Dr. Hurter and himself for calculating photographic exposures [this will appear in a future number].

A number of lantern slides, the work of Dr. Paul, were shown, also the negative just produced.

At the close of the ordinary meeting the meeting was made special, and the revised rules, with slight verbal alterations, unanimously passed. The principal change in the rules raises the entrance fee for all new candidates to twenty-one shillings.

BATH PHOTOGRAPHIC SOCIETY.

APRIL 24,—Mr. W. Pumphrey (President) in the chair.

The CHAIRMAN referred to the loss the Society had sustained in the death by drowning of Mr. Janvrin.

Mr. G. F. POWELL detailed the interest taken by deceased in the Society, of which he was a founder, and spoke of the dangerous condition of the coast

where the sad accident occurred; and, upon motion, a letter of condolence with the family was ordered to be sent.

Messrs. Hensley and Munday were elected members of the Society.

A series of large photographs of Niagara, representing both summer and winter, were, through the kindness of Miss Ashley, exhibited.

Mr. J. DUTTON drew attention to some negatives of Salisbury Cathedral made by the wet collodion process about fifteen years ago on 18x14 plates. It was said to be a difficult subject at any time. Some negatives made by means of the old collodio-albumen process were shown by the same exhibitor, and the peculiar colour and slowness of such negatives were remarked upon.

The President handed round for inspection two sets of photographs, the result of a month's tour in Italy and in Switzerland. The prints were shown to illustrate the capabilities of film photography, and the mode of mounting adopted was that of attaching the boards with glue whilst the prints were in contact with sheets of ebonite, which, when stripped, left the picture with a highly-glazed surface.

Mr. FRIESE GREENE said he had lately found that it was quite possible to destroy the effect of light—the latent image in a plate by the influence of electricity, after which the same plate was again ready to be acted upon by light. He then handed some notes to the Chairman, which were read as follows:—Acids and alkalies combine through being in opposite states of electricity. If you put the acid in a positive state of electricity it refuses to combine with an alkali. You will find the developer will not act if it is in an electrified state on an exposed sensitive plate, and if a plate is left for two minutes in a weak acid solution which has a current of electricity passing through it the latent image cannot be developed, but you can wash and expose the plate again; so by this you can extract the latent image and still use the plate again. Suppose two particles holding a different amount of energy or electricity had another particle come in contact with them it would combine with the one with the most energy or electricity. Suppose you have two particles the same as above and two particles instead of one come in contact with them all holding different amounts of energy or electricity the two particles with the most energy would combine.

Mr. AUGUSTUS F. PERREN next demonstrated the treatment of platinotype prints by the hot bath process of development. Having pointed out the absolute necessity to keep the sensitive paper dry and the variations in temperature of the developer allowable under fixed conditions, proceeded to pass a number of exposed papers over a hot bath of potassic-oxalate solution. These were afterwards soaked in acidulated water and then handed round. The pictures, mostly local views, were much admired, as also were some finished specimens.

After a brief discussion the proceedings terminated.

ON Thursday, April 25, the first outdoor meeting took place at Farleigh Castle. There was a good attendance, and all the chief points of interest in that vicinity were photographed. At half-past five p.m. the party assembled at the Houlton Arms, where a substantial tea was provided, over which the President presided.

The next excursion, May 30, will be to St. Catherine's.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

APRIL 26,—Mr. Pringle in the chair.

The President showed a travelling lantern he had had made. By packing the condensers (four inch) and front lenses inside the body of the lantern, the whole thing packed into a box about six inches cube. This lantern had no chimney, the roof being specially jacketed to obviate the necessity for one. It was much admired as a marvel of compactness and portability. He also showed a camera which had been built to design. One special feature was an arrangement whereby the centre swing could be obtained without the use of the extra weight of wood-work usually put on the back for this purpose. A patent box for carrying plates was also shown by Mr. Pringle. This had a simple arrangement of pressure springs which had the effect of making the plates carried in it practically one solid block of glass, thus avoiding all fear of breakage.

Watson's detective camera was next shown by the Secretary who also handed round a specimen copy of THE BRITISH JOURNAL OF PHOTOGRAPHY, and Pallowfield's new catalogue which had been forwarded for the use of the members.

Mr. Hawkins exhibited a number of stripping film negatives taken on a cycling tour.

Mr. PRINGLE then gave a short address upon *Quinol versus Pyro*. He had made a series of exhaustive experiments comparing the merits of the two as developers of negatives. The result of them was in favour of pyro. It has been said that quinol gives negatives of a wet plate character and this has been advanced as a fact in its favour. Now the distinguishing characteristic of a wet plate negative is clear glass in the shadows. This is a thing we ought to be very careful to avoid. Clear glass would give absolute blackness in the resulting print, there being no such thing in nature as absolute blackness, the very deepest shadows in a view possessing detail, and this we want to reproduce on our negative. Now quinol will develop the high lights to an abnormal degree of density while leaving the shadows unaffected, and this great density in juxtaposition to clear glass while being entirely wrong for nearly all classes of work is just right for one branch, viz., copying engravings, &c. Another great fault of quinol in landscape work, is that it does not render distance or atmosphere. Many workers liked this developer because it gave such "pretty negatives." These were to be guarded against, as however nice they might look as a negative, it was impossible to obtain a good print from them. While being unsuitable for negatives, it was, however, a most excellent developer for transparencies.

After a short discussion the proceedings terminated.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

APRIL 9.—Annual General Meeting.

The HON. SECRETARY submitted the audited accounts for the past year, showing a balance in hand of 124 13s. 4d.

The following gentlemen were elected to form the Committee for the ensuing year:—Messrs. J. Morrish, W. H. Baldwin, F. J. Bright, J. Larcombe, W.

Rice, W. A. Rouch, and Dr. Charles Gross, one of whom to be Secretary and Treasurer, to which office Mr. J. Larcombe was appointed at a subsequent meeting of the Committee.

The next meeting will be held on Tuesday, May 7, at eight p.m., when Mr. W. Thomas will read a paper, illustrated by lantern slides, on *The Coast of Yorkshire*.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 29.—Mr. H. Blandy, L.D.S. Edin. (President), in the chair.

Mr. George Smith was elected a member.

Mr. POLLARD GRAHAM, of Derby, gave a demonstration entitled *The Relation of Exposure to Development*. The experiments were directed chiefly to showing the immense latitude in the exposure possible with development suited to the occasion.

Four plates had been exposed during the day at Bestwood Lodge by Messrs. R. S. Armitage and George Smith, the plates used being the Ilford, and exposures being given of one, three, five, and twenty seconds, the three seconds' being the correct exposure. This plate was developed by Mr. Armitage for comparison with the other three, after Mr. Graham's development, and it is satisfactory that Mr. Graham was successful in securing all as good negatives, with little trace of either under or over exposure. Another experiment was by contact exposure, excellent negatives being secured.

The PRESIDENT thought that he had made good his claim to the possibility of getting good results from widely diverging exposures, and had shown the members what could be done by studying the conditions under which they exposed, and that it rested entirely with themselves if they lost a plate through either under or over exposure.

DERBY PHOTOGRAPHIC SOCIETY.

APRIL 27.—The members of this Society held their first outdoor excursion of the season at Ashby-de-la-Zouch, where, by the kind permission of J. Hemsley, Esq., they were enabled to photograph the ruins of the Castle from the grounds of the Manor House. Upwards of sixty plates were exposed, and some excellent negatives obtained. The weather being exceedingly fine a most enjoyable time was spent. Mr. Hemsley kindly entertained the members to light refreshment during the afternoon, and before returning home the party sat down to an excellent repast, provided by Mr. Boden, of the Queen's Head Hotel.

MANCHESTER PHOTOGRAPHIC SOCIETY.

APRIL 11.—Mr. Alan Garnett (Vice-President) in the chair.

Messrs. T. Worthington Wright and Edmondson were elected members.

After replying to technical queries from the question box, the subject of the evening was introduced by the HON. SECRETARY (Mr. W. I. Chadwick), who gave a lecture on *Stereoscopic Photography*. In the course of his remarks the reason why prints taken direct from a stereoscopic negative must be transposed, the size of picture most suitable for stereoscopic observation, and the advantages derived by using lenses of longer or shorter focus (depending upon the nature of the subject), were fully explained, as was likewise the construction and principles of the refracting or lenticular stereoscope. The most approved method of mounting and trimming stereoscopic paper prints was then described, and some simple appliances to facilitate the work were exhibited. The trimming and mounting of stereoscopic pictures was a matter that had been sadly neglected in the old days of the stereoscope. Thousands of these pictures have been placed upon the market which, from defective mounting, were absolutely worthless. Attention to this detail was, therefore, of the utmost importance. Mr. Chadwick illustrated his remarks by three stereoscopic slides printed from the same negative: No. 1 was perfect, Nos. 2 and 3 were printed and mounted incorrectly and could not be made to coalesce. Beautiful as properly mounted paper slides undoubtedly were, the best of them fell far behind good transparencies printed upon glass, and it is this latter class of stereoscopic work that mostly engage the attention of amateurs just now. Indeed, with the reliable dry plates made for the purpose by Mawson & Swan, Thomas, and others, and a few simple appliances, glass transparencies were almost as easy to produce; and as the work could be performed in the evening (daylight not being required as in paper printing), this branch of photography was admirably suited to amateurs, and with whom it was rapidly becoming popular again. The lecturer then exhibited and described a very simple printing frame which he had constructed by which stereoscopic transparencies could be transposed and printed in contact. Camera printing was, however, the best of all methods, the advantages of which were explained. With the apparatus shown (a simple and inexpensive addition to the ordinary binocular camera with which the original negatives were taken) the printing and transposing could be done by one operation, all the adjustments made and viewed on the ground glass of the camera before exposing the plate.

At the conclusion of the lecture Mr. Chadwick replied to many questions.

The formal meeting was then adjourned and the members gathered round the tables to inspect a large and interesting collection of stereoscopic pictures. Six charming slides sent by Mr. Stroh (instantaneous street views in and about London) excited universal admiration; and a collection of highly interesting slides sent by Mr. J. Traill Taylor, Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY; on the back of each slide was written the particulars and particular features. Mr. H. Smith exhibited prints from two negatives by Mr. Chadwick which were shown at the previous meeting; one was a glass plate negative, the other was taken on a Carbutt flexible film under precisely similar conditions; the print from the glass negative was decidedly the best. Mr. Clayton exhibited a very nice series of transparencies in a revolving stereoscope, but the climax of enthusiasm was reached when Mr. Chadwick exhibited several of the choice composition transparencies of the late Charles Breese, in which were introduced, over breaking waves, birds on the wing in mid air, distant clouds, sunset and moonlight effects, &c.; and, notwithstanding the lateness of the hour, many of the members remained to enjoy a portion of the series of the Royal Jubilee Exhibition, Manchester, taken by Mr. Chadwick for the Executive Committee.

BRIGHTON PHOTOGRAPHIC SOCIETY.

APRIL 23.—Mr. W. Jago, F.C.S. (Vice-President), in the chair.

Mr. G. PERREN read a paper entitled *A Short History of Photography from its Earliest Stages*, and handed round several fine Daguerreotypes executed by himself, which were much admired by the members present.

Mr. Jago exhibited an ingenious detective camera. Several fine negatives of Sussex churches were exhibited by Mr. S. B. Harlecastle.

At the next meeting, on May 14, Mr. George Foxall will read a paper on *Landscape Photography*.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

APRIL 25.—Mr. W. J. Harrison, F.C.S., in the chair.

Messrs. R. H. Edney and Alfred Reading were elected members.

The question box contained:—"Can the Sciopticon be thoroughly recommended as a thoroughly efficient mineral oil lantern? Is there any better form of oil lantern? Is a double-wick or a circular-wick lamp best adapted for showing lantern slides?"

The CHAIRMAN spoke in favour of the Sciopticon with double wick; had used the same for some time, and was thoroughly satisfied with it.

Mr. C. J. COTTELL: The four-wick lamp is very effective, but wants careful manipulation, especially with regard to the great heat it gives out.

Mr. F. GREENING had used the circular wick with advantage.

Mr. WALTER GRIFFITHS remarked that *Lantern and Lantern Work* should be a subject chosen for a Tuesday social evening in the Club Room, and that the suggestion be referred to the Council.

The following half-day excursions were recommended by the Excursion Committee:—May 4, Yardley Wood; May 18, Dudley Castle; June 1, Coleshill and Mazatoka Castle.

Mr. B. KARLESE then introduced the subject of *Cameras and Appliances*. In the course of his remarks he said:—

In selecting a camera the chief consideration usually is its cost and the purpose to which it has to be applied. For amateurs the range of usefulness should be as wide as possible. The remarks I shall make this evening will be confined chiefly to the apparatus used by myself (which you see before you) and my experience with the same. This is a tourist's camera for whole-plate size, which I consider to be the largest limit to use with convenience and comfort in landscape work. It was made to my own specification, and, as you see, is of the square form, made of mahogany, and with leather bellows, and parallel throughout, closes to a focus of four inches and extends to twenty-six inches; this is ample range for the lenses usually supplied for this size of plate, my own lenses being from eight and a half to twenty-two inches focus. The focussing is by rack and pinion, and operates from the back, which is preferable to the front focussing, both as regards convenience for manipulation when using a long-focus lens and the advantage of having the baseboard out of the way for a wide-angle lens and the use of a drop shutter. The front has vertical and horizontal movements, the back is firmly supported in a vertical position by a long rod running from a groove in the baseboard and secured in position by screw nuts at the top; it is reversible, and the focussing screen hinged to it in such a manner as to fold completely out of the way when the plateholder is in position; it swings from the centre, also from either side, giving in each case a range of over an inch. The arrangement for inserting the plateholder, you will observe, is of the simplest form—a groove running the length of the back with a corresponding lip on the plateholder to drop into it, and a spring catch on the opposite side to secure it to the camera, the whole being reversible in two seconds. The plateholder carries two plates, is of the book form, and the shutter double-hinged, so as to fold completely out of the way. When the camera is closed the baseboard folds upon the focussing screen, so as to entirely protect it; and you will see that to open or close the camera only two operations are necessary, those of releasing or fixing the side struts and withdrawing or closing the back to the position required on the baseboard; and, most desirable of all the advantages, there is not a single loose screw or pin in the whole apparatus, a *sine qua non* to the forgetful photographer. Nothing has been sacrificed for the sake of weight, and I should advise you rather to select a substantial apparatus than to be looking out for phantoms and featherweights which when set up in the field are vibrated by the softest breeze. With respect to levels, rather than fix them to the camera I prefer to carry a pocket spirit level of about three inches bearing a small plumb line, which with the compass, you will notice, are conveniently disposed of in this small case. When travelling I pack the cameras in one case, the plateholders in another, and the tripod in another; I am then able to carry the whole comfortably myself or to accept the services of a companion without the risk of fatigue on him. The tripod I have here is of the sliding pattern, and when set up to its full extent elevates the camera to a height of five feet six inches, enabling me to see the focussing screen without stooping, at the same time I can reduce it to three feet when necessary. Having given you a full description of the apparatus suitable for landscape work, I may mention mine has been in use for two years, and I have not found on the beach, the mountain, or in the field that any further additions have been necessary.

A long discussion followed, and a number of different cameras and apparatus exhibited and explained by the members who exhibited them, and their respective merits were debated upon.

Messrs. Marion & Co., of London, had kindly sent down McKellen's detective camera and Krugener's book camera, which were shown by Mr. B. Karlese.

The evening proved a thoroughly interesting and instructive one.

The subject of next meeting's paper will be *Composition*, by Mr. E. T. Cox.

Correspondence.

Correspondents should never write on both sides of the paper.

PAPYROXYLINE.

To the Editor.

Sir,—Please allow me in the columns of your JOURNAL to thank Junius for the full information he has given me regarding papyroxyline, and although, without having tried it, I think it will be useless for my

purpose, I shall be glad to accept Junius's kind offer to send me samples of papyroxyline which burn at different speeds. I shall also very much appreciate any hints regarding the preparation of the same.

As to Junius's remarks anent to yellow light mixed with white having no deterrent action, I must admit that his theory seems sound. But my experiments have led me to the opposite conclusion. When I used a given quantity of magnesium powder mixed with pulverised gunpowder, and the same amount of magnesium mixed with chlorate of potash, I found that the latter gave a much better exposed negative than the former, and that is the reason of my partiality for using a substance burning with a white light for consuming the magnesium powder. Trusting I have not encroached too much on your space—I am, yours, &c.,

W. GUTTENBERG.

29, Triangle, Clifton, Bristol, April 29, 1889.

CAMERA CLUB EXHIBITION.

To the Editor.

SIR.—We are requested by the Committee to ask if you would kindly note that the third of the series of one-man photographic exhibitions at the Camera Club will be open for private and press view on Monday evening, May 6, at 8 p.m.; and on and after Tuesday, May 7, it will be open to visitors on presentation of card. The exhibition will continue for about two months.

The object of this series of exhibitions is to bring together in turn, as already stated in connexion with the Sutcliffe and Tolley Exhibitions, representative collections of the work of the best photographic artists.

By the kind co-operation of Mr. J. Gale we are enabled to exhibit a representative set of his photographs. These pictures are chiefly landscape, and landscape with figure, and are printed in platinum and in silver processes.—We remain, yours, &c.,

G. DAVISON,
E. G. SPIERS, } Hon. Secs.

Camera Club, 21, Bedford-street, W.C., April 30, 1889.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPH REGISTERED:—

A. E. Smith, Bristol.—Photograph of Lord Salisbury at Bristol.

ALPHA.—Yes, either will do.

J. P.—See reply to "H. Bruton."

KEMPSSELL.—Inquiries are being made.

W. AND E. ALCOCK.—Received. Thanks.

GALWAY.—See reply to "Work" in this issue.

H. C. SUMMERS.—We are unable to give the address you require.

CLUB MEMBER inquires if guni sandarac is soluble in alcohol.—Yes.

CHEMIST.—All methods are employed according to their requirements.

F. W. HART.—Your letter came too late for insertion in this week's issue.

MARSH AND TIDY.—Hill Brothers, 43A, Milton-street, E.C. Letter forwarded.

DOUBTFUL.—Gelatin plates, not collodion, are now universally used for studio work.

J. JAMES.—Your long letter received, but it is of a subject totally unsuited for our pages.

SPENCER NICHOLL.—Yours is not a matter to answer in this column. We will reply privately.

BLUENOSE.—The projection of powdered magnesium through a powerful flame is about as rapid as any.

L.—Not knowing the make of plate, or the treatment the negative received, it is impossible to give an opinion.

R. L.—Pure lead may be obtained by reducing nitrate of lead with charcoal. As the rule, the softer the lead of commerce the purer it is.

WORK.—Please send your address, which has been destroyed, as we have a communication for you on the subject about which you wrote.

A. S.—1. Fume the paper well with ammonia before printing.—2. The emulsion spoken of will do equally well for either lantern slides or opals.

PHOTOGRAPHER says: "What will be the result if the combinations of a lens are brought closer together?"—The image would then cover a larger field.

M. M.—The position of the stop in your single-view lens is evidently not correct; move it nearer to the lens and you will obtain the effect you desire.

T. S. R. writes: "Can you tell me if there is any metal which, when heated, will contract, and will expand when cooled?"—Take lead, nine parts; antimony, two parts; bismuth, one part. This expands as it cools. It is used for stereotyping purposes.

L. M.—1. Better eschew the side swing altogether, unless the camera is a large one.—2. The side swing for the back and that for the front answer a similar purpose.

REV. J. C. BROWN asks what "O. H. E. Cy (L⁴)" means, and if the Company burn in photographs.—In reply: It is "The Old Hall Earthenware Company (Limited)," Hanley, Staffordshire. As regards the burning-in of photographs, if only the firing is meant, I should say they do. The managing director of the Company is Mr. W. F. Drew.—W. A. MEIGH.

WILLIAM RULE asks if there is any means whereby a blue print can be rendered of a brownish tone?—Immerse the print in the following—borax, two and a half ounces; hot water, thirty-eight ounces; when cold add a small quantity of sulphuric acid and a few drops of ammonia, then add about one hundred and fifty grains of gum catechu.

PRINTED.—Make a strong solution of potassium sulphide (liver of sulphur), and of this pour enough into the old fixing solutions until the silver is precipitated, which will be in the form of a dark mud. When the whole of the barrel has been filled, take a little out and filter it, and ascertain by a drop of sulphide whether the whole has been precipitated. Do not add more than is absolutely necessary.

H. BRUTON.—The formula recommended by Mr. Lyonel Clark consists of:—No. 1, ammonia one part, water forty-nine parts; No. 2, sodic sulphite a saturated solution; No. 3, potassium bromide twenty grains, water one ounce. To develop, fifty minims of No. 1 are added to eighty minims of No. 3 and sixty minims of No. 2. About one and a half grains of pyro are placed in the developing cup and the whole made up to two and a half ounces. When all details are out, more pyro and ten minims more of No. 1 are added.

ANXIOUS complains that he has a difficulty in getting his toning bath to work after it has toned a few prints, and the addition of more gold does not improve matters to any great extent. He asks if a brass tube he has in the corner of the wooden dish he uses may have any influence on the solution.—If the solution be brought into contact with metal the gold will be thrown down. This, no doubt, is the cause of the trouble. The two prints enclosed bear evidence of careless manipulation. One is terribly yellow through imperfect fixation.

FLORENCE writes: "1. I took some photographs (views) the other day with a wide-angle lens and developed in the usual way, and have got good clouds in all of them; do all wide-angle lenses act the same?—2. I have a lot of sensitised paper gone bad; I saw a receipt for making it work the same as new, but cannot find it now; can you give me a way by which I can make it work all right?"—1. It is a matter of relation of aperture and stop irrespective of the class of lens.—2. There is no way known by which deteriorated sensitised paper can be restored to its pristine quality.

S. W. writes: "Having read of the platinum silver printing in which an image is first printed on plain paper in silver and then brushed over with Willis's cold bath developer, I tried it and got excellent results. Then I took ordinary ready sensitised albumenised (silver) paper, and printed till a little darker than I should have done for gold toning, &c. I washed it well till no clondiness appeared in water, and then brushed it over with Willis's cold bath developer as above. Very slowly it changed, and in three or four minutes my red print was a magnificent, rich, jet-black colour, and when finished it looked like a true platinum print, having all the delicacy and beauty of an albumen silver print. Now, what I want to know is this, Am I correct in considering such prints absolutely permanent as a true platinum print? I see that in Willis's platinum process the image is only pure platinum, but in this process the image is not of pure platinum. In fact, it seems to me that the platinum has only played the part of the gold toning bath."—The image will consist entirely of platinum only when the toning is carried on until the whole of the silver has been substituted by the platinum. As our correspondent has been working, the process has been analogous to the ordinary gold toning, and the results cannot be expected to be more permanent.

MR. W. TYLAR, Birmingham, has sent us a sample of a white ink that he has introduced for writing on dark paper, such as the masks of lantern slides. For this purpose it is admirably adapted.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, May 8, 1889, will be on *Fixing Negatives and Prints*. Saturday outing at Waltham Abbey. Train from Liverpool-street at a quarter-past two.

THE copartnership concern of M'Ghie & Bolton, Manufacturers and Dealers in Photographic and Scientific Materials and Chemicals, No. 47, West Nile-street, Glasgow, has been dissolved by mutual consent. The two gentlemen named will in future conduct similar separate businesses each under his own name.

OFFICERS OF ST. LOUIS CAMERA CLUB.—Elected April 2, 1889.—President: Mr. Robert E. M. Bain.—Vice-President: Rev. Charles M. Charroppin, S.J.—Secretary and Treasurer: Mr. William M. Butler, 2636, Osage-street.—Executive Committee: Messrs. Eliot C. Jewett, John W. Dunn, John B. Holman.—Lantern Slide Committee: Messrs. Henry B. Alexander, Henry Blattner, Robert E. Collins.—House Committee: Messrs. John F. Valle, William M. Bulkley, Henry M. Holland.—Membership Committee: Messrs. Charles M. Alexander, Charles W. Melcher, Samuel B. Ball.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1514. VOL. XXXVI.—MAY 10, 1889.

THE STRENGTH OF ALKALINE SOLUTIONS.

WHEN we wrote last week on this subject we were under the impression we had given all the information that was needful, although in a brief form; but queries from several correspondents tend to show that we have left something undone, and that it is necessary to explain the method of calculating the results of the quantitative analysis. We shall therefore do this in as succinct a manner as possible.

Let us first suppose we have a sample of alkali—let it be liquor ammonia, carbonate of soda, or carbonate of potash—the real value of which we do not know. The ammonia may and does vary in strength very greatly from mere evaporation of the gas. Carbonate of soda exists in commerce in combination with very different proportions of water of crystallisation as well as in the anhydrous state; besides which, crystals originally containing a definite proportion of water may become unreliable from loss of a portion of the water by efflorescence, in which case they possess an additional strength. Carbonate of potash—one of the most deliquescent of salts—can scarcely be relied upon as a definite compound at all unless newly dried, so variable is the proportion of its contained moisture. There is, therefore, every need to adopt measures for the accurate estimation of all such substances. When we speak of accuracy, however, in this connexion, it must be understood that analytical exactitude is neither necessary nor intended, but simply a degree of what the chemist would consider “approximation,” though it is ample for all the purposes of the photographer.

Let us suppose we have a sample of one of the above-named substances that requires examination. Let it be taken in its ordinary form as obtained commercially, that is, without any drying or other special preparation, but just as procured and as it will be used. From the bulk weigh out carefully ten or, better, one hundred grains; the larger quantity reduces the proportionate error in weighing. We will suppose that we are operating upon a sample of carbonate of soda which must be dissolved in water to make up precisely two drachms or two and a half ounces, according to whether ten or one hundred grains are dealt with.

If the means be not at hand for accurately measuring small quantities of liquid, it will be better and perhaps easier to make the solution by weight. In this case counterpoise a suitable vessel in the ordinary scales, and having introduced the weighed quantity of carbonate of soda carefully, make up the weight to ten times that of the original salt with distilled or rain water. Thus, if one hundred grains of carbonate of soda are taken, add carefully, especially towards the last, sufficient water to just turn the scale at 1000 grains. The liquid then

contains one grain of the original alkali in each ten grains by weight of solution, and this will be found a more accurate method of working than by measurement.

Of the solution thus made we will take for actual trial either one drachm by measure, if it has been made by measure, or one hundred grains by weight, if the latter plan has been adopted; but there must be no mixing up the two systems of weighing and measuring. We will take, for example, one hundred grains of the solution made by weight and containing ten grains of the original salt.

Let this be diluted with, say, an ounce of water, and a few drops of litmus solution added to tinge it a decided blue, without imparting any great depth of colour. Having now filled the burette with the standard solution of acid of the strength of 126 grains in 1000 measures, and with the precautions described last week commence very carefully to run it, a few drops at a time, into the weighed portion of alkali solution. At first there will be no change in colour, except, perhaps, just at the surface where the acid first touches, and this quickly disappears as the contents of the flask are agitated. But presently the contents of the flask change from the original blue colour to a sort of nondescript pinkish purple, showing that one molecule of the soda in the Na_2CO_3 is saturated with oxalic acid, and that the liberated carbonic acid is still remaining in the solution in the free state or, in combination with the remaining molecule of soda, as bicarbonate, NaHCO_3 .

If the solution is now boiled for a few seconds the free CO_2 will be driven off and the blue colour restored, when the further addition of the acid solution may be resumed. By repeatedly reapplying heat to the now hot solution the liberated carbonic acid is quickly driven off after each fresh addition of standard acid, and soon a point will be reached at which the pinkish purple tint gives place to a full red, and boiling fails to alter it. Then the reaction is complete, the whole of the carbonic acid has been displaced, and the test is finished.

A chemist would work upon probably a much smaller quantity of alkali and with a far more dilute solution of acid in order to obtain closer accuracy, but, as has been already said, for photographic purposes the proportions given above will serve every useful end. Still some care must be exercised in adding the test acid and in getting rid of occluded CO_2 , otherwise the point of neutrality will be missed. One or two trial operations will, however, give the necessary practice.

Now for the method of calculating the result. Let us suppose that 37 c.c. or divisions of the standard acid have been used. The latter solution contains 126 grains in each 1000 divisions, therefore 126×37 , or 4662 grains, is the

quantity of oxalic acid consumed. If we now turn up the table of equivalents in the ALMANAC we find that the equivalent of crystallised carbonate of soda is 286, and that of oxalic acid 126. Making a rule-of-three sum of it, we find that the original ten grains of carbonate employed, if strictly accurate in composition, would require, as shown, 4.404 grains of oxalic acid: thus—

$$286 : 126 :: 10 : 4.406.$$

We are, therefore, a little over the theoretical quantity, proving that the sample tested has lost some portion of its water of crystallisation. If liquid ammonia, or carbonate of potash, or even anhydrous carbonate of soda had been tried, instead of "washing soda," the result would almost surely have been that the quantity of standard acid used would have been below the theoretical figure, or that they contained less than the proper proportion of alkali.

In testing the caustic alkalies the procedure is precisely the same, only there is no necessity, except in the case perhaps of potash, to resort to boiling to get rid of the carbonic acid. Potash has such an affinity for CO_2 , that if the sample has been carelessly kept it will be certain to have absorbed an appreciable portion, which will have to be allowed for in development.

From the results obtained in this manner from a known quantity of the substance it will be easy to make up solutions of definite and uniform strength at any time, and to make, further, solutions of different alkalies all having the same degree of alkalinity. In our ALMANAC for 1885 will be found an article on this subject, which may be worth perusal now that the caustic alkalies are coming into use with hydroquinone.

COMBINING TWO OR MORE NEGATIVES.

In a previous article, see page 278, *ante*, we explained how negatives can easily be combined, provided they are, in the first instance, taken in the film form. But as every one who may at times be desirous of making a combination picture does not take film negatives, we shall here describe how the combination may be effected when the subjects are taken on glass in the ordinary way. In the previous article, it will be remembered, we indicated, somewhat briefly, how this end might be attained by removing the film from the plate. At the same time, however, we pointed out that, in inexperienced hands, the method would be attended with some little risk of failure, arising from a tendency in the gelatinous films, when removed, to expand, and that often unequally in the different negatives.

The method now to be described is to reproduce the negative through the medium of a transparency. By this method of procedure we have the choice of two ways of effecting the combination. It can either be done in the transparencies or in the second negatives. Each plan, it may be explained, possesses certain advantages over the other. If the combination be made in the transparencies it involves the reproduced negative being made as a whole the same size as the finished picture. This may possibly necessitate working on a larger scale than that to which the operator is accustomed, while by the other plan the reproductions are all the same size as the originals. The latter method may therefore commend itself to some, but the former is the one which is capable of yielding the most satisfactory results, and, on the whole, with the least trouble. For when the combination transparency is once obtained, a single exposure secures the final negative; whereas, when it has

to be produced by different printing from separate transparencies there is the greater chance of their not being identical in density. Therefore, the former plan will be the one first described.

The first thing is to produce flexible transparencies from the different negatives. These are best made on stripping films by contact printing, the exposure being to artificial light on account of its uniformity. The exposure should be a very full one, so as to avoid forcing in the development. The developer may be any with which the operator is most familiar, and the different transparencies, it goes without saying, must be made of as nearly an equal density as it is possible.

In making transparencies for the reproduction of negatives the great fault with novices is under exposure and over development; hence the reproduction is too often lacking in detail, as well as being hard and crude in the lights. A good transparency for reproducing negatives should possess full detail in the very highest lights, even when viewed in a strong direct light. It should also be much denser than would be permissible in the case of lantern slides. Indeed, a transparency for our present purpose would be perfectly useless for lantern projection. When the pictures are fixed and washed they are stripped on to the gelatine skins in the ordinary manner.

In place of the stripping films, the carbon process, if the operator be familiar with its working, may be employed for the transparencies, the image being developed on glass and afterwards transferred to a film of gelatine. It matters not by what process the transparencies are made, so long as the quality is right and they are of a flexible character.

When the transparencies are stripped they are joined on a glass plate, in the same manner as that described for negatives in the previous article, which need not here be recapitulated. It is always difficult to successfully hide a join through the sky of a picture. Therefore, unless the clouds in the original negative be exceptionally good, it will be better to sacrifice them altogether and substitute others. In this case the sky should be masked out in the negatives, so that in the transparencies it shows as clear glass.

There are two ways by which the clouds can be introduced into the picture. They may either be put into the transparency or they may be introduced in the ultimate print by printing from a cloud negative. If they are introduced into the transparency—and this is undoubtedly the best plan, as then the clouds are secured in the final negative, so that double printing is afterwards obviated—they may be put in with delicate washes of colour on the back of the glass, or by stumping them in on the film with plumbago. No difficulty will be experienced here by any one who can use the brush or stump, for, as the lights and shades are as seen in nature, what is made to look well in the transparencies will look equally as well in the finished prints. The only thing to be avoided is making the clouds too pronounced. If requisite the shadows of the picture at this stage may be strengthened with plumbago or colour, or any imperfections may easily be remedied. The transparency being finished, the second negative is then made, like the transparency, by contact printing, but on a dry plate, artificial light again, by preference, being employed as the source of illumination, on account of its being more uniform than daylight. The exposure in this case should be full, though it should not be overdone. The development and after treatment of the negative does not, of course, differ from the ordinary method of working.

If, instead of making the combination in the transparencies, it be decided to make it in the reproduced negative, then the transparencies may just as well be made on dry plates, as, in any case, the reproduced negatives must be in the film form. In this case it will be useless to attempt to introduce the clouds at the transparency stage, as this would materially add to the difficulty of hiding the junctures in the finished negative. In this the sky may be blocked out, so that it prints quite white; the clouds can be introduced into the prints from a stock cloud negative. The joining manipulations, whether they be carried out in the transparencies or the reproduced negatives, are precisely the same as those given in the former article.

In the event of the transparencies or the second negative varying slightly in density, this may to some extent be ameliorated by coating the backs of the thinner one, or ones, with matt varnish or with mineral paper. It is manifest that when the combination is made with the transparencies there is far greater scope for remedying defects, as we have the chance of doing it at every stage; whereas, when it is made in the reproduced negative this opportunity is more circumscribed.

WE remind our readers that there is now open, free to all photographers, an exhibition of "one man's work" in the rooms of the Camera Club, the works in this instance being those of Mr. Joseph Gale. All should see this admirable collection, which they can do on application at the Club, Bedford-street, Strand.

WE are glad to see that still another Society has been formed in London, this time in Hackney. The meetings are to be held monthly during summer and fortnightly during winter. We wish the young Society all prosperity.

WHAT is a "nickel" prism? We had never heard of this term previously, but we have now come across it in the last number of the journal of the Photographic Society of Great Britain, which is considered to be a scientific journal. A prism implies something by which light is capable of being transmitted; but all the nickel we have seen is an opaque metal. From the context we would imagine the so-called nickel prism to be in reality a prism formed of that particular carbonate of lime known as Iceland Spar, which possesses the property of double refraction of light, and which, from a peculiar method of cutting the same, discovered by a long-since-deceased Glasgow *savant*, has since borne his name, and is very well known as the Nicol, or, as now commonly spelt, the Nicol prism.

WE have to thank Mr. T. C. Hepworth for a new term as applicable to a certain class of photographic portraits. In his *Camera* he says that those who are about to be photographed by flash light, and do not want to be mistaken for *Blue-ruinites*, should never look towards the flash, as it shows the eyes "in the shape of lazy, half-closed lids, which give rise to suspicions with regard to the temperance of the sitter." This is precisely the nature of the suspicions we and others entertained when inspecting four flash-light groups of four different photographic societies in our possession, all of which suggest "blue ruin," a suggestion intensified by the presence of various glasses on the table—glasses of a class not usually to be found among the appliances of a chemist's laboratory.

BEARING on the important subject of varnishes, a portion of a paper having no other connexion with photography, recently read before the Institution of Naval Architects, will yet be of special interest to photographers. Really a great portion of the paper might with advantage be read by them, for many points of contact between its subject matter and the varnishing of photographs arise in its course.

THE writer dealt with the various means of coating iron and steel ships with paint, varnish, or other anti-fouling compositions, and it is with regard to the second-named that the photographic interest arises when he describes its application and effect. The writer, Professor V. B. Lewes, states that "no varnish is impervious to gas or liquids." Here, at the outset, is a statement of the utmost importance to photographers, for it is generally thought that when once a protective coating is applied to a negative or print the action of noxious air is entirely prevented. But the explanation of his dictum at once tells us how the false impression has arisen. "We are apt to think," he says, "of a coating of varnish as being perfectly homogeneous, but, on examining it through a microscope, it is seen to be full of minute capillary tubes." The application of several coats of varnish tends to diminish this evil, as in many cases the holes in the first coat will not correspond with the holes in the second, and so each succeeding coat will tend to make the protective more and more impervious.

IT is not to be supposed that in consequence of these remarks photographers will in the future make a practice of double or treble varnishing their negatives, for, as we need not say, many gelatine plates are printed from without any varnishing at all; but where a large number of prints are required from the same negative it appears that Professor Lewes has given us a practical means of increasing the value of varnishing. This is no light matter. Every printer of experience knows the effect upon a negative when by accident, or in a shower of rain, water has gained access to a negative upon which a piece of silvered paper was pressed. Again, too, the practised printer knows that continuous printing from a negative at times results in the silver salt somehow finding its way to the film itself, whence it can never be perfectly eliminated, and it is now allowable to suppose that by using a thin varnish and coating the negative several times perfect immunity from silver stains may be expected.

IT is a matter of course nowadays that the aid of photography should be called in to assist in scientific investigations requiring accurate demonstration, but it sometimes happens that the demonstration itself requires explaining, and this has recently happened in the case of photographs of lightning flashes, in a number of which that have recently been exhibited are to be found two singular phenomena—a duplication of particular flashes and the appearance of what is termed a "dark flash." It is evident that a double flash might possibly be seen by the unaided eyes, but that if such a phenomenon as a dark flash were in existence the brilliant light of the ordinary flash would render its visual appreciation almost impossible.

THE double flash has been ingeniously explained as being possibly caused by the flash having been taken through a window, in which case it would be strange if a second or duplicate flash were not seen. Mr. Whipple, at the Physical Society, stated that even white chalk lines on a blackboard showed such duplication when taken through plate glass, and through ordinary "window glass." But the *English Mechanic* quotes a writer in the *Bayswater Chronicle* as "speaking from personal knowledge that the ribbon lightning photograph was taken in the open air, and not through a window." If this be so the explanation is as far off as ever.

IT would be deemed paradoxical to state that silver was insoluble in nitric acid, yet, strictly and exactly, the statement would appear to be true. At a recent meeting of the Chemical Society, in the course of a discussion upon the rate of solution of metals in acids, the writer stated that he had had occasion to verify Dr. Russell's observation that silver is not dissolved by nitric acid free from nitrous acid. Of course the action once started this acid would be formed, and then the usually understood dissolution would progress. The point is to cause the initial action to be called into play. We need scarcely say that the discussion has not a practical bearing upon such operations as making nitrate of silver, for in the first case perfectly pure silver

would never be employed, an electrolytic action would be set up to cause solution in any other sort. Secondly, any acid likely to be used for the purpose would contain nitrous acid in some small degree, and hence cause the action to be started, which is all that is needed to ensure total dissolution in the presence of a sufficiency of dilute nitric acid.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM, 1889.

ARRANGEMENTS for the Photographic Convention of the United Kingdom for the present year are fast approaching completion. The Great St. James's Hall, Piccadilly, has been taken for the week of Convention in August, some influential patronage from the worlds of science and art secured—the list including such names as Lord Rayleigh, the Archbishop of York, Sir J. D. Linton, Dr. William Huggins, Mr. Vicat Cole, Professor Dewar, &c.; and plans are practically settled for the exhibition of apparatus and pictures in the splendid hall which has been secured. Manufacturers and dealers will probably soon have before them conditions for the exhibition of their goods, and it has been determined to make no charge for pictures not exhibited *bona fide* for commercial purposes.

A new, and probably welcome, feature is to be an exhibition of coloured pictures from or on photographic bases, but for evident reasons arrangements must be made to prevent the colour work from marring the effect of plain photographic prints. The exhibition of photographs will, it is expected, be of high quality rather than of large extent, but on account of the *prestige*, the centrality, and the ease of access of the hall, a "run" may be expected on space for exhibits of apparatus. It is also a part of the project to get together a collection of material marking historically the eras of photography, and inventors will find encouragement and facility for displaying any outcome of their genius, whether new or old.

The optical lantern will be used on a gigantic scale, papers read by the highest authorities, and a varied series of entertainments will mark the Convention week.

ECHOES.

REFERRING to Mr. J. A. Forrest's remarks on *Ground Glass Sensitive Plates*, I think they are mixed up with a little ambiguity. For instance, he speaks of the "tooth" the ground surface gives for retouching, the increased hold it presents to the emulsion, and incidentally the larger quantity of the latter the glass will hold. Finally, he mentions the "non-halative" quality of such plates.

Now, though it seems to me that so far as the emulsion is affected by the ground glass it is of course obvious that it must be applied directly to the corroded surface, but as regards retouching and halation I am left in doubt as to which side is intended to be used, or perhaps I should say that while Mr. Forrest seems to intend that the ground side is to be coated, I fail to see how it can under such circumstances have any beneficial effect.

For instance, with reference to retouching, the coat of emulsion itself will mask or destroy any tooth that the corrosion of the glass surface may present, for it is impossible to believe that the thick layer of bromised gelatine can adapt itself so closely to the minute grain of the etched plate as to show any roughness or "tooth" on its own surface; but if the polished side of the glass is to be coated, then the back remains available for the pencil. Again, in the case of halation it is reflection from the *back* surface of the glass plate that causes the trouble, and not the front or film-bearing side; consequently, in coating the corroded or roughed surface with emulsion, though the light passing through the film may be very slightly diffused before reaching the back of the glass, it is not to any appreciable degree deprived of its tendency to produce halation when the necessary conditions prevail. On the other hand, if the plain side be coated the light undergoes diffusion on leaving the back surface, but even then the beneficial action must be inferior to that produced by total absorption.

By the way, too, Mr. Forrest is rather ambiguous in what he says about fluoric acid and chloride of ammonium. Thus he says, "This acid is bought in druggists' shops and sold in lump." Which? I

never heard of "lump" fluoric acid, and I scarcely think even a country druggist would class sal ammoniac amongst the "acids." But Mr. Forrest continues, "as it is gradually added to the fluoric acid," so that it would really seem as if the "chloride of ammonia" is the acid intended. Finally, he says "it has become known as 'white acid.'" What? Sal ammoniac alone or the mixture with fluoric acid?

The "wrinkle" regarding the addition is, however, a valuable one to those who wish to avail themselves of this somewhat unpleasant method of obscuring glass. I remember trying the method many years ago, but the fault was that neither the liquid acid nor its vapour would give me sufficient grain, or rather opacity, to be of much use, either for focussing purposes or for backing transparencies. The result was, in fact, very similar to an oiled focussing screen.

Once again we are treated to a report of the invention of an automatic portrait-taking machine, by means of which a victim—I mean person—having of course "put a penny in the slot, may seat himself in a chair, and by pressing a button be photographed instantaneously." It is interesting to know that "the objective is placed in front of the chair," not behind it be it noted, and that "the portrait is delivered a few minutes after sitting." But Messrs. Carquero and Guillaumont might further inform us what arrangement the machine is prepared to make in cases of downright failure, and whether in the event of the "expression" not being entirely satisfactory any reduction in price is made for a "re-sit?"

The method of photo-engraving on wood given in last week's *Foreign Notes and News*, on the authority of *Les Inventions Nouvelles*, is interesting so far as the details go, but scarcely sufficiently clear. In the first place, What is the particular function of the carbonate of copper with which the pores of the wood-block are impregnated, and what is the effect upon the wood itself of the process by which that end is effected, namely, *boiling* in alternate solutions of sulphate of copper and carbonate of soda? I was under the impression that wood engravers endeavoured to keep their blocks as free from contact with water as possible, but boiling is an operation they would, I imagine, religiously shun. The coating of "sensitive gelatine" on which the subject is "photographed" is, I suppose, simply bichromated, though the account reads as if the exposure was made in the camera. After developing the image and "inking up" the impression with an asphaltic varnish-ink, we are told that the block is immersed for an hour each in concentrated nitric and sulphuric acids, by which means "the wood is eaten away wherever it is left unprotected by the varnish." So I should think; but what about the sharpness of the lines and the condition of the wood with which the acids have been in contact without dissolving? It does not seem to me, on the face of the description, that such blocks would have a very long life.

A question arose at the London and Provincial Association as to the possibility of toning with acetate of lead and hypo. From the report I cannot say what were the details of the method suggested, but I can say that the colour of a silver print can be changed under conditions which are rather those of decomposition over the whole surface than of a properly so-called toning process, and yet without the production of the unsightly results to be expected from such a method.

If a silver print, either untuned or toned, be fixed in hypo, and after a partial washing be immersed in acetate of lead, a decided change in the colour of the image will be apparent, more so in the case of an otherwise untuned proof than when gold has been used. The brick red of the untuned print is changed to a sepia brown, while the purple or black gold tone is more or less modified by the admixture of brown.

A similar, though less powerful, result is produced by using a strong solution of alum instead of the lead salt, and, so far as I am aware, from my own experiments, the reaction, in both cases, requires the presence of soluble silver salts, *g.*, silver hyposulphite or the double salt of silver and sodium. This is decomposed by either acetate of lead or alum with formation of sulphide of silver, and other forms of sulphur, including of course, in the case of lead acetate, the sulphide of that metal. A *slightly* washed print, after removal from the hypo, may be thus toned, but I never succeeded in producing any appreciable change when the proof had been thoroughly freed from silver hyposulphite—that is to say, a perfectly washed print, reim-

mersed in *fresh* hypo before treatment with the "toning" solution, failed to give the same result.

It is curious, seeing that the change arises from the decomposition of a substance with which the print is uniformly pervaded, that the whites and lighter tints should not show an even greater change of colour than the shadows, since the very slightest deposition of silver or lead sulphide would be more palpable on an expanse of white paper than where a deposit of silver already existed. But such is not the case, and I have seen prints that upon removal from the hypo have received a mere "rinse" and after treatment with the solutions named have presented a really respectable appearance. How long they might continue in that condition I am not prepared to say, but I fear not long.

JENKS.

THE WHOLE ART OF PHOTOGRAPHY IN A SERIES OF EASY PROGRESSIVE LESSONS.

CHAPTER II.—CONCERNING LENSES.

THIS chapter, it may at once be said, is not to be devoted to the nature and properties of lenses (which will remain for subsequent treatment), but will prove only as a stepping-stone to the beginner who knows as yet little, if anything, of photography, yet is desirous of having a general idea of the tools with which he is to work.

For the present it will be enough to say that lenses are either single or compound, and these in turn may be either simple or achromatic. A lens is usually termed single when only one is employed, and this being mounted at one end of a short tube with a diaphragm at the other end constitutes a landscape lens, so named because of its being specially suitable for landscapes or for outdoor groups in contradistinction to one which has a lens at each end of the tube with a diaphragm midway between, and which is more suitable for architecture or copying, being orthographic or rectilinear.

A landscape lens will cover the plate both flatly and brightly, but if the subject were a house there would be a slight curvature in such lines as fell near the margin of the plate. By employing two lenses in the tube the distortion of the straight lines caused by the one lens would be counterbalanced by the opposite distortion of the other, for while every single lens distorts in itself it depends upon the relation of the lens to the diaphragm whether it shall do so in one direction or the other, and with two lenses and a diaphragm between we have the opposing conditions balanced, the result being rectilinearity.

This is the case whether the lenses be achromatic or merely simple lenses of the spectacle-glass nature.

An achromatic lens brings the rays of every colour to one general focal point, the working or chemical focus coinciding with the focus as seen by the eye, or visual focus as it is termed; but if simple or non-achromatic lenses are employed the focussing screen of ground glass would have to be a *little* farther away from the lens than the plane on which the sensitive plate is placed in order to obtain the sharpest results. The precise distance is one-fortieth of the focus.

The single achromatic or landscape lens is a most satisfactory instrument for a beginner in photography, and one with which he will experience much satisfaction in photographing such views and scenes as will engage his attention for a considerable period. The photographic aspirant need not here conclude that it may be better for him to purchase at once a lens which possesses far higher virtues than those to be found in the single achromatic, because not only is this a safe instrument with which to commence his operations, but it is one which he will never care to part with in the hereafter of a more extended experience when he shall have considerably added to his optical supplies. Let him also bear in mind that some of the finest landscapes the world has ever seen have been produced by this lens.

The beginner, too, may be troubled to know the meaning of the, to him, cabalistic terms by which the intensity of a lens as produced by its diaphragms is designated, such as $f-4$, $f-8$, $f-20$, &c. This will now be explained in terms sufficiently simple as to be understood by all. Suppose that a lens is said to have been working at $f-6$, it means that the diaphragm has an aperture one-sixth of the focus of the lens. If the focus be six inches, then would an aperture in the diaphragm be one inch in order to represent $f-6$, and this ratio holds good no matter what the focus of the lens may be, whether six, nine, twelve,

or twenty inches, $f-6$ would simply be a working aperture (in the diaphragm or stop) equalling a sixth of the focus. So with other figures. The lower the number the greater will be the intensity of the light transmitted through the lens, and therefore the greater the rapidity of its action. It is not the *actual* diameter of the aperture that determines the rapidity of a lens, but the diameter as compared with its focus.

The most rapid of all the lenses that have yet been introduced is the portrait combination. This is made with various degrees of rapidity. Some have the unusually great aperture of $f-2.5$, and are, designated "baby" lenses, from their suitability for taking instantaneous pictures of babies in even a dull light. High-class *carte* or cabinet lenses are constructed with an aperture of $f-3$; ordinary portrait lenses work at $f-4$, and a slower class of portrait lens, to which such trade terms as "D," or "Universal," or "Group" lenses have been applied, equal $f-6$. In all of the above the back combination is separated, an air space being between its two components.

The cemented "rapid" class of lenses come next in point of rapidity. The most rapid of these, of the Group or Euryscope order, have apertures equal to $f-6$, although some of the smallest are $f-5.5$. The average "rapid" objective of this class is $f-8$. This is known by so many trade names that to designate them would be impossible. Next in order of rapidity follow the "portable" lenses belonging to the same class, whose aperture usually equals $f-16$, although some are a little more rapid than this. Last of all come those intended to embrace a very wide angle of view, for the greater the angle intended to be included the smaller must be the working aperture.

Some single lenses are now made to work with so large an aperture as $f-8$, but this is mainly for portraits or groups. For landscapes it is not advisable to employ them with such intensity, but to stop them well down in order to get depth and good covering power.

"GONE BAD."

How constantly do we hear this expression applied to anything and everything, from a potato to a man, from a piece of gelatine to a finished photograph! Of all the multitude of substances with which the modern photographer has to deal I think we would find some difficulty in picking out a dozen which are not liable at one time or another to deteriorate. In the main there are two great causes for the "going bad" of both men and materials, and these are dirt and neglect. Certain men there are here and there in this world who *will* keep their iodine in paper parcels, their pyro in jelly-cans, and their gelatine in the sink, for these people I do not write, but rather for that well-meaning "brother of the dirty fingers" who finds the obstinate moral obliquity of his materials a source of serious expenditure, both of money and temper. For this brother in adversity the chemist may draw certain valuable or curious facts from his experience. Firstly, then, to take the case of solutions; these are all, more or less, liable to evaporate. How may this be prevented? If a solution has to be kept for a long time absolutely unchanged there is really no certain method whereby this may be accomplished, except by sealing the vessel containing the liquid with the blowpipe. Narrow-necked flasks and tubes of all sorts may be treated in this way without much difficulty by any one who has even a little experience of glass working, and who possesses a gas blowpipe. This process is actually used now by certain dealers who send out ready-made developer in sealed tubes; and chloride of gold is always packed in this way. As using the contents of a sealed flask or tube involves destroying the vessel, this method, although the only absolutely trustworthy one, is too expensive and troublesome to be generally employed. It might often be used with advantage where unstable substances have to be carried a very long distance before use, the tubes being opened and their contents transferred to bottles when necessary.

All this however, so far as the majority of photographers are concerned, is not practical politics. With them the question reduces itself to, How may the contents of bottles be preserved unchanged? To begin with then; do you know how to tie down a cork or stopper? I will venture to say that nine out of ten do not. A knot, however simple, cannot be made intelligible by description without a number of diagrams, so for the acquirement of this art it is best to see the thing done by a druggist or other experienced person. Stoppers of bottles containing strong ammonia or other should always be tied down; but stoppers are liable to stick, an event which often leads to the sacrifice of both bottle and contents. It is said that this may be prevented by covering the stopper with a thin film of paraffin wax. Certain

substances should never be kept in stoppered bottles, because they invariably cause the stoppers to stick sooner or later. These are for the most part substances which are acted on by the air, such as caustic potash or soda, carbonate of potash or soda, ferrous sulphate, water glass, &c. For these indiarubber corks are the best, common corks being very quickly attacked by the caustic substances. It is often very difficult to get a cork which fits really air tight, but this may usually be done in the following manner:—Select a cork of good sound appearance, considerably too large for the bottle to be fitted, and boil it in water for a few minutes; it will become so soft that it can easily be forced into its place, and after it is cold it will retain the exact form of the bottle neck. A test tube or thin flask is very apt to break if corked in this way. In order to keep ammonia solution of approximately known strength, a very simple plan is to dilute the '88 ammonia as bought with an equal bulk of water, and then always use twice the quantity stated in mixtures. A few liquids may be prevented from evaporating by a layer of oil, but this, of course, does not apply either to liquids which might dissolve the oil, such as alcohol and ether, or to those which might act chemically on it, like the caustic alkalis; farther, as few, if any, oils can be said to be absolutely insoluble in water, the method is always objectionable. A few solutions, instead of evaporating and becoming stronger, decompose on keeping and so become weaker. Potassium permanganate solution gives off oxygen and becomes weaker after keeping for some months.

So much then for liquids which lose some part of their substance on keeping. Let us consider now the more difficult subject of preventing the addition of oxygen or water from the air to materials which have an attraction for these substances. The first thing the photographer will naturally think of in this connexion is pyrogallic acid. I have lately performed a number of experiments on the preservation of pyrogallic solutions, a report of which I hope to lay before the readers of the JOURNAL at an early date.

Substances which are deliquescent must, of course, be kept in bottles as nearly air tight as possible, but even this may not always suffice. A few bodies which are extremely deliquescent, sulphuric acid and zinc chloride for instance, attract moisture through the best ground stoppers. At first sight this seems impossible, but it happens in this way. A little, let us say of the zinc chloride, sticks in the neck of the bottle when it is exposed to the air, and soon absorbs so much water as to turn liquid; we then have a film of liquid exposed on the one hand to the absolutely dry air inside the bottle, and on the other to the moisture of the atmosphere. The solution becomes very concentrated on one side and weak on the other, and diffusion tends to mix the whole, so that water is always gradually carried in and evaporates from the inside of the neck of the bottle. This process is naturally a slow one, but I have often been surprised at the amount of water which could pass through a good stopper in a few months. All this explanation would be quite out of place here did it not point out the remedy, which is to clean the stopper and apply a trace of grease, or, if that be objectionable, to wax it round the top with a hot wire. All solutions of ferrous salts (and the solids in a less degree) are liable to spoil by absorbing oxygen. As the substances are cheap it is usually best to make them up as they are wanted; but old solutions may be reduced by boiling with clean iron or zinc and filtering. A solution of a ferrous salt containing no ferric should give a pure white precipitate with potassium ferrocyanide. Ferrous ammonium sulphate has almost exactly the same reducing qualities as ferrous sulphate, and keeps much better both as crystals and as solution. Solutions of nitrate of silver often become black by keeping, this is entirely due to the use of impure materials or dirty bottles; pure silver nitrate dissolved in distilled water should remain clear indefinitely, either in daylight or in the dark, if kept in a well-stoppered bottle. Traces of organic matter, such as may enter from the air, will cause a black precipitate. Somewhere I have seen the statement that there is a micro-organism or germ which inhabits the surface of crystals of nitrate of silver. This, however, cannot be the case, because the protoplasm of the creature would be immediately destroyed by contact with the caustic.

Although "germs" certainly cannot live on nitrate of silver, the things they can live and thrive upon are many and various. They can flourish upon the most hopelessly unfertile soil. Be it remembered, however, that no organism can live long or grow at all upon a surface which is dry; hence the necessity for keeping plates and solutions in dry places. Speaking generally, most organic substances, and some inorganic, are liable to "go bad" by putrefaction or moulding. The following solutions I have found to mould or ferment on keeping:—Potassium nitrate (even saturated solutions), sodium sulphate (very slowly), tartaric and citric acid, and all tartrates, citrates, or acetates, except those of silver. The change is always retarded and often prevented entirely in concentrated solu-

tions. Liquids containing sugar, starch, gelatine, albumen, or gum, all spoil so rapidly that antiseptics have to be used if they are to be kept more than a few days. The choice of antiseptics open to the photographer is not large, as he must avoid like the plague anything which could conceivably affect the permanency of his photographs. He would be a rash man who would assert dogmatically that any treatment which had not been tried for at least twenty years would not affect silver prints, but so far as human foresight can go alcohol and eucalyptus oil must be safe preservatives for mountants, and the latter is a more effective antiseptic than carbolic acid.

Litmus solution occupies a unique position, in that it must be kept in open vessels to prevent its loss of colour. Old litmus, which has grown brown or nearly colourless with keeping, may be restored to its original brilliancy by leaving it for a few days in an open flat dish.

All these putrefactive changes may be combated, either by the use of antiseptics or preservatives, or by sterilising. The latter process might be resorted to by photographers more frequently than it is for the purpose of preserving gelatine solutions, and such preparations which stand boiling, but are liable to be destroyed by addition of an antiseptic. Sterilisation is a very simple process, and is performed by boiling the liquid and then excluding all but filtered air from contact with its surface; in other words, by plugging the flask or bottle tightly with clean cotton wool. This allows air or steam to pass through freely, but stops all germs of fermentation or moulds. Even the most highly putrescible liquids, if properly sterilised, may be kept indefinitely.

C. I. BURTON.

AN EASY AND ECONOMICAL METHOD OF MAKING LANTERN PLATES.—IV.

AFTER the emulsion has been melted and made up to eight ounces it is ready for being filtered.

A great many ingenious and complicated methods of doing this have been proposed, but I prefer to do anything in as simple a manner as possible, so I always use a common glass paraffin lamp chimney, the sort with a small outside rim round the bottom edge; they cost about 2d. each. Over the bottom I tie a fine linen handkerchief (six or eight thicknesses), and then pour the melted emulsion into the glass and give a good hard blow in at the top and the emulsion goes through splendidly.

The emulsion is now ready for coating the plates. We shall require a level surface for the plates to lay upon while the gelatine is setting; if one has not a table or shelf perfectly level, a drawing board, levelled with the aid of three wedges, or, what I prefer, three screws, will do very well. Two of the screws are screwed about half an inch through the wood near the two corners at one end of the board, the third screw passes through the wood midway between the two opposite corners. The screws act as three feet for the board, and from their positions form the three points of a triangle.

A level is placed midway between the two corner screws, and they are screwed in or out until the board is level. The level is then put lengthways along the board, and the third screw is raised or lowered as required. File off the sharp points of the screws.

Looking round a glass cutter's shop some years ago, on his scrap heap I saw a number of strips of plate glass two or three inches wide. These were just what I wanted, and I had them cut up into sixteen and twenty inch lengths. They are much better to lay the coated plates upon than a large flat surface; besides, sometimes a little of the emulsion will run over the edge of the plate and cause it to stick to the levelling slab, but it is very easy to detach it if these strips of glass are used, but it is often an awkward job if one uses a large slab of slate or plate glass to get a plate off it if it sticks.

I lay these strips of glass on my level table or board, and as the plates are coated with the emulsion they are placed upon them for it to thoroughly set, the plates are then put in the racks ready to go into the drying box.

The best receptacle for holding the emulsion when coating plates is, I think, an ordinary invalid cup (with the handle at the side), because any air bubbles formed when pouring the surplus emulsion back remain on the surface, and the emulsion passing down the spout is drawn from beneath. With care, however, a bottle or measure can be used to hold it.

As to the temperature of the emulsion when coating, I prefer it to be as cool as possible, while at the same time flowing readily over the plate. If it is too warm it does not flow in such an even wave over the plate, and is apt to run over the edges. But with a very little practice one soon learns the right temperature, &c., for plate coating.

Old collodion workers, or, indeed, any one who can varnish a

negative, will find no difficulty in coating the plates. Breathe on the surface of the glass, pour a pool of emulsion on the centre of the plate, flow it to the further corners, then to the left hand nearer corner, and finally to the right hand corner, from whence the surplus is poured back into the cup. The plate is gently rocked for two or three seconds, and then carefully placed on one of the glass slips for the emulsion to set, and another plate is coated in a similar manner.

Rather less than a drachm of emulsion will be sufficient for each plate, and it is as well to check off the number of plates coated with the amount of emulsion used every now and then (allowing about nine plates to the ounce of emulsion), because as the latter cools more clings to the surface of the plate, and it is necessary to drain it a little more.

It saves a great amount of time in coating if one can get a friend to help by taking the plates as they are coated and laying them on the glass strips. With his assistance one can easily coat a gross of small plates in an hour.

One of the best formulæ for the development of these plates which I have found so far is the following:—

No. 1.

Hydroquinone	15 grains.
Sulphite of soda	75 "
Water	5 ounces.

No. 2.

Carbonate of potash	90 grains.
Water	5 ounces.

No. 3.

10 per cent. solution of bromide of potassium.

Use equal parts of Nos. 1 and 2, and add two or three minims of No. 3. With some samples of gelatine, however, no bromide restrainer will be required.

HERBERT S. STANNES.

A PHANTOM IN A PHOTOGRAPH.

THE venerable and usually quiet town of Ipswich is at present in a ferment, and all through the appearance of a figure in a photographic negative of a river scene, no such figure having been seen by either of the two gentlemen whose cameras were busy in depicting it. We learn the story from the *East Anglian Daily Times*, from whose columns we have condensed what follows.

It appears that on Saturday last the gentlemen referred to (Mr. R. Cash, master of the Shirehall Board School, and Mr. E. H. Pringle, solicitor) were taking photographs of the Gipping. Both the gentlemen mentioned are members of the Amateur Photographic Society; Mr. Cash was the operator, and the light being favourable, he obtained some capital views at various points on the riverside. One of the scenes selected, depicted from the lock gates, showed a reach of the river in the foreground, with trees overshadowing the bank on one side and a group of boys fishing on the other; the end of the Steam Laundry was in the middle distance, and far beyond were the spire of the Presbyterian church and the roofs of other buildings. The photograph was taken on an ordinary dry plate by the instantaneous process. Neither Mr. Cash nor his companion saw anything unusual or mysterious at the time. It was about four o'clock in the afternoon, and the sun was shining brightly upon the surface of the water from behind the camera.

In the evening, however, while developing this particular plate—Mr. Pringle being still in his company—he was perfectly astounded by an appearance which he had never seen when taking the photograph, and for which he could in no way account. On completing the development there was plainly revealed, in the foreground of the picture, the figure of a woman, apparently floating upright in the water, as it is declared that drowned bodies sometimes will after immersion for a certain length of time. "I cannot in the least explain how it got there," said Mr. Cash, when interviewed on Monday, "but here is the negative, and you can see for yourself." And, says our Ipswich contemporary, it can only be said that the woman is unmistakably shown. It is no shadowy likeness difficult to detect, nor does it require pointing out before the lines can be traced, as with the puzzle pictures so commonly seen. The face and head are clearly outlined; the arms are hanging straight by the side of the body, which is clad in ordinary female attire, and is visible to the waist; and the portrait generally appears to be that of a tall and comely young woman. There is nothing repulsive in the photograph, although it looks weird and ghost-like.

Unable to account for the apparition, Mr. Cash communicated with the borough police, one of whom was so struck with the reality of the picture that he at first imagined it to resemble some woman in the town,

and inquired whether she had lately been heard of. Next morning the river was dragged at this particular spot, but no body was found; and so far, therefore, the climax of the narrative is happily left wanting.

It has been suggested that there was a defect in the film, and the hypothesis might be entertained if the figure were not so well-defined; but it is hard, if not impossible, to believe that it is the mere result of accident—that the shape should be so exactly that of a woman, or that it should fall in the picture at the precise spot where it is seen. Another theory is that the plate had been used before, and that the old negative was not completely cleaned off. In reply to this, however, it is said that the plate was new, and that, as a matter of fact, it is cheaper to issue fresh plates than to reprepare old ones. It is altogether a perplexing mystery. There is the girl in the photograph, and, like the fly in amber, nobody knows how she got there. About the good faith of the operators in the matter there can be no question, and it is certainly one of the oddest things ever chronicled that a river should be dragged all on account of a phantom in a photograph.

CAMERA CLUB CONFERENCE PAPERS.

IV.

PHOTOGRAPHY AND THE LAW OF ERROR.

By CAPTAIN ARNEY, C.B., R.E., F.R.S.

THIS Conference, I hope, will excuse such an uncanny title as that which I have chosen. It looks odd, to say the least, seemingly indicating that photography is subject to errors of some description. I am not going to enter into any optical errors to which it is liable, but only to its inability to render truthfully the gradations of black and white. A question which I have often asked myself is this: "In a negative or in a print, do the values in density of deposit, that is, in the translucency of the former and in the blackness of the latter, have any relation to the value in intensity of the light acting to produce such density or blackness?"

This question, as I have said, I have very often asked myself, as my writings will show; but it is only quite recently that I have been able to answer the question satisfactorily to myself, and I hope it will appear equally satisfactory to the meeting.

If an initial impact of light has to be given in order that any action may be visible on a negative or print on development, we may suppose, after such an impact, that equal increments of intensity in light will give equal increments of action on the sensitive salt; but it by no means follows that the density of deposit will proceed by equal increments. As an example, if we take an intensity of light which we may represent by 1, and another intensity of light which we may represent by 2, and allow them to act on different parts of the same plate, it by no means follows that on development the opacity caused by the latter will be double that caused by the former. We may look at it in this way: If we have " n " circular discs of very thin metallic silver, and place them at random on an area of a given size, it may be, or may not be, that some will overlap others; but the chances are much greater that, if we have $2n$ of these discs, and scatter them at random on the same area, some will overlap others. Suppose in the case of the n discs none overlapped, but that in the case of the $2n$ discs some did, and if the area of each disc was a , and the area of the surface on which they were scattered was A , then in the first case the transparency of the surfaces to light would be measured by $(A - na)$, and in the second, $A - (2n - 2nk) = A - 2n(a - k)$, where k is the amount of average overlap of the discs. Evidently, then, the transparency of the last area would not be twice that of the former. In the same manner it can be argued that by increasing the number of particles to 3, 4, &c., " n ," the transparency would not be proportional to the number of particles scattered. This is exactly what occurs when light acts on a film. The number of particles of deposited silver in a given area are presumably proportional to the intensity of the light acting, but they are in a sense scattered at random over that area, and hence some overlap, and the overlapping increases as the number of particles increases. If this were not so we ought to have an intensity of light in which absolute opacity is introduced after a certain exposure, which we know is not the case.

Were it so in a Spurge's sensitometer, in which the light admitted to each chamber increases 2^2 , we ought, if we know the size of a particle, to be able to calculate the curve of descent. This can be readily done, for if we measured the transparency of the part of the plate where the intensity of the light was known, then that would give us a measure of the areas of the particles deposited, and we ought to be able to calculate the transparency for any other intensity of light. Thus, on a sensitometer plate, if the smallest hole gave a transparency to light of $\frac{1}{16}$ of the original light falling on it, then we should know that the silver deposit was $\frac{1}{16}$ of the area on which it was scattered. At the fourth smallest hole, where the light acting is doubled, the silver would occupy $\frac{1}{8}$ of the area, and the transparency would be $\frac{1}{8}$; at the seventh hole it would be $\frac{1}{4}$, and the transparency $\frac{1}{4}$; similarly, the tenth hole would give $\frac{5}{16}$, the thirteenth $\frac{3}{8}$, the sixteenth $\frac{1}{2}$, the nineteenth $\frac{9}{16}$ of transparency, while the twenty-second would cause total opacity of deposit.

Now, from absolute measurement we know that such is not the case; the curve which a developed plate exposed in the sensitometer takes is very different, as the diagrams show. The curve which the transparency takes is identical with the curve of error of observation, taking for abscissa the number of the holes and not their area. I may refer you to Sir G. Airy's book on the *Theory of Errors*, and there you will find that the probability of an observation being at a certain distance from the truth is expressed by the formula $A' = A e^{-kx^2}$ where A' is the probability of error and x the distance from the truth.

I should like here to give the measurements of the apertures of a sensitometer made on Spurge's plan, in order to show the accuracy which is attainable by it. The holes were measured by a micrometer made by Hilger, which is capable of measuring to $\frac{1}{100000}$ of an inch. The following measures were made in $\frac{1}{100000}$ of an inch. The largest hole is indicated as having the highest number; the holes diminish in area by $\frac{1}{23}$

HOLE No.	THEORETICAL.		MEASURED.	
	Diameter: ten thousandths.	Area.	Diameter: ten thousandths.	Area.
30	4560	1633	4560	1633
29	4017	1267	4063	1296
28	3605	1017	3620	1029
27	3202	814	3220	817
26	2856	642	2873	648
25	2497	491	2560	515
24	2290	412	2280	409
23	2031	324	2030	324
22	1818	260	1810	258
21	1642	211	1610	204
20	1439	162	1436	162
19	1260	122	1280	129
18	1145	102	1140	102
17	1010	81	1010	81
16	894	62.7	905	64.5
15	800	50.3	806	51.0
14	724	41.2	718	40.5
13	650	32.2	640	32.2
12	554	24.1	570	25.5
11	512	20.6	508	20.2
10	465	17.0	452	16.1
9	416	13.6	403	12.8
8	358	10.1	359	10.1
7	305	7.3	320	8.1
6	285	6.4	285	6.4
5	231	4.15	231	4.15
4	217	3.7	226	4.0
3	194	2.9	202	3.2
2	181	2.5	179	2.5
1	158	2.0	160	2.0

The boring of the holes will be seen to be very accurate, and the deviation from what was desired is as small as can be expected. In the very small holes the percentage of error is much larger than in the large ones, which might be anticipated.

(To be concluded.)

PROJECTING LIFE-LIKE MOTIONS.

THE popularity of the table Zoetrope and kindred instruments was sufficiently great when the optical lantern rose (by leaps and bounds) in public appreciation for its principle to be applied to various apparatus capable of projecting its phenomena on the screen; and among the most successful of these may be mentioned the *Lantern Zoetrope*, or wheel of life, and Beale's *Choreutroscope*. The best of the former is the well-known mahogany slide with brass fittings and interchanging discs of glass, having photographic designs of such subjects as "The Skater," "The Bottle lamp," "Fishes Swimming," and "The Giant's Ladder." These are very effective, but being in black and white, and only illuminated when on the screen by about one-eighth of the light employed in the lantern (because a metal disc has to revolve rapidly in front of the design in order to produce the effect of motion, and this disc has only a small section cut out of it for the light to pass through), it only answered for very powerfully lighted lanterns.

The Beale's *Choreutroscope* permits of either coloured or photographic pictures being rapidly shown in succession, so that by persistence of vision the object apparently moves on the screen. The original, made by Mr. Beale, and used at the Royal Polytechnic Institution, had the designs on a large circular disc of glass, and the present commercial lantern *Choreutroscope* has a long slide with a number of figures on, which, by the movement of a cam and shutter, momentarily obscures

one picture and advances or retires the slide one space, so that a different aspect of the same figure is shown (with normal illumination) and apparent motion conveyed. The *Praxinoscope* is a development of the wheel of life, and has the advantage of showing a series of pictures by reflection from mirrors instead of through slits in the wheel (as in the original). This was adapted by the French maker for lantern projection, but owing to the want of care with which the mechanical part was made, notwithstanding that a comparatively high price was charged for it, the demand, at least in England, was very small. The designs were painted on pieces of glass taped together, so that when placed in the wheel for revolving they would make a circle. Some modification of this apparatus should be scientifically and commercially successful if well made at a moderate price.

It has been left for Mr. Eadward Muybridge, of the University of Pennsylvania, to perfect an apparatus for not only photographing the consecutive phases of animal and other movements, but also for reproducing them on the lantern screen. The projection apparatus he calls the *Zoopraxinoscope*. It is an enlarged Zoetrope, as far as it contains a circular disc with the designs on, and a metal disc with the slits in, but it is necessarily far more substantially constructed, for the disc is about eighteen inches diameter, and in order that varying rates of speed can be obtained it has driving wheels and gear for rapid or slow rotation. It will be understood that, as the large disc of glass with the designs on has to rotate vertically in front of the lantern condenser, a special form of apparatus has to be made, and so the lantern body containing the limelight jet and condenser is supported on brass pillars to the necessary height, and the objective or front lens is carried on an arm or elbow from the front of body, so as to be at the right distance from the pictures on the disc to focus them on the screen. Mr. Muybridge has some hundred or more photographs of animals, birds, children, &c., in motion, and for each a special metal disc is required, or rather the metal disc must have slits to the same number as the subjects or objects on the slide if they are to go through their motions in a *fixed* position on the screen, or one more if to move forward, and one less if to move backward on the screen. The reason of this is not easily explained, but certainly progressive motion is obtained by having one more slit in the metal plates than designs on the glass discs.

The illustrations shown by Mr. Muybridge during his lecture at the Royal Institution settle many points in doubt among sportsmen as to the action of a horse when trotting, and among others prove conclusively that the horse at one period of each pace has all four feet off the ground. It will be of interest to state here that, in some of the series of photographs taken, the exposure of each picture was not more than one five-thousandth part of a second. G. R. BAKER.

Our Editorial Table.

THE PERFECTION DARK ROOM CANDLE LAMP.

BENHAM & FROUD, Limited.

THE mere announcement of the fact of this candle lamp being the inception of such a veteran and ingenious photographer as Mr. Frank Haes will prove sufficient to arrest attention.

We may state that the "Perfection" is a candle placed in the focus of a parabolic reflector, and that the position of the flame is always stationary. This position it has in virtue of a spiral spring, common to almost all such candles. As a lamp—that is, taken as a whole—it is elegant, and can grace as well the drawing-room table as the bench of the dark room. Contrived so as to have the most perfect ventilation, this is secured without any leakage of light: indeed, in the matter of combustion, several very ingenious contrivances have been imported into the "Perfection."

As will be seen from the illustration, the parabola points downwards, so as to direct the light upon the plate instead of in the face of the operator, as many do, and this suggests its applicability as a reading lamp for lantern lectures. The body is faced with a disc of non-actinic glass, neither ruby nor orange-coloured, but a species of "cross" between the two. When used for isochromatic plates these are held to one side, and out of the direct beam of light. The stand being telescopic, the light may be raised or lowered as regards its



height from the table. So perfect is the combustion that the flame (from a specially prepared candle) gives no smoke, and, as we have said, not a vestige of light is allowed to leak out except what passes through the front. The coloured glass can be removed without trouble, thus giving a beam of white light.

Between Mr. Haes, the designer, and Messrs. Benham & Froud, Chandos-street, W.C., the makers, they have produced a lamp at once elegant and most effective.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7113.—"Improvements in Stereoscopes." R. TIMPERLEY.—*Dated April 29, 1889.*

No. 7134.—"Adjusting Photographic and other Apparatus, called 'Larkin's Patent Adjuster.'" F. C. LARKIN.—*Dated April 29, 1889.*

No. 7234.—"Improvements in Photographic Cameras." J. A. MORLEY.—*Dated May 1, 1889.*

No. 7235.—"Improvements in Means for Developing Negatives on Photographic Plates." J. A. MORLEY.—*Dated May 1, 1889.*

No. 7305.—"An Improved Detective Camera." T. WILSON.—*Dated May 2, 1889.*

No. 7347.—"Improvements in Photographic Cameras." R. W. THOMAS.—*Dated May 2, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN THE MODES AND MEANS OR APPARATUS FOR TAKING AND PRODUCING PHOTOGRAPHS, AND IN APPLIANCES CONNECTED THEREWITH.

No. 5140. JAMES HINES, Dunedin Lodge, Lenzie, Dunbartonshire; EDWARD HOWELL, Inglebank, Lenzie; and ALFRED HOWELL, Ingleisle, Pollokshields, Renfrewshire.—*April 6, 1888.*

This invention has reference to and comprises new or improved constructions, or arrangements and combinations, of the parts of automatic spring or weight-moved mechanism within a dark close box-stand, all self-contained or portable, and for the novel and interesting purpose or object of automatically taking the photographic likeness or miniature portrait of any person on a small prepared plate, card, or other equivalent, and then delivering it to the individuals by their merely putting a certain number of copper coins (as, say, three pence) into a slit conveniently formed and placed in the front case, and then turning or otherwise slightly moving a few handles placed outside in front a short time or number of seconds after each other, according to simple instructions printed at the side of each handle (or it might be only one handle or lever), a time-piece, with pointer indicating seconds, being also fitted in front for the purpose. These automatic machines for enabling any person (unskilled in the art) to take and receive delivery of a photographic miniature in a few seconds or minutes are devised for the purpose of being placed at railway and steam-boat stations, public markets, parks, gardens, and other places where people congregate and have a little leisure, and may desire to give or get photographs of themselves and their friends at little expense in money or time, and thus be greatly appreciated and taken advantage of for taking photographs or pictures of persons or simple objects.

The nature and novelty of the invention, and new or improved automatic mechanism, under one arrangement, consist all as follows:—In securing by their case a suitable set of photographic lenses with mechanical or pneumatic closing diaphragm or shutter on the inside of the front wall of the dark box through or opposite a hole at a proper height to let the rays of light in through the lenses from the person or object whose photographic picture is to be taken. Within the back part of the dark box a great number or set of the small (preferably rectangular) properly prepared sheet metal plates (or it might be cards or paper) on which the pictures are to be taken would be mounted as close together as possible by their lower edge in slit clip bars or equivalent on endless bands or chains traversed on two end rollers (preferably vertical), but it might be horizontally, or they may be so mounted on the edge of a rotating wheel, in any case so that each front plate left, as the others are removed and used, would be brought round and forward up against a stop guide, preferably in a vertical position over the top roller, nearly in line with the lenses, by a weighted cord passed over a cone pulley or fusse on the roller, which would remove it out radially from the other plates behind it at the top edge. Each plate is thus set under and ready for being caught by a pair of spring finger grippers jointed to project down from the long arm of a beam or reverse two-armed lever, so mounted in its normal position on its round longitudinal spindle, fitted in end bearings at one side of the box, as to be oscillated down on or by its said spindle, and be successively traversed along it over a set of the necessary chemical and water washing baths to be oscillated, and dip the plate once or twice into each bath at each traverse forward to complete the picture, mainly by this automatic acting lever, after the money is put in the slit of the box and the outer handles are moved. The said treating baths are preferably formed narrow, say an inch or so in width, to require the least convenient traverse of the plate and lever between the supply plates at the back of the box and inner end of lenses, where the baths are ranged preferably mostly in one porcelain vessel with only division walls between them, or portable and removable from between the walls, and of a depth and width to ensure that the liquids in them would remain clear and in good working order. The chemical and collodion baths might be portable and separate from the others for ease of removal and refilling, and have light spring flap lids for remaining close to prevent evaporation of the ether from the collodion except when the plate is being inserted and withdrawn, which opening and closing of the lid may be effected by a wedge rod action, or other

equivalent, moved by the lever which dips the plate into the bath. Each water bath would be supplied from a cistern in the top of the box stand, led by a small pipe and controlling tap to holes across the lower part, to ensure a clearing motion through the whole bath. The water would be kept at a nearly uniform level in the bath by an open or syphon overflow tube, which would convey the waste water down to a cistern fitted in the lower part of the stand box, and have the water supplied to and removed from these cisterns daily, or from time to time as found necessary. The short back arm of the said oscillating and traversing lever (which so catches, traverses, and dips the plates in the baths to have the pictures formed on them) traverses along a horizontal guide and stop bar in the highest or normal position of its long gripping arm. This traversing of the lever step by step forward on its horizontal spindle over the respective baths is, by our arrangement, effected by a light chain or light steel band, or other equivalent, having its one end secured to the front of the boss or short arm of the lever, and round guide pulleys carried on the sides or fixed cross rails of the framed stand box, to and wound one or more turns round a reverse weighted or spring take-back motive drum or barrel, and has the other end conveyed over reverse guide pulleys at the other side of the box, and attached to the back end of the boss or short arm of the lever. All so that as this motor and stop barrel are turned intermittently in one direction or forwards by the several spindles with their handles outside, as will be described, it draws the lever over the several baths to dip the plate as explained, and also winds up a weighted light chain or steel band on its periphery, which, when the lever has passed over the last water washing bath and delivered the finished plate with the portrait on it, the last and lowest spindle with its handle outside will release the stop catch from the barrel, which will by its weighted chain turn backwards and draw the plate lever by its endless chain or band back to its starting position again ready to grip and treat a new plate. The top end of each plate is punched with a hole, or it might be otherwise indented or roughened, so that the hinged gripping fingers will grasp the plate securely; and the grippers would have short arms above the fulcrums, which could be compressed to open them against the power of their spring to release the plate. The spindle of the plate gripping, oscillating, and traversing lever is made parallel or cylindrical, so that the eye of the lever may fit it and slide and oscillate freely on it in all its positions except the first, where a projection on the spindle, when turned by its handle outside, comes in contact with a projection on the boss of the lever and causes the grippers on the lever to descend and catch the plate and raise and remove it out of its holder on the back or return action of the spindle, effected by the power of a reacting weighted cord or spring. By one suitable arrangement of the mechanism for so first traversing the plate-gripping lever and then oscillating it to dip the plate, seven other horizontal reacting oscillating spindles are mounted in bearings inside, some distance below the first spindle, with similar acting handles outside, all preferably on the left hand front side of the close stand box, with arrows over them to show the direction in which to turn them, stops preventing them from being turned too far in either direction by the hand or by the reacting springs inside, a half of a circle being the maximum amount of turn required. The long arm of the lever of the plate-grippers or fingers has a hanging pulling-down rod or bar jointed to it at top, and free to move at the lower end in a suitable guide, having open pulling-down gals or snags at a suitable distance above and out from each of the seven actuating spindles, so that wiper arms on these spindles in the plane or line of the several baths will come down and take into the respective gals and pull the lever down as soon as it has been shifted along its spindle by its endless chain and stop reacting barrel opposite each bath and wiper of the spindle, so moving it in both directions. Each of the seven spindles below the first has an abrupt cam or anti-friction roller on it, working over a suitable raised intermediate part on a long transverse lever mounted below it, fulcrumed at its inner end, and having jointed to its outer end a pendant pushing rod or bar reciprocating in a guide frame below, so that its lower end, or a projection on it, acts preferably direct on a pushing and retaining projection on the periphery of the weight or spring reacting motor barrel. Each cam lever has a hanging retaining stop bar fulcrumed over it to a part of the frame, and which comes into action over the lever by its own weight each time the lever is depressed to turn the barrel and hold the lever and barrel there until the next spindle and handle outside is turned to actuate the barrel by the first motion of the next spindle and its upper lever as the strain is taken off the former lever and its holding bar, which is then withdrawn out of the way for the backward motion of the barrel. These levers with their acting cams are all ranged preferably as close as convenient towards the back of the box over the barrel, so that the pushing rods can all work in one guide, with their ends or projections reciprocating and acting tangentially to their projections on the periphery of the barrel which they intermittently turn gradually further round by having the projections mounted spirally stepwise round a part of its periphery. In the front of the case a recess is formed to the right, or one side of each spindle, with a light raising and lowering shutter or semaphore inside opposite each recess, having simple instructions on it how to actuate each handle, and which is removed as each handle is actuated, and then by its reaction brings the semaphore of instructions of the next handle below it into view. This is effected by light oscillating levers with hook rods actuated by each spindle and handle, which raise the said instruction lever of the handle below it, and by its back action release or lower its own instruction handle out of view by disengaging the lever from its raising rods, each in succession, until they come to the last handle, which by its back action releases the top semaphore to give the instructions again for the first lever, for the taking and delivering of another photograph. The box in front would have a low chest or table part projecting forward to the distance the person required to stand in front of the lenses, and a screw hassock or stool would be fitted there in front near the floor, preferably with a screw and hand wheel over the table part for conveniently raising this stool to any height to suit the height of the individual whose photograph was to be taken, and raise him in line with the lenses for taking a bust likeness with his breast up against a steady rail or other equivalent for setting him up in proper distance focus from the lenses.

A further improvement consists in having a folding-up part of the table or

other equivalent, with a mirror fitted on or over it, in proper distance focus, and at such an angle that when the person whose photograph is to be taken stood in a position close to the dark box convenient for working the handles, he would turn his face towards the mirror, which might have a nice fancy oval frame, so as to take his likeness from his reflection in the mirror instead of from himself. To ensure that the likeness of the person would be taken in the centre of the oval or other fancy framed mirror, a small oval regulating mirror is set near the large one, opposite or at right angles to the position in which he stood, but at such an angle to the large mirror that when he places himself so that his image is in the centre of the small mirror, it would be in the centre of the large mirror in relation to the lenses, and in true focus to the lenses and plate inside on which the image is to be taken, owing to the angle and position of the large mirror being set the same to the person as its angle and position of reflection is set to the lenses. A mechanical self-closing diaphragm or shutter would be fitted in the lenses inside, either in connexion with a pneumatic tube, or with a pulling and turning handle mechanism, which would open the lens for any number of seconds, according to the instructions given on the semaphore of the third handle, by the person outside placing his hand on and depressing a knob in connexion with the pneumatic tube or on the said lever for the said time, the diaphragm closing as soon as the person raised his hand.

The action of the internal mechanism of this automatic photographing machine, and the procedure and simple operation of the said eight handles outside by the persons desiring to have their photograph taken and delivered by the machine, consist all as follows:—Following the simple instructions on the outside and on the semaphore label of the upper handle, the person first puts the coins into the opening for receiving them, the weight of which tilts the receiving box lever, so as to unlock the spindle of the top handle and deposit the coins into a till; the person then turns the top handle slowly round in the direction of the arrow over it, which brings down the before-mentioned gripping lever to catch the plate on which the photograph is to be taken, the reaction of a spring or a weighted band takes back the handle and spindle to their normal position with the gripping lever in its highest position, clear of the top of the baths and in line with the lenses. This motion of the top handle releases a simple locking catch of the second spindle and brings the instruction semaphore label into view for the action of its handle, to turn it slowly round once or twice and hold it there for the number of seconds stated, which action would cause the mechanism inside to draw the plate and lever over the collodion bath and dip the plate into this first bath to coat it. The automatic motion and mechanism of this second spindle also raises the lever and plate to their highest position and frees the locking catch of the third spindle, so that its handle can then be turned in like manner to bring the plate over the second or nitrate of silver bath and dip the plate in it once or twice and give it the number of seconds required to sensitise the collodion surface, the internal mechanism would then bring the sensitised plate to its highest position in the true line and proper focus distance to the lenses to take the portrait when the person, following the instructions brought into view for this stage and handle, went and stood steadily on the stool in line with the lenses and raised their closing diaphragm by the pressure of a finger for the number of seconds stated on the label of the handle, all as hereinbefore described. The picture would then be taken by the light on the plate, so that the turning of the next or fourth handle (now unlocked by the motion of the former handle) to the instructions brought into view would, by the internal mechanism, bring the plate over and dip it into the third or developing bath of the protosulphate of iron (or other suitable mixed developer) for the number of seconds stated. In like manner, the turning of the fifth handle to the instructions brought into view would bring the plate over and dip it into the fourth or water washing bath for the number of seconds stated. Then the sixth handle, like the others, would be turned once or twice for the number of seconds according to instructions, which would cause the internal mechanism to bring the plate over and dip it into the fifth or clearing bath of hyposulphite of soda, or other suitable clearing agent. After this the seventh handle (previously unlocked like the others by the motion of the handle above it) would be turned for the number of times and seconds stated on its label or semaphore, which would cause the internal motive mechanism to bring the plate over the sixth or final water bath, and wash or dip it therein conform to the instructions given, controlled by the person actuating the handles or getting the photograph. To give a thorough washing of the plate and picture in the two water baths, a corrugated or serrated hollow segment would be mounted in the plane and arc of the plate grippers jointed on the end of their oscillating dipping lever, all so that a light spring or arm projecting from the grippers would act on the roughened surface of the segments and vibrate or shake the grippers and the plate edgewise while being oscillated up and down in the water by the plate-dipping lever. A last motion of the eighth handle would, after the plate was so washed in the last water bath, bring its lever forward beyond the plane of this bath over an angled spout, and the upper ends of the grippers above their joint in contact with a V-shaped or other equivalent relieving arm, which would open the grippers and let the plate slip down on its back with the picture upwards into an inclined channel, which would deliver it on to an open receiving tray shelf outside the front of the machine, convenient to be picked up by the person so putting in the money and controlling the action of the machine to the instructions given, and which being carefully observed would by this well-adjusted and arranged combination of self-acting or motive mechanism produce a very fairly good photographic picture or likeness. The last motion of the eighth or lowest handle outside would unlock the holding catch of its own instruction semaphore lever to let it fall out of view and that of the first top handle to let it fall into view, as well as release the motive weighted band or spring acting barrel, which would then take back the plate gripping lever on the upper spindle to its first normal position ready for being brought down over another plate as soon as the prescribed copper coins were again put into the receiving channel.

All the spindles with the handles outside, for sequentially and intermittently enabling the mechanism inside to automatically perform the several operations described, are all fitted with simple locking and disengaging mechanism to prevent the handles being tampered with outside, except when the money is

placed in the slit and actuates the disengaging lever of the first spindle and handle outside. One simple construction or arrangement of this locking and disengaging mechanism consists in having a short lateral projecting pin or lever secured in each spindle inside the box, and having mounted over this a vertical oscillating lever, the end of which locks the said pin and its spindle by its own gravitation, falling vertically over the said lateral pin when allowed to do so out of its retaining spring catch. Each spindle is provided with another short projecting pin, which disengages the holding out catch of its own locking lever, either in its forward or backward reacting motion, which holds it out of action when disengaged by a cord or other equivalent attached to and actuated by the spindle above it. The spindles and their handles would thus act in succession to disengage the locking lever of the spindle below it, and lock itself after each action.

The projecting lever on the first spindle, however, is locked by the heavy end of the money lever, which is relieved when the full weight of the coin is put in, and comes up against or over a horizontal hanging stop or catch, so as to allow the first handle and spindle to be turned; but the back action would by its second projecting pin take this stop out of action and allow the money to be discharged into the till, when the heavy end of the lever would again come back by its own gravitation and lock the spindle.

This photographic machine may also be used and made to act in rooms or places at night, or where there is insufficient sunlight, by having an electric or other strong artificial light fitted for use on the top of the box or where the light would act on the person or object being photographed, or on the mirror where that is used.

Other arrangements of reacting spring or weighted band motive mechanism may be employed as an equivalent for the spring or weighted band barrel described for bringing back the plate gripping lever on its spindle to its starting normal position, after having delivered each photographed plate; such as a spring, or a long lever actuated by a spring or weighted band acting over a guide pulley at one end of the machine, the plate traversing lever being brought forward by the turning, pulling, or pushing action of the eight handles, step by step, each one in succession relieving the previous turning, pulling, or pushing lever or rod of the motive spring lever brought into action by the previous spindle and handle above it.

Instead of traversing the lever, which carries the clip and raises and lowers the plate or card on which the photograph is to be taken, by sliding its boss on a fixed spindle, as described, over the baths, this spindle might be made in the form of a screw, and work in a corresponding hollow screw in the boss of the lever, so as to traverse the lever when the screw spindle was turned. The screw spindle is turned by a spur wheel on its one end gearing into an intermediate wheel, working a spur wheel on the corresponding end of another spindle mounted in bearings parallel to the screw spindle, with short lever tappets and curved cams on it, both spindles being turned by a spring or weighted cord barrel or other equivalent motor. The times of the motion or revolution of these two spindles would be regulated by a separate time motor with a regulating fan or other equivalent set in action by the insertion of the coins as hereinbefore described. In this arrangement the various outside handles and their spindles for regulating the action and intermittent traverse of the lever would be dispensed with, as also the stop barrel, and the screw spindle being set in motion would gradually traverse the lever over the baths; and the cams and tappets would be so arranged on the spindle geared parallel to the screw spindle as to act on the back short arm of the lever and raise the front long arm and the plate on it out of the baths while being traversed along the screw, and regulate the pauses the lever had to remain down with the plate in the bath, and be held up to give the exposure and be traversed by its screw spindle. The screwed boss end of this lever might be in the form of a half circle, and weighted so as to retain it in its traversing screw, but have it so mounted with a loose longitudinal bar in the segmental boss above the screw that when the lever was traversed to the far end of its screw spindle this bar would be released by a disengaging cam or pawl arrangement, and raised so that the lever could be traversed on this bar as an inclined plane, on rollers or with a cord and light weight to the starting end of its screw, where it would also cause the sliding bar to fall, and the screw boss of the lever to fall into its traversing screw spindle ready for receiving a new plate, all otherwise substantially as described in reference to the former arrangement of traversing the bar. Instead of having the baths ranged stationary in a straight line under the traversing lever carrying the photographic plate, the baths might be ranged in segmental divisions round a circular tray under this lever, which in this arrangement would be moved so as to rotate on a spindle or centre over the baths, by having a screw wheel on the boss on which it is jointed and oscillated, actuated by a screw spindle working into the wheel, and the back end of the lever be actuated so as to raise and lower the lever with the plate on it by a fixed or rotated ring cam ranged concentrically round its axis, the projections and hollows in the cam regulating the position and pauses of the lever in its lowest and highest positions, in bringing the plate over the baths and in front of the lenses for having the photograph taken otherwise substantially as described in reference to the former modification, the plates being held by the clips and lever either radially or parallel to the lever or tangential to the circular troughs at right angles to the levers.

In this modification or arrangement in which the chemical and washing troughs are set stationary within a circle, the lever arm carrying the gripper and plate to be operated on might oscillate on a fulcrum on a vertical shaft carrying it round with it over the troughs, and actuating the slide of the grippers within slotted guides projecting down from an arm and bracket carried over the lever on the rotating shaft, both the lever and bracket being counterbalanced by weights on the opposite sides of the shaft, which might revolve in footstep and top journal bearings in a frame erected in the centre of the dark box or camera. One mode and means of rotating the shaft would be by a large bevel wheel secured near its lower end, say, with 144 teeth by a bevel pinion with 12 teeth. The shaft of the pinion would be actuated by increasing speed spur gearing from the weight and cord motive spring barrel, each revolution of the pinion giving one-twelfth of the circle of the shaft, and twelve revolutions the complete circle of the central shaft, carrying the arm and clip with the plate to be photographed respectively, each

division of the circle of troughs and round the whole circuit to complete a picture and deliver a photographic plate. The times of the revolution and pauses of the said pinion shaft would be regulated, as before stated, by a stop pin in the shaft and engaging and disengaging lever controlled by the light motive time regulating weighted cord or spring barrel mechanism, set in motion by the coins placed in the slot and box lever mechanism for that purpose. Sectional divisions would be cut between the chemical and water troughs at the parts round the circle, where the plates had to be photographed and dried after fixing and washing, and after being varnished, and where the plate had to be delivered, and another new plate picked up during the pause of the lever carrying the picture over these divisions, preferably in this case having the pauses while the lever was in its lowest position, with the photographic plate within the troughs, or in front of the lenses to be photographed, or over the light to be dried. The oscillating motion is given to the lever carrying the photographic plate (to raise the plate out of the baths and leave it in the new bath or position as they are carried round with the shaft for taking the photograph and drying the plate) by a connecting rod carried down to a small crank shaft mounted in bearings under and parallel to the lever, having a bevel pinion with twelve teeth on it working into a large bevel fixed wheel or rim with 144 teeth in it, not rotated by the shaft, but concentric with it, and corresponding to the bevel wheel fixed on the shaft, so that each movement of the shaft during one-twelfth of its revolution makes the crank shaft rotate one revolution, and reciprocates the lever up and down as described during that revolution, leaving the lever and plate always in the same lowest position ready for rising again, which is preferably at the forty-five degrees of the crank, having raised the lever and plate a little from their lowest position for making the pauses within the boxes, or for drying and photographing the plate, and enabling the plate to clear the top of the boxes while rotating with the lever and shaft. The pauses are regulated as before stated by the secondary time motor stopping the bevel pinion shaft which actuates the vertical shaft, and which, as described, moves the secondary lever reciprocating crank shaft. The shaking motion is given to the plate within the baths in this arrangement by a small radial spindle mounted over each bath, actuated by pinions from a bevel wheel rotating loose on the central spindle, and operated by the motor which regulates the time movement, and by a knurled wheel, as before stated, acting on a lateral spring lever connected to the spring clips carrying the plate. In this arrangement the plates may be carried on an endless band, or large rim wheel, by their lower angled ends being brought up vertically under the clip in the position where it seizes it when its lever is going to make its first motion after the cams are inserted into the apparatus.

Under another modification, or modified arrangement of the parts of this apparatus, instead of the lever which grips the plates on which the photographs are taken being traversed over a stationary set of baths, it might simply reciprocate in one position after gripping the plate, and have the baths arranged radially in equal divisions round a circular rotating tray or radially divided frame, rotating horizontally on a hollow rotating vertical spindle; which spindle might be made to supply and circulate the water to and from the several water baths, which, as well as the other chemical baths, would preferably be made portable and segmental to fit the divisions in the rotating frame. This rotating frame might be divided into twelve or other suitable number of equally divided segmental spaces, with a ratchet wheel on its spindle having a corresponding number of teeth to the segmental divisions of the rotating frame, set and actuated on the lower part of the spindle, which would revolve on a footstep bearing below, and a steading bush bearing above secured to the frame of the machine. One sectional segment of the rotating frame of troughs would be cut away right through where the wheel frame stopped at each rotation, under the lever which picks up each photographic plate brought round radially for that purpose under the clips of the lever after each revolution of the radial trough frame, which would be rotated by a small crank shaft and horizontal ratchet spring pawl connecting rod made to pull or push it round one tooth of ratchet wheel and division of the frame at one time for each revolution of the crank shaft. The crank is rotated by a spring barrel, or a cord and weight barrel within the case, or by an electric or other motor, and ranged horizontally in line with the ratchet wheel, which cord and weight might act through speed-reducing and power-increasing pulleys, so that the weight would not require to traverse through a very deep recess or case to give two or three hundred revolutions of the crank shaft, twelve revolutions of which would be required to make one revolution of the trough frame and complete and deliver each photographic picture. Another crank would be formed on this crank shaft, with a vertical connecting rod, having its upper end connected to a reciprocating segmental lever, the outer periphery of which might either be toothed as a toothed segment to work on a toothed rack, or other equivalent with steel bands or chains, on the reciprocating plate or frame of the gripping clip which caught the photographic plate and actuated it, so as to pick up the plate through the open section in the frame and bring it down into each bath as they were brought in succession under it by the ratchet pawl and other crank of the shaft. The different times of rotation of this shaft and pause during which it would stand still for each of the several operations—of coating the plate, sensitising it, exposing it to the light to take the photograph, developing the picture, washing it, fixing it, washing it again, drying it, varnishing it, and drying and delivering the picture, and picking up another plate to be similarly operated on, constituting the twelve revolutions of the crank shaft and operations of the cycle for producing and delivering a picture—are regulated by another spring or cord and weight barrel time mechanism and arrangement of gearing with regulating fan or other equivalent; and of a light character, requiring only the power to actuate the engaging and disengaging stopping lever of the crank shaft which has the greater amount of work to do, the weight of the coin or coins inserted into the apparatus setting on this time mechanism for each revolution of its regulating, engaging, and disengaging wheel. The division teeth of this wheel correspond in number and distance between them to the times or pauses between the twelve revolutions of the crank shaft, each of a different length corresponding to the time of the pause between each revolution. The thin photographic plate would be mounted, as hereinbefore described, on lateral blocks, or slips of wood

mounted on an endless band the depth of the plates, traversed in this arrangement horizontally on loose vertical pulleys in front of the spindle of the radial trough frame, and round guide pulleys behind it, all with rim flanges to keep the band and its slit holders and plates in a horizontal vertical position, so that each plate would be brought into radial position under the vertically reciprocating gripping clips to receive it up through the blank section in the revolving segmental frame as this frame made the last motion of its circuit by a pin or other equivalent. Or the plates might be mounted on the periphery of a drum or pulley instead of an endless band. Each plate would be made of an angled or pointed shape on its other side, so as to more easily drain off all the water or liquids at the said angled central point; and under this radial position of the plate below the absent section of the frame a reciprocating plate, or frame gripper, would be mounted in guides analogous to the upper gripper, which would take on to the lower end of the plate, and by another segmental lever be raised so as to remove the plate from its band and place it into the grippers of the reciprocating arm above the baths at each twelfth revolution of the crank shaft. The crank shaft might actuate another short shaft through a pinion and wheel with teeth in the ratio of one to twelve, and a connecting-rod from this crank shaft be made to actuate the lower segmental lever of the under reciprocating gripping plate or frame which placed the plate into the upper grippers each time the segmental wheel made one revolution, the plate being steamed in guides in the open section of the rotating frame. During the pause of the plate in its lowest position within the baths, a shaking or vibrating motion would be given to it by its gripper on its reciprocating arm by a light projecting or spring lever on it taking over a knurled or ratchet wheel on a light spindle turned by the time-regulating mechanism before mentioned, through light spur gearing. The plate, when lifted up by its gripper to the highest position, after removal from the sensitising silver bath, would make a pause opposite the lens and hole in the front of the case for taking the photograph. This pause or time would be determined by the person acting on the instructions written on the outside of the case to give the desired time for exposure according to the strength of the light. And the time motive mechanism, or the trough rotating frame during its last motion, would release a pulling handle, or a moving lever brought outside, for the person getting his photograph taken, to regulate the time of the exposure by opening and closing the diaphragm or shutter of the camera, according to instructions, while he was in this position. The two sectional segments in the rotating trough wheel would be open up through at the parts where the photographic plate was brought down to be dried, after being fixed and washed, and also after being varnished, and the last motion of the trough wheel in coming to these positions would swivel or raise a gas lever tube and burner at these times and positions by a cam and tilting weighted lever mechanism, and open the light when the gas tube was brought under the photographic plate to dry it, and nearly close the light when removed from under the plate. The second last sectional motion in the circuit of the trough frame would be made to release the grippers and allow the photographic plate, with the picture completed, varnished, and dried, to drop into an inclined shoot under this open section of the rotating frame out through a slit in the front of the enclosing box into a tray or into a drawer, which can be drawn out by the person. By one arrangement the water is supplied to the segmental washing boxes of the rotating radial frame down through the central hollow spindle direct or through an indiarubber pipe with stop cock from a cistern in the upper part of the enclosing box of the apparatus, through the hollow eye or spindle of the wheel rotating on the said hollow tube as a fixed spindle and through inlet openings or ports in both spindles, the overflow water passing down through corresponding exit ports and holes separated off in a lower part of the spindle by a division in it, and from the lower part of the centre tube down into a receiving trough in the bottom of the enclosing case of the apparatus. Each trough is filled by its inlet ports while traversing towards the open division under the plate where it has to be washed, and is emptied while traversing the part of the circle from where and after the plate has been washed, thus giving fresh water for the washing of each plate. Or otherwise the fresh water might be circulated through these washing baths only while they were in the position under and with the plate moving in them while being washed. And as soon as the trough frame or wheel is turned it closes these ports in the spindle and prevents the water circulating through the washing boxes except when required. The rotating spindle is fitted with close watertight ground or packing rings above and below and between the said inlet and outlet ports to prevent escape of water at these working surfaces to waste, except direct and while being filled and emptied through their said inlet and outlet ports.

The novelty and improvements of this invention are the method or mode and means of taking and delivering photographic portraits or pictures within a dark box or large camera of persons or objects set up outside and on suitable plates or cards supplied and treated within the dark box, by the arrangement of motive power and time weight or spring regulating mechanism (analogous to a simple clock movement) performing the numerous operations required, all automatically and sequentially or in a cycle of properly regulated intermittent time movements merely started by the insertion of the coins, and stopping itself after the delivery of each picture, merely requiring one movement of a handle or handles on the part of the person deciding to have the picture to adjust the exposure by instructions approximately to the strength of the light. Many of the details of the mechanism are susceptible of considerable modification, but the essential organs and their functions of the improvements or invention are—the making of the one motor or mechanism to do the main power work of the operations, namely, bringing the cards in succession as required to the vertical reciprocating gripping lever and reciprocating it, so as to take hold of the card and traverse it sequentially over equally divided-off chemical and water troughs and spaces between them, for drying and delivering and for receiving a new plate, and either ranged stationary in a straight horizontal line or in a circumferential horizontal series, or it might be by rotating or reciprocating the troughs or spaces in an equivalent manner under the reciprocating lever; and further, in causing the lever to reciprocate up and down intermittently while making each movement, the up and down movements and pauses between these reciprocations of the lever being controlled by the light time motive mechanism intermittently

setting on and stopping the segmental motive traversing mechanism of the lever, or of the troughs when they are rotated or oscillated, the time mechanism automatically stopping both motors after each cycle of operations, until other coins are inserted, which starts the time-controlling mechanism again for a new cycle and taking and delivering a photograph.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 7432. SAMUEL DUNSEITH MCKELLEN, Spring-gardens, Manchester.—
May 19, 1888.

My invention is intended to facilitate the use of an oblique mirror in connexion with photographic cameras, and is especially intended to be used in so-called "detective" cameras.

For this purpose I place a ground glass focussing screen on the top of the camera, instead of as usual upon the back. The position of this ground glass is usually at right angles to the sensitive plate in the camera for exposures. Midway between the positions of the ground glass and the sensitive plate I place a mirror in such a way that the plane of its reflecting surface exactly bisects the angle formed by the ground glass and the sensitive plate. This method of focussing by means of an oblique mirror was adapted many years ago by a Mr. Sutton.

The mirror, when in position for focussing, is made to fit close down upon a frame, which prevents any light passing to the sensitive plate, either from the lens or the ground glass, but as an additional security against any light passing through the focussing screen I make the focussing glass of a non-actinic colour. Various colours may be used, but I find light yellow all that is required.

The lens is attached to a front which moves backwards and forwards by the action of a rack and pinion in the usual way.

The whole arrangement is enclosed in a box, by preference of an oblong form, having four sides and two ends. The front end is pierced with an aperture of the proper size to allow the light to pass to the lens. The top of the box is cut out so that the ground glass is visible through the opening, and a cover is hinged to one side of this opening, which folds down and covers the ground glass when not in use. The front is made with two thicknesses of wood, with a space between to allow a slide to move up and down freely. This slide is connected with the before-named cover, so that when the cover is opened up to allow focussing to be done, the slide moves away so as to allow the light to pass to the lens, and when the cover is closed down, the slide covers the aperture in the front. But, as in some cases it may be desirable for the cover to be closed when the lens is open, I have arranged a connexion between it and the slide in such a way that the attachment between one and the other may be readjusted so as to allow the cover to be closed whilst the lens aperture remains open. The front of the box is hinged, preferably at the top, so as to enable it to be opened in order that the lens stops may be changed. To ensure that no light shall pass into the camera, except what passes through the lens, I fix an opaque flexible diaphragm inside the box, and between the lens travelling front and the box front. This diaphragm is attached by suitable means to the inside of the box sides, and the centre of the flexible diaphragm is attached to the travelling front, near to the lens flange, so that the travelling front may move backwards or forwards for focussing.

The exposure may be either slow or rapid. For a slow exposure the slide working in the box front may be used, and any length of exposure may be given by that means, the mirror first having been lifted on its hinges out of the way of the sensitive plate.

To raise the mirror I use a spiral spring working inside a roller at the top of the box, and a winding roller at the bottom, with a curtain between the two rollers, in the form used by Mr. B. J. Edwards in his well-known shutter. The middle of this curtain I attach to the front rail of the mirror frame. The curtain is first wound on to the bottom roller by the hand. By so doing, the mirror is drawn into its oblique position for focussing, and is prevented from returning by a click acting upon a ratchet attached to the bottom roller. The releasing is done by removing the click from the ratchet, either by hand or by pneumatic action, when the upper roller is caused to revolve by the spiral spring within it. This rolls the curtain upwards, and carries the mirror with it as far as it will go towards the top of the box.

An aperture is cut in the curtain in such a position that, when the mirror is in its position for focussing, the aperture will be opposite the back of the lens, so that the rays of light may pass from the lens to the mirror, and thus to the focussing screen. Another aperture is cut in the curtain, immediately beneath the mirror, so that as the mirror rises to the top, the aperture is carried past the lens, and, in passing, the rays from the lens pass through it direct to the sensitive plate. When the mirror has risen to its highest the aperture is past the lens, and the opaque portion of the curtain presents itself and so blocks the rays. The speed of the exposure is regulated by the tension put upon the spiral spring, so that exposures of various rapidities may be given.

Other methods may be employed to give the exposure, as, for instance, instead of the opaque curtain tapes attached to the roller may be used, and an instantaneous shutter of any of the usual forms may be used with the lens, and released by the action of the rising mirror, one of the special objects of this invention being the utilisation of the movement of the mirror out of its oblique position to effect the opening and closing of the lens.

The mirror may also be arranged to rise to the horizontal position without being in any way connected with the shutter, and the shutter may be made to open and close by pneumatic action, or by the action of the hand, without being acted upon by the mirror frame.

The claims are:—1. In a photographic reflecting camera, the use of non-actinic coloured glass for a focussing screen. 2. In a photographic reflecting camera, the method of lowering and raising the reflecting mirror by attaching it to tapes, bands, or cords, or to a curtain, such bands, cords, tapes, or curtains working between rollers, substantially as described. 3. In a photographic reflecting camera, using the movement of the mirror to actuate a shutter of any convenient form, substantially as described. 4. In a photographic reflecting camera, the use of the revolving rollers to communicate motion to a shutter by

suitable connexions. 5. In a photographic reflector camera the use of the tapes, bands, cords, or curtain to actuate a shutter of any convenient form. 6. In a photographic reflecting camera the use of a curtain working between rollers to admit and exclude light from the lens, substantially as described. 7. In a photographic reflecting camera the use of a flexible diaphragm to exclude all light except what passes through the lens, substantially as described. 8. In a photographic reflecting camera the use of a hinged front to give access to the lens. 9. In a photographic reflecting camera connecting or disconnecting the top cover with the front cover, so that they may open and close together or separately as required. 10. The arrangement for stopping the movement of the mirror at the proper position for giving a prolonged exposure, substantially as described.

NEW OR IMPROVED PROCESS OR PROCESSES FOR THE PRODUCTION OF COLOURED PHOTOGRAPHS UPON GLASS AND LIKE SUBSTANCES.

No. 8518. AUGUSTE EMMANUEL LETALE, Mary-street, Balsall Heath, in the county of Worcester, and FREDERICK BILLING, Livery-street, Birmingham, in the county of Warwick.—June 11, 1888.

It is well known that alkaline chromic salts, such as bichromate of potash, prevent gelatine from swelling when treated with cold water, or dissolved, or made soluble in warm water, when light has acted upon the said gelatine or a film thereof.

Several photographic processes are based on the aforesaid properties of swelling and dissolving in water, viz., the Woodburytype, colotype, and carbon printing processes make use of or employ a photographic negative in order to render the gelatine insoluble in the parts where the said negative had allowed light to pass through.

In the Woodburytype process, the washing away of part of gelatine not rendered insoluble by light is also done in carbon printing, and in the colotype process in not washing away in hot water, the gelatine not insolubilised by light, but in swelling in cold water, for repulsing the greasy ink with which the gelatine is rolled over to produce a picture as is done in lithography.

Our invention consists in producing coloured photographs, upon glass, opal, china, and other like substances.

According to one part of our invention coloured photographs are produced by covering the aforesaid substances, or a part of the surfaces thereof, with a film of gelatine sensitised for light with a salt of chrome, and exposing the said sensitised and prepared film under a transparent positive, instead of under a negative, as in the preceding processes, as hereinbefore referred to.

Thus, for example, a plate of white opal glass is taken, and one side thereof covered or coated with a gelatine film sensitised for light by a salt of chrome. This plate is now exposed under a transparent positive, and then placed in a bath of cold water, and the salts of chrome thus employed washed away. The plate is then dried, and subsequently immersed in a bath of dye, containing a large proportion of glycerine (about one-half).

The parts of the film or surface not hardened by the exposure to light absorb or take up the dye and produce a photographic picture in the colour of the dye used.

The surface of the plate thus treated is then immersed in a bath of alum and left to dry.

Thus, the process, or the combination of processes in the production of photographic pictures on the surfaces of the materials as aforesaid, and according to our invention, consists essentially in employing dyes in connexion with gelatine films, or rather those parts not hardened by light under a positive.

According to another form of our invention, we use dyes in connexion with gelatine films as before described, but sensitised with perchloride of iron and tartaric acid, and with the said prepared and sensitised surface placed under a negative instead of a positive.

The plates are dried in a warm room at about 120 degrees Fahrenheit.

The dye solution is made by putting the colouring matter (which must be soluble) either in pure water, or in water and methylated spirit, with or without glycerine, gum arabic, or other bodies of a like nature or constitution added.

Our said invention is eminently adapted for the reproduction in colour of drawings, works of art, portraits from life, landscapes and other scenery from nature, advertisements, tablets, coloured windows, and for all other purposes where ordinary photography has been applied.

The surface substances upon which the photographs are reproduced may be of any colour desired.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—1. The production of coloured photographic pictures by employing dyes or stains in connexion with gelatine films, or rather those parts hardened by light under a transparent positive, as set forth. 2. The production of coloured photographs upon glass, china, and other like substances, by employing dyes or stains in connexion with gelatine films sensitised for light by a salt of chrome, and exposed under a transparent positive, and which said process of production, or the combination of processes, is or are conducted or carried out in manner and by means substantially as set forth in the first part of our invention. 3. The production of coloured photographic pictures upon glass and other like substances by employing gelatine films sensitised for light with perchloride of iron and tartaric acid, and placed under a negative, substantially as described in the second part of our invention.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Tuesday, May 14, at eight p.m., at the Gallery, 5A, Pall Mall East, Mr. T. R. Dallmeyer will read a paper on *The Form and Applications of Single Landscape Lenses*.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting May 15, 1889, will be on *The Relation of the Focal Length of the Lens to the Size of the Image*. Saturday outing at Finchley, Church End.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 14	Great Britain	54, Pall Mall East.
" 14	Bradford	55, North Parade.
" 14	Derby	Society's Rooms, 3, Derwent-street.
" 14	Manchester Amateur	Manchester Athenæum.
" 14	Bolton Club	The Studio, Chancery-lane, Bolton.
" 15	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 15	Bury	
" 15	Manchester Camera Club	Victoria Hotel.
" 15	Edinburgh Photo. Club	5, St. Andrew-square.
" 15	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 16	London and Provincial	Masons Hall Tavern, Beasinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 2.—Mr. William England in the chair.

The HON. SECRETARY read the following question from the box:—"What is the average weight of three-fold portable stands, each leg when extended being five feet six inches long, and what proportion of that weight is in the head of the stand?" The Hon. Secretary added that it was a most extraordinary question, and that the inquirer had better put another.

No public answer was given to the inquiry.

Mr. ARTHUR S. NEWMAN exhibited a detective camera which he had long been making, assisted by criticisms from Mr. L. Medland, to whom the instrument, whilst in course of construction, had been sent about a hundred times. It would, he said, carry twelve plates; all the working parts were underneath; it was fitted with a Wray's 5x4 doublet lens; it had a double shutter, that is to say, the window in front of the camera was opened first and the true shutter released next, both by a single movement of the finger releasing the detents; and it had what is known as Samuel's system of changing the plates. When one box of a dozen plates had been used another box could be put in its place. With twelve quarter-plates it weighed eight and a half pounds.

Mr. P. P. CEMBRANO presented a German circular he had just received about the introduction into the market of the camera of Anschütz, of Liessau, with a roller-blind shutter having a narrow slit, and said to be capable of giving exposures as short as the one-one-thousandth part of a second. The plates used measured 9x12 centimetres—a little larger than the English quarter-plate.

Mr. WILLIAM COLES exhibited two photographs of the same person and asked if any difference could be seen in the freckles of the sitter represented in each.

The CHAIRMAN remarked that one was a little better than the other, but they ought to have been printed to the same depth to allow a fair comparison to be drawn.

Mr. COLES added that one was taken upon an orthochromatic plate, and he could not see that it was any better than the other.

Mr. J. R. H. WELLINGTON exhibited views of the boat-race over which the exposures had been made with the roller-blind shutter, and he remarked that the pictures presented no visible distortion.

A question in the box asked whether shellac could be obtained which would form a perfectly colourless solution; if not, what was the best method of eliminating the colour.

Mr. A. COWAN thought bleached shellac to be always rotten.

Mr. A. HADDON believed it was bleached by blowing chlorine through an alcoholic solution of ordinary shellac.

The CHAIRMAN said that it was best to use seed lac; the spirit must be allowed to take up what it would without the application of much heat, otherwise an inferior kind of resin seemed to be dissolved out of the sediment, and that made the varnish soft afterwards. The bottle should be kept in a warm place for a few days and then the moderately clear portion poured off and filtered. By shaking this varnish up with animal charcoal it could be reduced to nearly a sherry colour.

Mr. COX had tried a method recommended by M. Vidal, and it had not answered in his hands.

Mr. L. MEDLAND asked the best known method of testing the speed of shutters.

The CHAIRMAN remarked that Mr. C. Wollaston had exhibited very good and simple apparatus for the purpose.

Mr. MEDLAND wished that there were a place to go to to have shutters tested on payment.

Mr. W. H. HARRISON said that about a year ago Captain Abney had published that photographic lenses would, after a time, be tested at Kew Observatory; perhaps shutters might be tested there also.

WEST LONDON PHOTOGRAPHIC SOCIETY.

MAY 3.—The President in the chair. Joint paper on *Enlarging* by Dr. Harrison Low and Mr. John A. Hodges.

Dr. Low, after some introductory remarks, said that enlarging was undoubtedly a good subject for discussion; the methods were various, and opinions upon their relative merits equally so. The advisability of getting "a large picture" appealed to every one; all were agreed that a large picture was better than a small one, within due limitations. He thought if all could work 12x10 size at the same expense and with the same comfort there would be small demand for quarter-plate cameras, and even the strictest Pharisee of the quarter-plate sect, the lantern-slide enthusiast, was but an enlargement man in disguise. He was aware that the production of big pictures by enlarging was not everywhere received with favour, but to his mind the taking of large pictures direct was put out of court by the large and costly apparatus necessary. His observations would be confined to enlarging direct on bromide paper. Opinions upon this method varied considerably, from eulogies (chiefly commercial) commencing "Permanency at last," to condemnations like "Bro-

mide prints are not worth the paper they are printed on"—the opinion given lately by a gentleman well known as a writer to the photographic journals. A far more weighty depressant had lately emanated from the pen of a Vice-President of this Society, whose book on *Naturalistic Photography* had caused some stir. Dr. Emerson considered, speaking of enlarging, it was, "in our opinion, a needless and undesirable proceeding." This, coming from a high light in our art, was another shock, and, but for the presumption, he (Dr. Low) should have thought the high light a little dense in this particular. (Dr. Low then proceeded to read extracts from the chapter on *Enlarging*.) Dr. Emerson's strictures on enlarging were to him the more surprising because they appeared to give that very broad pictorial effect so much advocated by him, and in many instances good examples possessed all the "tonality" of platinotype. Though disagreeing with the author on this matter, the book was one that should be read by every photographer. He pressed the claims of direct enlargement on bromide paper as opposed to making lantern slides and showing them upon a screen. He had come across clever photographers, whose knowledge of theory and practice was as an encyclopædia to an elementary handbook, who had not half a dozen decent prints to show, but who revelled in negative or transparency making. It was not, however, to be forgotten that to these gentlemen working in a scientific way mere picture makers were indebted for tabulated results, therefore he trusted his remarks would be taken good-humouredly. As to methods, he would only speak of daylight, leaving artificial methods to Mr. Hodges. His own mode of working had the great recommendation of being cheap, contrary to the apparatus recently exhibited at the Crystal Palace, which was said to be "just the thing for amateurs," and was only 14*l.* or 15*l.* If a room could be set aside for the purpose so much the better, but, personally, he had to do a "Cox and Box" performance with a relative who occupied a small upper room facing south-west; therefore he had to arrange that when Cox was there Box's arrangement should not interfere with Cox. (Dr. Low then demonstrated his method of working.)

Mr. HODGES said although he only proposed to deal with the various methods of enlarging by means of artificial illumination, he wished them to understand that he considered the results obtained by daylight were much superior, and that after a careful comparison of results he had abandoned the use of artificial light in favour of daylight. Artificial illumination, however, had many points in its favour; it enabled photographers to work at night and in dark weather, and the duration of exposure could be ascertained with a greater degree of accuracy. Broadly speaking, an apparatus for enlarging by artificial light embodied the same principles which applied to the construction of an optical lantern, and if the negatives were very small an ordinary lantern might be used, or if they were of larger dimensions a lantern transparency might be made by reduction in the camera and a small negative printed therefrom by contact, which could then be enlarged to any required dimensions in the lantern. Mr. Hodges then demonstrated the method of working an enlarging lantern. Speaking of illuminants, any form of limelight might be used, or, failing that, a flame of oil or gas. It might be taken as an axiom that the smaller the source of light the better would the definition be. An ordinary circular-wick burner would be found to give results equally as good as the very expensive parallel-wick arrangement, although the exposure would be slightly protracted. In regard to lenses, probably the best results would be obtained with a lens of the ordinary rapid type, preferably of longer focus than would ordinarily be used to take the negative. Attention to this point would ensure the attainment of better marginal definition and greater flatness of field. (Mr. Hodges then demonstrated the function of the condenser.) A form of lantern which dispensed with a condenser was introduced some time back by M. Hutinet, although the principle appeared to be old. It consisted of a chamber enclosing rows of gas jets arranged in tiers, which strongly illuminated a sheet of ground glass against which the negative was placed. A modification of this system, recently suggested by Mr. Ferraro would probably be found to answer the purpose better. He thought one reason why bad results were often obtained when using artificial light lay in the fact that artificial illuminants of low intensity did not possess sufficient penetrative power to enable the full scale of gradulation of tone in the negative to be reproduced. For this reason, when developing negatives to be enlarged, extreme density should be avoided. A negative inclining to thinness would give the best results. In regard to developing bromide papers he had found some brands apt to give hard prints, but they produced more pleasing results by modifying the developer. He used one part of iron to ten of oxalate, diluted with an equal bulk of distilled water. He wished to call their attention particularly to Alpha paper on account of the great variety of tones obtainable with it. It was very slow, but allowed great latitude in exposure. The colour produced by development might be modified by toning with any ordinary toning bath, or the ferro-cyanide intensifier might be employed, which would result in the introduction of brown tones. Mr. Hodges then referred to the production of enlarged negatives and advocated Mr. V. Blanchard's process, which was described in an old YEAN-BROOK as being a simple one to work and capable of giving fine results. In conclusion, he strongly advocated the practice of taking small negatives and enlarging therefrom. Working a large size meant a heavy tax upon one's purse, and the possession of a more than average amount of physical endurance and energy. He would ask why should the photographer who, from motives of economy or lack of physical strength, was compelled to adopt a small-size plate be debarred from the pleasure of seeing his work reproduced upon a large scale?

Mr. FOXLEY said that he had had considerable experience with artificial light, including the electric light and magnesium, but he gave a decided preference to daylight. The mode of illumination with paraffin lamps and no condenser spoken of by Mr. Hodges would be improved by using two pieces of ground glass placed about one inch apart. He thought the focus of the lens used by Dr. Low, six inches, was too short; a longer focussed instrument would give more equal illumination. Speaking of processes, if the negatives were suitable, bromide paper would give excellent results; if, however, the negative was not a very good one, a better result might be obtained by making an enlarged negative through the medium of a transparency. In reference to Dr. Emerson's assertion, that commercial enlargers examined negatives with a magnifier for the purpose of ascertaining that they were sharp, he would only say that that was contrary to his experience; in fact, he had known many

instances where the enlarged image was intentionally made a little out of focus. Mr. Hodges had said that he used a very weak developer with a very small proportion of iron; that was the way in which M. Nadar worked in producing his very fine specimens shown by the Eastman Company. He thought Dr. Low's arrangements would be improved by the employment of a reflector placed outside the window.

Mr. Broughton said it was hardly to be expected that Dr. Emerson would advocate enlarging. He seemed to aim at getting only one small portion of the negative sharp and the rest as much out of focus as possible. Such negatives naturally would not produce good enlargements. He had found hydroquinone in conjunction with caustic soda cause frilling. The addition of a small proportion of chrome alum was an effectual remedy. He had used a great deal of alpha paper, but had not obtained very successful results.

Mr. H. Selby had been able to produce a good range of tones on bromide paper with hydroquinone by lengthening the exposure and diluting the developer. He had also produced some warm tones with the uranium intensifier on under-developed bromide prints.

Mr. Foxlee said if Mr. Broughton used washing soda instead of caustic soda he would not be troubled with frilling. He always used it himself, and successfully.

Mr. Whiting considered artificial light better than daylight for most people, as the exposure could be more easily determined, and with the rapid papers it was more under control. Mr. Foxlee had said that some people threw their enlargements out of focus. That was a practice much to be deprecated. He referred himself a sharp photograph.

Mr. Blackmore said his remarks on ferrous oxalate development referred to negative work. With regard to the proportions of iron to oxalate, he would go further than the previous speakers—one to thirty worked well in his hands. He did not agree with the practice of diluting the developer with water to such an extent as had been recommended, as it tended to produce hardness in the prints. He had also noticed that a large proportion of bromide produced on an over-exposed print an unpleasant greenish tone; he had therefore discontinued its use.

Dr. Low was surprised to hear Mr. Foxlee speak disparagingly of the electric light. Personally he thought nothing could be better.

Mr. Foxlee said that the Eastman Company had gone to great expense in fitting up the electric light, but had abandoned it, and they now used daylight.

Dr. Low and Mr. Hodges having replied, the proceedings terminated. The members will meet on the towing path, under Richmond Bridge, at three o'clock on Saturday, May 25th, for an outdoor excursion.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

MAY 6.—A lantern evening.

Mr. Chatham Pexton provided the lantern and worked it himself.

Slides were exhibited by Messrs. Humphries, Hiscock, Pexton, Beadle, Lathbridge, Cox, Walker, and Treadway.

A short meeting was afterwards held at which the Council announced that they had decided that it would be advisable to remove the Club to a room known as Jubilee Hall, in the Hornsey-road, which they had taken from June 24, there being greater convenience, a dark room being attached to it, and being next to the Hornsey-road Station, Midland Railway. This change would necessitate a slight alteration in the printed syllabus of the Club, it being necessary to hold the meetings on the second and fourth Monday night of the month instead of each alternate week.

May 20, technical meeting, Iron Room, Stroud Green.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

MAY 3.—Mr. Tollett in the chair.

The business was a show of Easter work by the members. Among the very many different views there were some very pretty views of Chidehurst by Mr. Tollett, and some instantaneous views of Chingford by Mr. Bull; there were also a set of the Portsmouth manoeuvres by Mr. Baker.

On Friday evening (to-night) Mr. Tollett will read a paper on *The Alpha Bromide Process*.

On Saturday afternoon, May 18, the members will go to Chingford.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

MAY 3.—Mr. Warnerke in the chair. Lecture by Chairman on *Flash-Light Photography*.

Mr. Warnerke pointed out the great help flash light could be to both the professional and amateur, for the professional on dull days and for the amateur after the daylight had gone, who could then use it for portraits and groups. Mr. Warnerke showed the two lamps he used, which were both compact and inexpensive, and thought they could be had commercially. During the course of the lecture he took three negatives of the members of the Society, one of which was on Fry's celluloid films. He also showed the method of using the films in an ordinary dark slide, which method was both simple and efficacious. Mr. Warnerke showed a more powerful lamp which he used for copying prints, &c., and which would obviate the grain, and also that even if the original were much creased, the effect in the copy would be that none of the creases showed.

Six members were elected, and the names of ten gentlemen were proposed as members.

Next meeting will be held at 76, Peckham-rye, Friday, May 17, at eight p.m.

DUKINFIELD PHOTOGRAPHIC SOCIETY.

APRIL 23.—Mr. John T. Lees (Vice-President) in the chair.

Messrs. J. A. Armitage, A. Turner, T. Moores, C. Bates, A. M. Fletcher, and Dr. Park were elected members.

The first annual report and statement of accounts was read and adopted.

The report stated that the Society consists of fifty members, and the statement showed a balance due to Treasurer of 15s. 6d.

At a subsequent meeting of the Council the following officers for the year were elected:—*President*: Mr. John T. Lees.—*Vice-Presidents*: Messrs. John Ashworth, J. H. Brooks, and T. Glazebrook.—*Committee*: Messrs. S. T. Ainsworth, W. Chadwick, G. H. Dean, J. W. Hadfield, W. Jenkinson, and James Leech.—*Auditors*: Messrs. T. Borsey and A. Sampson.—*Hon. Treasurer*: Mr. J. Winterbottom.—*Hon. Secretary*: Mr. W. H. Shirley, King-street, Dukinfield.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

APRIL 25.—The first outdoor meeting of the season to Kenilworth, Ashow, and Stoneleigh. There was a poor attendance of members, but a great many plates were exposed with fairly satisfactory results.

MAY 1.—Usual monthly meeting.—Mr. President Andrews in the chair.

The next outdoor meeting was fixed for May 22 at Lichfield.

A pleasant evening was spent examining the negatives taken at the outdoor meeting, and prints from them. Specimens of Mr. Blanchard's new process were also handed round.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

MAY 1.—Mr. R. A. Scott, M.A., in the chair.

The chief business of the evening was the reading of a paper on *Stereography* by Mr. D. Waterson. Many practical hints were given on the preparation of pictures for the stereoscope, and there is no doubt that it will be the means of starting some to this most interesting branch of photographic science.

The cyclist's detective camera, by Turnbull, of Edinburgh, was exhibited. It was fitted with the Waverley express shutter, opening and closing from the centre, with which there is absolutely no shake.

The Secretary handed round some negatives on celluloid films (Carbutt's patent), which were thought an improvement on glass in all but price.

PAISLEY PHOTOGRAPHIC SOCIETY.

MAY 2.—Annual General Meeting.—Mr. Robert Harris in the chair.

The SECRETARY in his report stated that the past season had been exceedingly successful; thirteen meetings of the Society had been held, and the various demonstrations and lantern exhibitions had been highly appreciated. There were at present forty-two members on the books.

The TREASURER stated the financial position of the Society was very satisfactory, a balance being in hand after paying all expenses.

The following officers for the ensuing season were then elected:—*Hon. President*: Mr. Hugh H. Smiley.—*President*: Mr. James Donald.—*Vice-President*: Mr. Robert Harris.—*Council*: Messrs. Archibald F. Craig, James Mure, George Robertson, jun., James Reid, and William Holmes.—*Treasurer*: Mr. Matthew Morrison.—*Secretary*: Mr. Thomas Rastall, Inchinnan-road, Paisley.

A vote of thanks to the retiring officers brought the meeting to a close.

CINCINNATI CAMERA CLUB.

APRIL 1.—Dr. Carson in the chair.

Officers for the ensuing year were nominated, and subsequently, at another meeting, on April 15, the following were elected:—*President*: Mr. George Bullock.—*Vice-President*: Mr. William Hubbell Fisher.—*Librarian*: Mr. Arch. I. Carson.—*Treasurer*: Mr. Aaron Prince.—*Recording Secretary*: Mr. Emory H. Barton.—*Corresponding Secretary*: Mr. H. C. Fithian, N.W. Corner Fifth and Walnut-streets, Cincinnati, Ohio.

Correspondence.

Correspondents should never write on both sides of the paper.

RE PSYCHIC PHOTOGRAPHY.

To the Editor.

SIR,—Those who know everything there is to be known on all subjects they have not studied usually veil their ignorance of these subjects in sarcastic or repulsive ridicule. Your reporter is no exception to this rule, as exemplified in your issue of April 5, on *Psychic Photography*.

Mr. Edwin C. Middleton is probably aware that there are such things as imitation bank notes; also that there are imitation spirit photographers. He may also know that the fact that there are imitation bank notes in existence proves that there are not sufficient of the genuine ones about to please some people. The same thing is true in reference to spirit photography.

His knowledge also may inform him that none but a cunning, covetous, selfish person, who for years has been *successfully* deceiving and tricking his neighbours in trifles, would ever think of imitating bank notes, and that none but those who had the above qualities latent could allow themselves to waste precious time in imitating spirit photography; because all imitations are lies in act, done with intent to deceive, even if only in fun, and none the less a *sin*.

But Mr. Middleton's knowledge does not seem to carry him so far as to make him cognizant of the fact that no honest man accuses his neighbour of imitating bank notes until he has the proofs safe in his own hands; and your intelligent and thinking readers are looking for the proofs of the imitation spirit photographs or fraud Mr. Middleton witnessed I was the victim of, and none more so than myself. He is greatly mistaken if he thinks that your readers and myself will be satisfied with his pointing out that my assistant has drifted from an uncongenial trade into an artist without adding the usual brass plate ("Artist"); or that he was so simply natural as to come into such an august presence as Mr. Middleton's in the easy *déshabille* of his studio garb; or that because I have five or six large furnished rooms which I never use, and a school-room which will seat two hundred and fifty to let, while I go into the country for long periods to give myself up entirely to these experiments; or that his mis-statement asserting that Mrs. E— gave me the address of the artist when I distinctly told him "it was dangerous to give private names and addresses in the presence of his friend" (the reporter of the *Birmingham Daily Gazette*); or that I informed him that I never got phenomena unless the artist alone was present, when my plates sent to you, Mr. Editor, contradict that statement; or that because I was ill and incapable of the least exertion—in fact, had been ordered a three or four months' rest at the sea-side when able to be removed, and, therefore, could make no definite appointment—in any way go to prove that the humble man of refined feelings is a rogue, or that I am a victim of fraud. The age is progressive, and requires *proofs*, not assertions. I have sent mine to the Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY—further than this every one must search for himself in his own family.

The Spiritual Evidence Conference affords enlightenment to inquirers, at which, periodically, there are sittings for psychic photography. The members can bring their own plates, and watch the process all through (but in a spirit of friendly inquiry—not as detectives). If Mr. Middleton does not think it worth a fee of 10s. per annum to support such a Conference, his desire for psychic light is not very great, and no person becomes clever with another's knowledge; it must be sought before it can be found, and found before understood.

I accepted as your deputy Dr. Norris, President of the Birmingham Photographic Society, a well-known experimenter, one well able to detect fraud, and who can also appreciate even small successful results. I still trust that before long he will see his way to devote some time and thought to a few experiments here.—I am, yours, &c., S. A. POWERS.

92, Ashted-rose, Birmingham.

P.S.—If Mr. Middleton will undertake to pay Mr. Bleasdale for paper, toning, fixing, burnishing, mounting, cards, and postage, I will undertake to see that these prints are supplied *free* to all who may apply for them. I only print a few from each plate, and the Conference members and friends soon take these.

[As Miss Power considers herself aggrieved by Mr. Middleton's report, we have thought it only right that she should be allowed to respond.—ED.]

RAPID COLLODIO-BROMIDE PLATES.

To the Editor.

SIR,—The announcement made at the time of last year's Convention of a new discovery by Dr. Hill Norris with reference to rapid collodio-bromide dry plates interested me much, and I have been patiently waiting for the formula, and now that it is published (and patented too) I must confess to a feeling of disappointment—such a lot of baths and dipping and draining.

Turning to an old number of the JOURNAL, pages 357 and 366 of No. 1309 of June 5, 1885, you will see a rapid collodion process given by Mr. Ernest Graham (page 357) and by myself (page 366), which in the hands of any real amateur (not a "shamateur") who buys everything and get his plates developed and printed for him ought to be a very workable process.

We have still many of the old collodio-bromide men living who could say a good deal, if they would, of their experiences with collodion plates and modern development. It would be a good thing if they could be induced to speak out as they used to do, but not through the columns of the patent reports.

For detective camera work and small lantern or quarter-plates, the process advocated by Mr. Ernest Graham and myself would be just the right thing, as the grain is very fine on these plates, and details come out very sharply defined, and therefore suitable for subsequent enlargement. The absence of halation is another strong point, the under film of collodio-bromide is very inactinic, and prevents the light from travelling to the back of the glass and being reflected again on to the image.

Heat has, no doubt, an influence in making these plates so rapid.

When experimenting with these plates I used to first coat glass with emulsion (collodio-bromide) and wash under the hot water tap at about 120°, and this would raise the temperature of the glass; then coat with gelatino-bromide emulsion and drain off; let set and stand up for drying, which was not a long operation. I found the plates twenty times quicker than collodio-bromide plates.

I invite others who have experimented in this direction to give to the public the benefit of their experience.—I am, yours, &c.,

GODFREY V. J. POIRIX.

Greyhound-lodge, Greyhound-lane, Streatham, May 3, 1889.

VALUATION OF HYDROQUINONE.

To the Editor.

SIR,—I am much indebted to Dr. Smith for pointing out an erroneous sentence in the abstract of a paper I read at University College. The connected sentence should run: "This quantity corresponds to a consumption of ten atoms of oxygen by each molecule of the hydroquinone." It will thus be seen that my experiments fully confirm those of Dr. Smith, with which, however, I was not at the time acquainted.

I may add that a solution of hydroquinone in tap water, which on April 8 had required 11.3 c.c. of permanganate for every 50 c.c. of the solution, after having been allowed to stand in a narrow-necked flask without stopper, required on April 24 only 1.4 c.c. of the same permanganate, and had at the same time become very brown.—I am, yours, &c., H. FORSTER MORLEY.

University Hall, Gordon-square, W.C., May 8, 1889.

A NEW SOCIETY IN HACKNEY.

To the Editor.

SIR,—In the name of the Hon. Secretary, Mr. Fenton Jones, of No. 1, King Edward-road, I have great pleasure in announcing to you that he has been successful in forming a photographic association at Hackney, N.E., which bids fair to become an important one. At the first meeting nearly thirty members assembled, besides which the Secretary holds numerous promises.

The proceedings, presided over by Mr. E. J. Wall, were of an enthusiastic character. After the rules had been agreed upon the following officers were unanimously chosen:—Dr. Gerard Smith, President; Dr. Kibbler, Mr. J. Hubert, Vice-Presidents; Mr. F. Jolly, Treasurer; Mr. W. Fenton Jones, Hon. Secretary.

It was decided that the Committee should be elected at the next meeting. The meetings are intended to be held fortnightly in the winter and monthly during the summer.

The entrance fee was fixed at 5s., with an annual subscription of 5s.—I am, yours, &c., J. HUBERT.

238, Mare-street, Hackney.

FLASH LAMPS.

To the Editor.

SIR,—In my letter on page 275 I only commented on the matter found in the notice on page 260. Mr. England should have known better than to have introduced fresh subjects for discussion, as he has done, in his mean attempt to disparage my apparatus, by saying that he "never failed but on one occasion," &c. (Certainly he dare not say that my lamps failed; every one present knows that they acted perfectly.) The public do not know the particulars of the case he refers to, therefore I consider it excessively mean to have made such an *ex parte* statement. Nevertheless, without the knowledge of the full case, the public has the opportunity of seeing his position with regard to flash lamps, as he does not fail to blow his own (?) lamp as well as his own trumpet. Again, more fresh matter in Mr. England's remarks on "wonderful and costly." In reply to this baseless insinuation, I beg to assure your readers that, as a student of science, it is not my practice to ignore the principles of dynamics; therefore I cannot say, as Mr. England has done, "that an ordinary pneumatic ball will flash several lights simultaneously, and quite as effectively." It is contrary to the experience of engineers that one pressure and one volume—and that volume and pressure being of the hand only—should overcome the resistance offered by the tubes and powder, unless a very moderate construction is put on the word "several." Then there is the questionable legality of flashing several lights from one air ball or chamber by a distributor as referred to on page 275. Probably this point will not be settled till it has cost either plaintiff or defendant a few hundreds of pounds.

Again, he uses the words, "silly remarks." That is only to divert the public who have given no attention to the chemical aspect of the subject.

Having replied to the points raised by Mr. England in his letter, I beg to thank you in advance for giving me the opportunity to defend myself, as far as I am able to do, without adding fresh matter at the risk of prolonging a discussion without benefit to your readers.—I am, yours, &c., F. W. HART.

Exchange Column.

*• No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

- Exchange oxygen generator and holder, also a Wimhurst electrical machine, for a good cabinet portrait lens.—Address, L. DIXON, Photographer, Colne.
- Wanted to exchange, 12×10 Ross' rapid symmetrical, sixteen-inch focus, for Ross' Nos. 3 and 5 portable symmetricals.—Address, 62, Stanhope-street, Birmingham.
- Wanted, ferrotype plates and mounts in exchange for interior and exterior verandah backgrounds.—Address, PHOTOGRAPHIC STUDIO, 16, Chapel-street, Edgware-road.
- Will exchange Marion's print-washing apparatus (registered), large size, for large interior background; must be good.—Address, J. DUFFUS, Queen-street, Huddersfield.
- I will exchange Ross' 8×5 rapid symmetrical and Kershaw shutter for 9×7 Optimus euryscope.—Address, G. SCHOFIELD, Cobden-chambers, Pelham-street, Nottingham.
- Wanted, a half-plate rapid rectilinear lens in exchange for half-plate camera, single lens, and double slide.—Address, W. H. STANWELL, 70, Adelaide-road, Brockley, Kent.
- Will exchange Lancaster's whole-plate International camera, with rapid rectigraph lens and stand complete, for trieycle.—Address, GATES & STARR, Mill-road, Cambridge.
- Will exchange portable developing and changing tent for good portable whole-plate camera with two or more double backs.—Address, H. S., 27, Greiffell-place, Maidenhead.
- Will exchange Dallmeyer's 2m portrait lens, background, tables, specimen frames, &c., for good pony cart and harness or live stock.—Address, D 6, 2, York-street, Covent Garden, W.C.
- Victoria camera, nine lenses, two dark slides, and two shutters, also opal glass, various sizes, offered for backgrounds or accessories.—Address, W. HUTCHINSON, 70, High-street, Islington, London.
- Will exchange a studio half-plate square box camera and half-plate portrait lens, by Mason, Glasgow, for a half or whole-plate bellows camera and lens; difference adjusted. Also exchange three backgrounds (one interior and two exterior), also eight-foot tree, in exchange for anything useful in connexion with photography.—Address, A. COOPER & Co., Photographers, Market Entry, Church-street, Inverness.

Answers to Correspondents.

*• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

- J. J. J.—The yellow stains are produced from imperfect fixation. There is no means of removing them now.
- W. JONES.—Prepared canvas for painting on may be had in rolls of various widths from any of the artists' colourmen.
- A. CARRUTHER.—Both eosine and erythrosine can be procured from any operative chemist, or from any dealer in dyers' materials.
- J. T. LEON.—The cause of the fogging is through the plate being very much over exposed. One-fourth that given would have been ample.
- G. WILLIAMS.—Carbon tissue, readily sensitised, may be obtained from Messrs. Marion & Co., the Autotype Company, and the Woodbury Company.
- CANARY BIRD.—We are repeating your experiment with the plunge shutter, but have not as yet obtained the duplication of the image. More as to this hereafter.
- W. GILES.—Coat the inside of the vessel with paraffin wax, which will be the best. Next to this a solution of shellac in spirit. Neither will injure the developer.
- S.—Gelatine varies in price from about tenpence a pound to five or six shillings. We cannot say what you ought to pay unless we know the purpose for which the article is required.
- S. GARFIELD.—Probably it is only a solution of chloride of gold. Why not buy the salt in crystal, in tubes, from any of the dealers? You will then know what you purchase.
- D. C. L. P.—The design for the studio will do very well. The blinds and louveres will be quite sufficient to deal with the sunlight in the after part of the day. Give the roof a good slope.
- HERTS.—The marks on the negatives arise from the paper used, between the plates, in the packing. Call the makers' attention to the matter. They are evidently unaware of the effect of what they are using.
- "SCOTTY."—Unless the pyroxyline be an unusually soluble kind you will not be able to get twelve grains per ounce in solution to make an easily flowing collodion. About six grains is what is generally employed for an enamel collodion.
- B. S. J.—The only way by which you can ascertain if the picture be copyright or not, is to search the register at Stationers' Hall. The author is not bound to put "copyright" on the work. If you pirate any photograph you do it at your risk.
- GREEN FOG.—1. If the lens is genuine, and in good condition, it is very cheap at the price mentioned.—2. Any optical brass turner in London will do this work. If you fail in discovering one write again.—3. A full explanation is given in an article in the present number.

L. MINNS asks: "When was ammonia first known or discovered?"—The question is a moot one. Whether ammonia or its aqueous solution was known to antiquity is still undetermined. The manufacture of carbonate of ammonia was early known to the Hindoos.

ASSISTANT.—Different establishments have different hours for working. That these are shorter in other houses in the town is no justification for your not conforming to the rules of the one in which you are engaged, unless you stipulated for certain times when engaging. If the place does not suit you why not leave, and so avoid unpleasantness?

GIL BLAS (Glasgow).—We know nothing more of the apparatus than was contained in the article. It is evidently of German manufacture. Ordinary typographic presses are usually employed for collotype printing, and these can frequently be met with at a low price, second-hand. If you have all the works you name you have all that is published on the subject. With them you ought, with practice, to work the process to a successful issue.

F. R. M. S. writes: "Can any reader give me a list of good subjects for the camera within a radius of eight or ten miles of Whitby?" He also asks: "What is the advantage or otherwise of using (say) a 10×8 landscape lens for half-plate pictures?"—In reply: One advantage will be that the plate will be covered sharp to the edge with a larger stop than would be necessary to impart an equal degree of sharpness to the edges of the 10×8 plate.

R. BRAYLEY writes: "I have during the winter been making my own dry plates, and have by me a lot of spoilt emulsion, probably a couple of gallons or more in all. Is there any less troublesome plan of recovering the silver from it than boiling it with potash?"—The simplest way of recovering the silver is to melt the emulsion and then add sulphuric acid, in the proportion of three or four ounces to the pint, and well stir from time to time. If the emulsion be now allowed to rest for a day or two the bromide will settle to the bottom in a compact mass, when the supernatant fluid can be poured off. A large vessel should be used, as the addition of the acid causes violent ebullition.

S. E. P. puts the following queries: "1. What are the advantages of registering photographs and the price?—2. Does registering confer copyright?—3. What is cost of copyrighting? also, is there any book published on copyright law re photographs?—4. If one's photographs, portrait or landscape, are not copyrighted, can any other photographer copy them with impunity?"—In reply: 1. The advantage is to secure the copyright to the author.—2. Certainly, if done according to the Copyright Acts.—3. The cost of registering is one shilling, and a trifle extra for the form. Our publishers will effect the registration for you if you send them a picture, together with a postal order for one and sixpence. The Act of Parliament itself on copyright in works of fine art and photographs can be had for a few pence from the Queen's Printers, Messrs. Spottiswoode & Co.—4. Yes.

T. MOORE writes as follows: "A friend of mine has a French lens which he asserts gives better detail in the picture when it is worked with the full aperture than when it is stopped down. Is it possible that this can be the case? I have always understood that stopping down must improve the definition of any lens, and here it is said to impair it."—As a rule, a diaphragm improves the definition, but it does not follow that it does always. For example, if the centre of the lens be defective and a stop be inserted, only that portion is used; but when the instrument is used with the full aperture the best portions are also brought into play, and, to some extent, ameliorate the defective part. We recently had to examine such a lens; with the full opening the definition was moderately good, but as it was stopped down it gradually became impaired. A close inspection disclosed a mass of striae just in the centre of one of the glasses, which fully accounted for the impaired definition.

N. LAWRIE says that he is continually reading that some of the old photographs produced twenty or thirty years ago, and toned and fixed in the same bath, and which received but slight washing, are still as good as ever. He asks, if this be the case, why photographers do not go back to the old system of working, for, he says, no silver prints produced at the present time will last anything like so long.—One very good reason why the old system would not do nowadays is the fact that neither the negatives now taken nor the papers now in the market are suited to that method of toning. In the old days the paper was both strongly salted and highly sensitised, sometimes a hundred-and-twenty-grain silver bath being used. The negatives, also, were very intense, and had to be deeply printed. It was this that conduced to the permanency—not the system of toning, which more frequently than not was sulphur toning pure and simple. To produce good prints by the old method, strong negatives and highly sensitised paper are essential—things not general at the present day.

THE "granitine dishes" of Messrs. Taylor, Tunnicliff, & Co., of Hanley, are now becoming well known. Samples of these are before us, and with these this firm has enclosed fractured pieces made both of their granitine ware and also of the earthenware of which the ordinary dishes so long in the market have been made. The difference between these is most marked. The latter is so porous that when the tongue is applied to the fracture it adheres, whereas the granitine is close-grained, hard, and non-absorbent.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1515. VOL. XXXVI.—MAY 17, 1889.

AN IMPROVED PHOTOGRAPHIC LENS.

Among the specifications of patents published in our columns to-day will be found one on a new photographic lens.

Previous to entering upon a description of it, we may observe that the external surfaces of a lens do not afford an adequate clue to its powers. In this connexion and by way of illustration we may remark that we possess two moderately thick pieces of glass, the surfaces of which are absolutely flat, as if both had been cut out of a piece of rather thick plate glass; and yet when looked through one of them magnifies and the other diminishes any object examined. This proves a puzzle to most people, but all mystery ceases when we state that the seemingly plain plate of glass is in reality formed of two pieces cemented together, the junction being curved surfaces, being thus a plano-convex and a plano-concave lens united. But each of these elementary parts differs from the other, one being formed of glass having a high and the other a low degree of refraction—respectively a dense flint and a light plate glass. According to whether the one or the other is the most highly refracting so is the completed piece either a diminishing or a magnifying glass.

Turn we now to the new lens patented by Messrs. Schröder and Stuart. It will be seen from the specification that as the external radii of each lens in the combination are measured from a common centre, the lens would of necessity be a negative or diminishing one if formed of one homogeneous piece of glass, its form being essentially concave, or, more correctly, a negative meniscus. Parallel rays falling upon such a lens would diverge after transmission, and would therefore be useless as a photographic objective whose function is to bring to a focus all light incident upon it. And yet the patentees have so managed, by a suitable selection and arrangement of the components of this, externally speaking, negative lens, to make it a positive one capable of giving an image. The doing so would have been quite impossible—that is, as far as photographic utility is concerned—but for the introduction of the new Jena optical glass; but by its agency many optical problems which in the old flint and crown period could never have been solved are now capable of solution.

The new lens is, as we have said, a concave meniscus, the concave surface being of shorter radius than that of the convex. Its construction may briefly be summed up as follows:—It is composed of two simple lenses, a plano-convex formed of glass of a *high refractive* index and *low dispersive* power, cemented to a plano-concave of a lower refractive index but of the same or preferably of a higher dispersive power, the two flat surfaces being of course united by cement.

The lens thus briefly described may be used either singly as

a landscape objective or in combination with another of similar construction, in which case they must be set rather closely together, concave sides next each other, with a diaphragm between. Thus constructed it will serve as an architectural or copying lens, as there will be no distortion.

But whether as a single or a combination objective it ought, we think, to give such elongation, coupled with excellence, of the oblique pencils as to yield a flat field with good marginal sharpness.

Scientific men or those interested in the details of construction and the properties of the glass necessitated in its manufacture will find the requisite information in the specification of patent on another page.

THE DEVELOPMENT OF TRANSPARENCIES.

In employing pyro for this purpose, we think there can be no possible question as to the desirability or otherwise of combining it with sulphite of soda, since the absolute necessity for preserving the purity of the lights almost compels it. It is quite true that under extremely favourable circumstances pyro alone may be used without any derogation of the integrity of the result, and that clearing solutions may be used to remove any stain that may arise, but the percentage of successful transparencies so produced is very small. We may therefore start with the understanding that some form of "sulpho-pyrogallol" is to be employed.

This, of course, refers to gelatine plates, for with collodion the tendency to stain is absent, but even here the sulphite is no disadvantage since it can be made to materially modify the tone of the image.

For the purpose nothing answers better than the ordinary "ten per cent." solution of pyro, made by dissolving forty-eight grains of that substance in cold saturated solution of sodium sulphite to make up one ounce. Each ten minims of the solution then contain one grain of pyro. We have also seen some very pleasing tones produced upon gelatine plates, where the colour has been attributed to the use of meta-bisulphite of potash. If this salt be used its proportion may be varied to the extent of from one to two grains to each grain of pyro; but due allowance will have to be made in adding the alkali for the free acid it contains.

Equally important as regards the colour given is the choice of alkali. With very many operators, no doubt, liquor ammonia remains still the favourite, at least in conjunction with pyro, though there is undoubtedly a growing tendency to employ the carbonates, a practice which we are strongly inclined to favour for transparency work on account of the great

cleanliness of working thus secured. If ammonia be used the usual stock solution, made by diluting one volume of the strong *liquor* with water to three volumes, will answer.

If a carbonate be preferred, we should strongly recommend on many grounds the potassium salt.

Not only is the character of image produced as regards both purity and tone superior to that given by soda or ammonia, but the salt is a more convenient one to employ than either of the others, being easily obtained of definite composition and purity. The same can scarcely be said of sodium carbonate as usually employed in the form of washing soda, though by using the pure crystals or the anhydrous powder a nearer approach to accuracy is obtained. Carbonate of potash is very deliquescent, but only requires thorough drying to restore it to the anhydrous condition. Carbonate of soda, on the contrary, when it absorbs water requires to be "ignited" or heated to redness before the water can be completely expelled. The crystals of the latter salt, though originally containing a definite quantity of water, are liable to variation from efflorescence or loss of a portion of their water of crystallisation. Carbonate of ammonia is a very unstable compound, and not to be recommended on that account.

Carbonate of soda has an unpleasant tendency, even when combined with sulphite of soda, to impart a strong yellow tinge to the gelatine film, which, objectionable enough in a negative, totally ruins a transparency. Curiously, this yellow colour is frequently not apparent on the completion of development, but makes its appearance after washing, and is entirely unaffected by any clearing solution, or if it be removeable by such means, returns when the film is washed. For this reason alone we should eschew carbonate of soda and rely for preference upon carbonate of potash.

The strength of the solution that may be conveniently employed, calculated in terms of approximately equal energy, according to the table published in our ALMANAC for 1885, will be carbonate of soda (cryst.), 50 grains, or anhydrous, 18 grains to the ounce; carbonate of ammonia, 16 grains to the ounce, and carbonate of potash, 24 grains. These will prove convenient strengths for diluting with an equal bulk of pyro solution for use.

A certain proportion of restraining bromide is a *sine quâ non*; this may conveniently, and for transparency work perhaps preferably, be combined with the alkali, instead of being kept in separate solution. Ten grains of bromide of potassium to each ounce of alkali solution will be found a suitable strength.

For actual use the pyro solution may be diluted according to the quantity required to the strength of three grains to the ounce, and for normal exposures, if this be mixed with an equal volume of alkali solution, it will be found quite strong enough for most plates. If ammonia be the alkali, the concentrated solution mentioned above must be added in the proportion of six minims to an ounce of water, and mixed with an equal quantity of pyro solution.

The components of the normal developer will therefore consist in each ounce of—

Pyro.....	1½ grains.
Bromide of potassium.....	5 "
Strong ammonia.....	1 minim.
Or, Carbonate of soda (cryst.).....	25 grains.
" " (anhyd.).....	9 "
" potash.....	12 "
" ammonia.....	8 "

As has been already fully stated, we do not calculate or allow

for any latitude in development, but should slight errors in exposure be apparent, the developer may be modified by using more pyro or more alkali according to whether the time has been too long or too short.

In substituting hydroquinone for pyro it may be dissolved in the proportion of sixteen grains to the ounce of water, together with one drachm of sulphite of soda. The latter acts powerfully as a retarder of development, but is not otherwise objectionable in lengthening the exposure necessary; it is not used for the purpose of preventing stain, but merely to improve the tone.

If quicker development be desired the alkaline solution may consist of five grains of sodium hydrate or eight grains of potassium hydrate, with twenty grains of bromide of potassium to each ounce of water—this to be mixed in equal parts with the pyro solution.

If ferrous oxalate is to be used, though we see no benefit to be derived from such a course, it should be as concentrated and as freshly mixed as possible, but rendered decidedly acid, and well-restrained with bromide. A developer restrained, or with its energy reduced by simple dilution, is of no use. The best formula is the original one, in which precipitated oxalate of iron is dissolved in hot saturated solution of oxalate of potash. When cold, one minim of sulphuric acid and three grains of bromide are added to each ounce.

THE EFFECT OF REVERSING LANDSCAPE LENSES.

ARISING out of a paper on "Single Lenses," read by Mr. T. R. Dallmeyer on Tuesday evening at the meeting of the Photographic Society of Great Britain, was the question of the effect produced by reversing the usual position of the landscape objective. A case was cited in which a photographer, who had failed in obtaining the required sharpness when taking a portrait by such a lens used in the ordinary manner, secured all the definition he desired by the expedient of reversing it. No explanation as to the reason for this having then been given, we take occasion, in a necessarily off-hand manner, to make some observations relative to this subject.

If a lens of plano-convex or slightly meniscus form (that commonly employed for landscape lenses) have its flattest side directed towards the view without any diaphragm or other obstruction in its tube, the image on the focussing screen will be found to be hazy, and by no amount of racking it in and out can sharpness be obtained. But if, under the same conditions of full aperture, its position is reversed, and the convex side be directed towards the subject, then does the sharpness become considerably increased, especially in the centre of the field. Indeed, some single lenses give such a high degree of sharpness when thus used that the employment of a diaphragm fails to impart greater definition, although by such a diaphragm is the area of definition extended.

The reason for this is to be found in the fact that spherical aberration is minimised when the convex surface of a plano-convex lens receives the incident rays and transmits them axially; whereas by the same lens, when the flat side is outwards, spherical aberration is at its maximum: hence, while there is illumination everywhere there is sharpness nowhere.

If the lens be of an extremely deep or pronounced meniscus character, such as obtains in either front or back of a wide-angle doublet, then when the convex surface is outwards no good definition can be obtained unless a diaphragm be inter-

posed between the lens and the ground glass, rather close to the former. With high defining power under the altered conditions we also obtain a large area of sharpness and fair flatness of field; whereas by reversing the position of the lens, its diaphragm being now outside, the quality of the definition is impaired, although the sharpness, such as it is, will be found more evenly distributed all over the plate.

Several practical deductions may be made from the foregoing. One only shall claim attention at present. When using a doublet composed of lenses of a pronounced meniscus form, and when occasion arises to render the employment of only one of them desirable (as when taking a view of a subject at a distance on a larger scale), it is not absolutely necessary to remove the front and use the back lens alone as frequently recommended, for it may prove to be more advantageous to remove the back and leave the front *in situ*. Many cameras will not extend to a length sufficient to permit of the former arrangement being adopted, for be it remembered that the optical centre of a meniscus lens—that from which the focus is measured—is situated a short distance outside the convex surface, and this, in the case of an objective whose components are separated to the extent of one to two inches, makes a difference somewhat exceeding this in the expansion of the camera.

The more a lens partakes of the plano-convex form, as in the case of the front lens of a portrait combination, the less proportionate area of sharpness will be obtained when using it alone, convex side to the subject, although near the axis the sharpness with even a large aperture will be all that is desired.

THE ill-fated Cellerier Syndicate, or Photographic Company, which made such a noise in the financial world but a comparatively short time since, has now paid the debt of nature. Its remains have brought the sum of two hundred pounds, which, after the expenses incident upon the winding up are paid, will leave but little to divide among the shareholders.

At last there seems to be some prospect of this country possessing a National Portrait Gallery. When the building is obtained—and for which, by the way, we shall have to thank a private individual—it is to be hoped that a section of it will be devoted to photographic portraiture. Many who have distinguished themselves, and whose portraits would be prized by their country, have never sat for an oil painting, or, if they have, the portrait, as a work of art, may not be such as would be considered worthy of a place in a national collection of pictures. Nowadays it is rare indeed that any one has not had his portrait taken by photography. A photograph may generally be taken as being far more truthful as a likeness than are a large proportion of the oil paintings.

It would be a great pity if the portrait of an individual who had rendered himself famous should be lost to the world simply because it existed only as a photograph. Any photograph can be enlarged, and, in the hands of a skilful artist, made into a fairly good picture without alteration of the likeness. And this can be done by processes which yield results which are quite as permanent as oil paintings. For example: Why should not the portraits of those distinguished scientific men shown in the science and art department, South Kensington, and which are now fast fading, be reproduced before the fading has gone too far and find a place in the national collection? It is quite possible that there is not an oil painting of the majority of them in existence, or if there were the family may prize it too highly to let it out of their possession. If the likeness be the chief consideration in a national collection of portraits, then photography will take the palm. But if pictures or works of art are to be the principle

feature the matter may possibly be different. The donor of the proposed building might possibly be approached on this subject.

AN ounce bottle of pyrogallie acid, it was stated at one of our meetings the other evening, is often a very indefinite quantity. It was not, even for a moment, insinuated that short weight was ever intentionally supplied. Indeed, it was mentioned that more often than not the bottles contained over the prescribed quantity, and that sometimes to a considerable extent. The prevailing idea was, that as "pyro" is troublesome to weigh, and is now very cheap, the bottlers adopt guess work as their standard, and err on the side of giving too much rather than too little.

Few, it may be presumed, take it as a grievance to receive more than they pay for; but sometimes over weight may prove an inconvenience and lead to trouble. As we have said, pyrogallie acid is troublesome to weigh, therefore it is the custom with most persons, in making up their stock developing solutions, to dissolve the whole of the bottle at once, taking it for granted that it contains an ounce, neither more nor less. Indeed, we have seen formulae written, "When dissolved pour into an ounce bottle of pyro and make up to," &c. Now it is clear that if one bottle contains, say, twenty per cent. more than the prescribed four hundred and thirty-seven and a half grains—and at the meeting referred to a much larger excess than this was spoken of—and another contains the exact quantity, or may be something less, the resulting developers would behave differently. If two such developers happen to be employed in testing different brands of plates they might act prejudicially to the one or the other. A difference of twenty or thirty per cent. in the pyrogallie acid in a developer is important. A skilled operator might not be misled, but in the case of a beginner the case might be different. Moral: Weigh your pyro, and do not take the contents of an ounce bottle as being a standard quantity.

ONCE upon a time, when photography was young, pyrogallie acid was quoted at four shillings per drachm. At that time the vendors were never, that we remember, charged with giving over weight. By the way, the four shillings per drachm article in those days could not be compared, for quality, with the one shilling per ounce one of the present time. If such an article as the old one were now offered, even at a few pence per ounce, we doubt much if it would find purchasers. Instead of being of a snowy white it was more or less brown or yellow, and its developing energy was about on a par with its, according to present ideas, unsightly appearance.

SHOR windows are a trying ordeal for photographs to be exposed to when they are not properly fixed, as the strong light very soon causes an ugly discolouration. A few days back we noticed the vignette portrait of a well-known celebrity exhibited for sale in a stationer's shop window, which was but partially fixed by the "hypo"—probably through its being allowed to remain in contact with other prints while in the bath—and it had suffered badly from the exposure. The print bore the name of a well-known house, and it had clearly not been long issued. The operation of fixing prints does not require skilled labour, therefore it is too frequently intrusted to lads or girls without proper supervision, hence the employer's reputation often has to suffer.

SPRING is with us now in earnest, and the country, generally, is in a charming condition for photography, while the light, actinically, may now be considered at its zenith. Far less exposure is required now than will be necessary later on—say in July, when the light to the eye may appear more brilliant. Then, it must be borne in mind, the foliage will be of a much more non-actinic character than it is at present. These facts should be remembered by the novice, for one of the greatest faults with the majority of beginners' negatives is under exposure.

THIS is an excellent time, our readers may be reminded, for instantaneous work, on account of the highly actinic quality of the light.

Many instantaneous pictures of cattle in which foliage is included are spoiled by the latter being too heavy through insufficient exposure. If such pictures be taken at this season much of this may be avoided, owing to the actinic value of the foliage coupled with the enhanced quality of the light. Stereoscopic pictures of cattle, taken instantaneously, with a landscape background, are very charming. Instantaneous stereoscopic photography is a branch of the art we should like to see more popular than it appears to be as yet.

How ideas and fashions change! At one time amateur photographers were by no means proud to be seen travelling with their apparatus. Consequently, many attempts were made to disguise it, particularly the camera stand. This was sometimes made up as fishing tackle, or perhaps as an alpen stock, or other popular article. An umbrella camera stand, or rather a camera stand disguised as an umbrella, was also contrived, as well as other devices, for its concealment. Nowadays amateurs, both male and female, appear to be proud rather than otherwise of their apparatus. Carrying a camera stand openly appears to be quite as fashionable as carrying a tennis racquet and a pair of tennis shoes, and this is saying something.

ECHOES.

LANTERN plates at a cost "for material"—i.e., for emulsion—of one halfpenny per dozen! The mere suggestion raises visions of the fabulous profits of the plate makers, who even at a shilling a-dozen have a margin of elevenpence halfpenny out of which to pay for glass, labour, &c., and still leave a handsome percentage for themselves if they only go the right way to work.

Or, on the other hand, we may dream of the immense quantities of silver that are absolutely wasted, lost to the world in fact, in the course of a year, under the present system of manufacture; for how many of the users of lantern plates nowadays take the trouble of recovering their wastes, even when as rich in silver as the fixing bath? All that silver finds its way into the sewers, and thence to the ocean, or on to some sewage farm, in either of which resting places it will have to remain for countless ages before it accumulates in sufficient quantity to again attract the notice of man.

That an unnecessarily large quantity of silver is, as a rule, introduced into dry plate films—unnecessary, that is, in the actual formation of the image—may perhaps be taken for granted; but it saves trouble in other directions, and hence the practice prevails. Still, there seems to be a very wide difference between Mr. Starnes's proportions and those in general use. It may be remembered that in the earlier days of gelatine emulsion—the comparatively "slow" days—ten or a dozen grains of silver nitrate to the ounce were considered ample, but as rapidity increased, and "boiling" and "ammonia" methods were adopted in the manufacture, the quantity rapidly rose to twenty grains, or even more, to each ounce. It would be an interesting experiment to take, say, a hundred negatives, of fairly average subjects as regards light and shadow, and, having extracted the silver forming the images, compare it with the quantity contained in the films before exposure, which might be readily ascertained. I dare say the result would be surprising to many.

I am quite of Mr. Starnes's opinion that quality depends more upon the manner of forming the silver haloid than on its quantity; that, in fact, is open to very easy demonstration. But I do not agree with him quite when he quotes the "much better results" of collodion-bromide as evidence in favour of his theory of fineness of division. The latter, I grant, is a desirable, if not absolutely essential, quality in a lantern plate; but collodion-bromide, and, for that matter, wet collodion plates, owe the preference given to them for lantern slides to their clearness, non-liability to stain, and to the facility with which a variety of tones may be obtained. Fineness of division is not an element that enters into the question there, or iron-developed wet collodion plates would be out of the hunt. Besides, it is possible to form just as fine an emulsion in gelatine as in collodion, but it does not follow that equal results can be obtained in both cases.

Dr. Paul has expressed himself before the Liverpool Amateur Photographic Association in rather depreciatory terms regarding

what he terms "micro-photography," meaning, however, what I thought it had long been agreed to call "photo-micrography." Its value he thought had been exaggerated; that, though invaluable for low powers, with high powers he preferred to make drawings. The first point that strikes me in connexion with Dr. Paul's view is, that it is not every microscopist who possesses the requisite skill with the pencil to make drawings, and if he did there still remains to be considered his individual capacity for accurate observation. By means of photography it is true it is quite possible to thoroughly misrepresent the object photographed, still I cannot help thinking that it is easier to make a good photographic copyist than a good draughtsman. In other words, the trouble involved in learning to make good and reliable photo-micrographs is infinitely less than that necessary to the production of equally accurate and reliable hand drawings.

The photographic work with high and low powers respectively presents very different degrees of difficulty, which is not the case to the same extent with the pencil. In Dr. Paul's case it may be that he, a practised observer and skilled draughtsman, may find it more to his purpose to continue to make drawings than to photograph the objects with high powers; but the circumstances would be different, I venture to think, in the majority of cases—my own I can certainly vouch for.

The exigencies of space in reporting scientific proceedings sometimes lead to ludicrous results. The reporter in trying to squeeze a great deal of "high" science into a few lines perhaps does not quite catch the meaning of the lecturer if the latter even himself express it. Thus Mr. Friese Greene's attempt to adapt Sir Humphry Davy's electro-chemical theory to photography, mixed up as it is with several "suppositions" of his own, reads very funnily in the report, and I am sorry to say I was not at Bath to hear exactly what he had to say.

In the published specification of a recently patented "detective" camera I find it stated that the "means of focussing by means of an oblique mirror was adapted" (query adopted) "many years ago by a Mr. Sutton." I am compelled to pause before going into the merits of the invention to take breath. A Mr. Sutton! I only know, or rather have only known one, and I have a fairly good recollection, personal and otherwise, of past photographic history.

Leaving one or two earlier names unnoticed, we have about fifty years ago a Monsieur Daguerre and a Mr. Talbot almost simultaneously introducing processes which brought photography within the bounds of practical utility, and their methods served generally for portrait and landscape work respectively, until a Mr. Archer introduced his collodion process. Then a great number of scientific men of all sorts arrayed themselves in the ranks of photographic experiment, to many of whose names it would be supremely ridiculous to attach the indefinite article. Amongst the number was a Mr. Thomas Sutton, who is, or was, the Mr. Sutton of the Patent Office specification.

If the late Thomas Sutton, one of the earliest workers in and writers on photography, the editor, or part editor, of at least three photographic journals, one of which is still in full life, and the immediate successor to a Professor Hardwich (also still alive, fortunately) as professor of photography at King's College, if such a man, who died in photographic harness not so very many years ago, is to be, in memory, at the mercy of a modern adaptor of his ideas, to be described as a Mr. Sutton, it behoves us who still live to make provision for our tombstones. Truly may I say with Rip Van Winkle, "How soon we are forgotten." In only a half sense can I requote, "*stat nominis umbra*."

However, the camera patented by a Mr. — but no! I do not wish unnecessarily either to call attention to his individuality or to advertise his patent. I will say the idea now utilised and adapted to detective camera purposes is a very good one, and goes beyond the intention of Mr. Sutton, who, if I recollect rightly, put it forward simply as a matter of convenience, to obviate the necessity for stooping so low in focussing when using a low studio stand.

But its first application to "detective" cameras—not then so called—was shown to me quite ten years ago by a distinguished F.R.S., who having experienced the difficulty of catching moving objects on the proper part of the plate had devised the means by which he could watch and follow his object until at the right instant he released the trigger and the picture was taken. From my recollection of the ten-

year-old arrangement it was better than I can make out the modern patent to be from mere reading; and I have heard of, but not seen, another "detective" camera of American origin, in which the same principle of exposure is involved. So the Mr. Sutton's stationary mirror has proved useful to at least three later inventors. JUNIUS.

THE PRESERVATION OF SOLUTIONS OF PYROGALLOL.

THERE seems to be an impression abroad that certain substances exercise a "preserving influence" on whatever is brought in contact with them. The idea, although unscientific, is not without foundation. A grain or two of corrosive sublimate added to a solution of gum or other putrescible liquid will make it keep indefinitely, although the mercuric chloride forms no sort of chemical compound with the gum. The explanation in this case is not very far to seek. The gum is rendered poisonous by the addition, and so becomes unfit to support the life of the organisms which cause fermentation. In the case of pyrogallol, however, we are not dealing with the complicated phenomena attending the life even of the most minute of organisms, but with a case of direct oxidation by contact with the air. We might naturally suppose, then, that the problem of preserving pyrogallol solutions, if solvable, should be quite simple. Such, however, is far from being the case, as every photographer knows to his cost. The experiments I am about to describe, although I cannot claim that they afford a full solution of the problem, do, I think, throw some light on it, and indicate with sufficient clearness the classes of substances which prevent and which assist the oxidation and destruction of pyrogallol solutions.

The following experiments were all performed at the same time, and under as nearly as possible the same conditions. In all cases where the strength is not referred to the solution was the same, that is, a one per cent. solution (roughly speaking four and a half grains per ounce). This was made with the pyro from a freshly opened bottle, and well-boiled distilled water, which had been allowed to cool in a closed flask. Prepared in this way, pyro solution is perfectly clear and bright, with no more colour than the water used in making it, a high testimony to the purity of Messrs. Schering's preparation. Equal volumes of the solution prepared as described were placed in a number of little flasks, the various substances to be experimented on added in small quantities, and the changes which occurred observed daily for seven days. It is difficult to arrange a set of experiments of this sort in any definite order, but they may be classed roughly under three heads: (1), Those in which the addition had a distinct effect in hastening oxidation; (2), Those in which there was no marked effect; and (3), Those in which there appeared to be a greater or less preservative effect. The first class include all the basic substances tried and a few neutral salts.

Caustic potash, soda, and ammonia.—The effects of these on pyrogallol solutions are so well known as to require no description. The solution in each case turned brown from the surface in a few minutes.

Calcium and barium hydrate.—Both cause rapid oxidation, but the appearances produced are remarkable. When lime water is poured into the one per cent. pyro solution a beautiful violet colour appears, but vanishes again almost instantly, the liquid turning of a dirty brown, then lightening to yellow; on further addition of lime water the colour flashes out again, or it may be temporarily restored by shaking the solution with air. The violet substance is evidently one of the many possible oxidation products of calcium pyrogallate, but so far as my experiments went I could not succeed in keeping the violet solution for more than a few seconds, either when exposed to the air or enclosed in a perfectly filled flask. Baryta shows some tendency to behave in the same manner as lime, but the liquid soon becomes filled with a black precipitate.

Carbonates of potassium, sodium, and ammonium act in much the same way as the caustic alkalis, but more slowly; a brown colour gradually spreading down into the solution from the surface.

Bichromates of potassium and sodium.—Effects very similar to those of the carbonates, but much slower.

Carbonates of calcium and barium.—These are, of course, added as insoluble powders and produce no change for some time. After a quarter of an hour the liquids were yellow. After fifteen hours the contents of the flasks had become of a turbid dark brown, showing traces of colours similar to those obtained with calcium and barium hydrate. These effects are remarkable, as they seem to indicate that pyrogallol, although not technically an acid, is in reality a sufficiently strong acid to decompose carbonates very slowly. No effervescence was in any case visible in making up these mixtures.

Hydroxides of zinc and iron.—These were prepared at the time,

thoroughly washed, and added in the moist state. The mixture to which the iron was added turned inky black in a very short time; that with zinc turned yellow in a few minutes; by the next day a black scum had formed on the surface, but the rest was nearly white. The whole turned dirty grey on shaking.

Sodium hyposulphite showed no rapid change, but after fifteen hours the liquid was dark brown.

Potassium bichromate.—This is one of the most curious of all the reactions. Bichromates being strong oxidising agents we might expect them to act quickly on pyrogallol solutions. Such is the case; but the action is evidently not a simple oxidation. The mixture turns dark red almost the moment it is made up, and turns rapidly darker till it is nearly black. After fifteen hours the flask contained a soft black jelly, which changed no further on keeping.

All the substances mentioned above, except the last two, are either bases or carbonates, and all bring the pyrogallol into a state in which it readily absorbs oxygen and is destroyed: in a word, form pyrogallates; and these, not the so-called pyrogallic acid itself, are strong reducing agents.

Each experiment above described was thrown aside as soon as it had given a decided answer to the question under examination. Indeed, it was only, as the Highlander said, "for the conceit of the thing," or for completeness, that I performed the experiments described with the caustic alkalis, for we all know very well how quickly alkaline pyrogallates are destroyed by the air.

The next series of experiments are those in which the addition had no rapid deleterious effect on the pyrogallol. The substances here dealt with are, for the most part, salts—ammonium bromide, chloride, and acetate. They all acted in very much the same manner, hastening the oxidation and colouring of the solution to a quite perceptible extent. These mixtures were all yellow after fifteen hours, and dark yellow after seven days, but the change was very far from being complete at the end of this time.

Potassium nitrate hastened the oxidation more than the salts mentioned above. It is difficult to believe that pyrogallol can reduce a nitrate to a nitrite, yet this seems the only simple explanation of the facts. This solution showed perceptible colour in a quarter of an hour, and was brown and turbid after seven days.

Sodium sulphate and acetate.—The former of these salts was comparatively indifferent, showed no change in fifteen minutes, became yellow after fifteen hours, and then changed very gradually to a colour similar to that produced by ammonium bromide. The acetate has a stronger action, the liquid being yellow after one day, and brown and turbid after seven days.

I now come to the only two acid substances which were found to have a bad effect, namely, alum and nitric acid. Alum, although a salt (double sulphate), has an acid reaction to test paper, and I naturally expected that it would be more or less effective as a preservative; such, however, was not the case, as the solution turned first of a curious pinkish colour, and in seven days was dirty brown. Nitric acid being a very strong oxidising agent, I naturally anticipated that it would quickly give up its oxygen to the pyrogallol. Such is the case, the solution turning yellow throughout on adding the acid; but further, the acid appeared to aid the continuous oxidation of the pyro by the air. If the nitric acid is reduced to nitrous during the reaction, this would absorb oxygen from the air and then be again reduced, and so act as a carrier of oxygen. It is only fair to say that in this experiment I used a larger proportion of nitric acid than would be employed in any photographic solution; it is not at all impossible that a very small quantity might have quite different effects. Taking the various experiments in the order of the keeping quality of the mixture, this always improving as we go on, the next on the list is plain solution of pyro, with no addition whatever. This solution keeps better than any of those mentioned above. It showed no trace of colour in a quarter of an hour; after fifteen hours was, so far as one could distinguish, the same as the mixtures with ammonia salts, sodium sulphate, &c. After seven days, however, it had a much lighter colour than any of these. A very concentrated solution (perhaps twenty per cent.) was made up at the same time as the others and kept along with them. It turned a little darker than the one per cent. solution, although probably the proportion of the pyro contained in it which suffered change was much less. So it is shown again, as it was shown long ago, that pyro solutions may very well be kept without any preservative. A strong solution kept in an ordinary corked bottle will certainly not lose strength perceptibly for months. Some of the original solution was kept for comparison in a flask filled completely, so as not even to leave an air-bubble, and then tightly corked. Strange to say, it did not remain perfectly colourless, although it was so when first put up; it gradually acquired a very slight yellow tint, fainter, however, than that of most of the mixtures now to be described.

The last class of substances to claim attention are really by far the most important from the point of view of the photographer, namely, the preservatives; these are, with one exception, acids. For no reason which I can assign, potassium sulphate seems to have a beneficial effect, though in a much less degree than the acids. Acetic, citric, and tartaric acids all act as nearly as possible in the same manner. After a quarter of an hour the flasks had a perceptible yellow colour, which deepened very slowly, and remained after seven days much lighter than the solution without addition.

Hydrochloric acid is more effective than any of the organic acids tried, and occupies a position intermediate between them and the other strong mineral acids. The solution containing hydrochloric acid acquired a curious pinkish-brown colour, changing very slowly.

Sulphuric and sulphurous acids and potassium bisulphate.—Of all the mixtures tried these three were the only ones which remained perfectly colourless after seven days. The sulphurous acid used was old and contained much sulphuric. The result of all these experiments then is to point out sulphuric acid as unquestionably the best preservative for pyrogallol solutions.

In conclusion, I may summarise all these results by forming a list of all the substances experimented with, in the reverse order from that followed above, taking the best preservative first, and the most quickly destructive solution last. Sulphuric acid (and sulphurous?), potassium bisulphate; hydrochloric, citric, tartaric, and acetic acids; potassium sulphate, solution without addition; sodium sulphate; ammonium bromide, chloride, and acetate; sodium acetate; nitric acid; potassium nitrate; alum; sodium hyposulphite; carbonates of calcium and barium; hydroxides of zinc and iron; bicarbonates of potassium and sodium; carbonates of potassium, sodium, and ammonium; calcium hydrate (lime water); barium hydrate; ammonia, caustic soda, and potash; potassium bichromate.

COSMO I. BURTON.

ENLARGING METHODS.

III.

THE kind of negative most suitable for enlarging requires some consideration. The prime qualities are sharpness and freedom from granulation, fog and density being secondary evils, capable of being modified or removed by one or other method of making the enlargement, whereas a general want of definition and granulation, almost amounting to rottenness, are beyond the operator's power to correct. These defects have to take their chance, and as they are now extremely common, they do much towards settling the argument of direct work *versus* enlargements, to the detriment of the latter. Comparisons under such circumstances are unfair and odious. I am no advocate for microscopic and map-like definition at the expense of more artistic qualities, at the same time photographs in the texture of a cross between cotton-wool and "macadam" are not to my liking.

Of late years we have been going decidedly backwards in respect of these qualities, the loss or its aggravation in some cases being ascribable to the employment of the cheap and inferior kinds of lenses with which the market is flooded, and which appear to find their way into the hands of photographers of the better sort, and mainly to the rage for great rapidity, whether necessary or not, to which the bulk of the craft elect to sacrifice the refinements of the older processes. Any old-established photographer of the first class who possesses the negatives of his thirty years or more of practice will have no difficulty in instituting comparisons and deciding as to the extent of the gain or loss in these respects in the practice of modern photography. Probably his series will include negatives by iodised collodion and pyro development, bromo-iodised collodion developed with weak and strong solutions of iron, and iron restrained by colloid bodies, as well as samples of negatives by dry processes, whose preservatives included almost the whole of the stock-in-trade of the grocer and brewer, collodio-bromide emulsions and alkaline development, possibly a few transparencies by the albumen process, and so forth, till the era of gelatine is reached, when he will find specimens in all the colours of the rainbow and plenty of a gritty look. The deposit of some of these earlier kinds partook more of the character of a stain, being so exceedingly fine and structureless that it would bear magnification to almost any extent. Take, for instance, the better kinds of micro-photographs that had a "run" many years ago. I recollect having a series by Mr. Dancer, I believe, through my hands, which were truly marvellous in this respect, some of the specimens being from line engravings and quite free from rottenness when viewed with a high power. Deposits of this description were capable of receiving the well-defined impressions of the best lenses without loss, and of enlargement to considerable

dimensions before the defects of granularity and woolliness became sufficiently apparent to proclaim the product as an enlargement.

The best specimens of dry-plate work of the older types, or, in fact, of any in respect of these qualities which have ever come under my notice, belonged to the late Mr. Daintree, agent-general for Queensland. A series of his negatives were in my possession for the production of stereoscopic and lantern transparencies about twenty years ago, and in course of conversation with him he told me how they were produced and under what circumstances. They had been taken some years previously during his exploring expeditions, the plates being prepared by himself frequently while leading a nomadic life far away from the centres of civilisation. They were by a collodion process preserved with a diluted alcoholic solution of one of the gums of the *Eucalyptus*, which he styled "bloodwood gum resin." I believe he published his process early in the seventies. It was simple, and must have been fairly rapid, for groups of animals and natives were among his subjects. Three or four years subsequently I wrote to him for a sample of the gum, he, however, had not any, but very kindly gave me a reference to Mr. Hill, the government botanist of Queensland, who as kindly and promptly responded to my request by sending me some, a part of which I have now in my possession. The negatives had the appearance of having been produced by an albumen process, so fine and structureless was their character.

In the course of business, negatives of all descriptions and by many processes find their way to Littlehampton, either for enlargement, reduction, or to be reproduced reversed for photo-mechanical work—so opportunities of comparison I find neither few nor far between. A striking instance occurred recently. The parcel contained a quarter and two half-plate negatives, from which others were to be made of a uniform size of 15×12. The quarter was a good specimen of wet plate, the halves, respectively, were ditto of slow and rapid gelatine plates. Transparencies were made from each in the usual way and by the same means, from which the negatives were made immediately following one another: that from the quarter being of splendid quality and equal to any original of the size; the slow gelatine coming next, somewhat coarse, but not of sufficient prominence to be observed in the print; and, finally, the rapid and forced one's result, as thoroughly rotten a specimen as could be, entailing plenty of work for the artist whose duty it was to finish its prints. Here is an argument for the employment of slower plates when rapidity is not a paramount necessity, and matter for the exercise of the brains for experimental plate makers in an endeavour to reduce the silver-bromide particle. Even supposing that the chemical or physical condition are such that to produce silver bromide in its most sensitive condition involves the large particle, are we sure there are no means whereby its greater fineness may not be secured by mechanical means? What effect would grinding the finished emulsion have? The query is worth an experimental answer, for it is by no means certain that breaking up the particles by mechanical methods would lower its rapidity or develop other evils. So much for want of definition and granularity.

Negatives for direct enlargement on paper or opal are best when of but moderate density, well exposed, and full of detail, but without a suspicion of fog. Fog is fatal to richness of shadows and to warmth of tone, even when negatives are strong and enlarged in a very powerful light; clouded shadows tend to give grey and muddy effects by shortening the scale of tones. For experimental proof, select two negatives as near as possible alike in strength and colour, except that one has a trace of fog, while the other has not. Make a similar enlargement from each, in either case doing the best possible to secure a good picture and to eliminate the effect of the fog. When fixed and dried, place them side by side and note the difference. There will be depth and richness as well as some sparkle in that from the immaculate negative to distinguish it from its fellow, which wears a more subdued appearance—good enough, perhaps, to pass muster by itself, but not in company, unless as a second rate. Allow me to digress for a moment. This plan of having a standard to judge by should be adopted by all beginners, and form part of the system of every enlarging room, where examples of work exhibiting all the most desirable qualities should be placed in a good light and handy for reference, and be, as it were, ever before the eyes of the operators² for no man can be quite sure of his judgment in all states of light and weather, and its aberrations from the influence of health. It may tend to produce feelings of dissatisfaction which, although uncomfortable, are, nevertheless, right and safe. These standards should only be entitled to their places of honour till better ones are produced. Years ago, in producing transparencies, proceeding thus was a great favourite of mine. As each was produced it was compared with its predecessor to oust it or not from the premier position, as the verdict was for or against its superiority. Keep this kind of thing going and

the standard soon becomes a very high one, which proves a good stimulant, if never reached, to raise the tone of the work and to refine the operator. To return. Hardness, great density, and fog are alike fatal, if not insuperable, obstacles to the production of the best direct work.

Negatives intended for enlargement should be employed for that purpose before they have been varnished or much printed from, for the dust and messes they pick up in these operations is a great distraction, and necessitates much labour on the enlargements where they appear to get more than their share of prominence. Retouching, especially of the description of hatching, is better kept off, as this kind when enlarged is very obtrusive, and adds much to the tedium and labour of working up the prints. If it be in the nature of a fine stipple it is not so objectionable, and may be left to take its chance, as it affords a by no means difficult ground for the artist to work upon. Negatives to be reduced are best retouched, they become still more refined in the operation. It must not, however, be overdone, or the smaller copies become insipid, and have too much of a French-polished look about them.

When the enlargements are to be made from enlarged negatives the minor defects of great density and fog are not of so much importance, it being quite possible to make a good enlarged negative from a small one not by any means of a good-looking type. In the early days of gelatine, over-exposed and dense negatives buried in fog were common enough, some requiring a week or more to get through them for the transparency, which, when obtained, other negatives could be made of usual density to print in twenty minutes or half-an-hour—a considerable difference if a dozen or so prints were wanted. If a mere ghost of an image in the way of a transparency, full of detail and pure in the lights, could be obtained from one of these “paving stones,” intensification would do the rest and give the power of reproducing a small negative of good quality for direct enlarging, or of making an enlarged negative for carbon or platinotype printing.

We have now arrived at the transparency. The earliest methods of producing these for enlarging purposes were by wet collodion, or by one or other of the dry collodion processes then in vogue, albumen coming into use somewhat later as a secret process. For enlarged transparencies, either for the method introduced by Sarony in 1872, for the purpose of producing the enlarged negatives used in connexion with Vanderweyde's style of finishing for enlarged paper negatives by Blanchard's method, or the production of large negatives in carbon tissue, wet collodion (bromo-iodised) and iron development stand alone. As these transparencies were required to be vigorous, and were often ultimately converted to decorative uses; it was a common practice to warm them up in tone by plunging them to fix in a dish of hyposulphite of soda only slightly washed from the iron. They were retouched and nicely got up before making the negatives from them, and should the latter be made by either of the contact methods their shadows were strengthened on the back, just as negatives are in the lights, giving a double chance of securing richness and vigour in the final result. Fixing the transparency half washed greatly improves the tone, provided the fixing agent be hypo. With cyanide of potassium a like advantage is gained by slightly over developing the transparency, thoroughly washing and fixing in a weak solution of this substance, and allowing it to remain on the plate for three or four minutes afterwards. This appears to dissolve out a slate-coloured element from the deposit, and to leave the transparency warmer and brighter, but slightly thinner, than it would have been if simply fixed and washed immediately. Amateurs who are adepts at lantern slide making by the wet process should note this. Weak cyanide or a weak solution of cyanide and iodine is a great power in skilful hands.

Collodion transparencies are at their best when thus made to full size for the negatives to be made by contact. They are not of the first class to enlarge from on account of their liability to halation and spreading of the light's action in the film as it were, producing when enlarged that peculiar inlaid and woolly look which at once proclaims the enlargement. Albumen transparencies were more refined in character, and not so liable to these defects; their deposit being finer, partook more of the nature of a stain than being composed of particles. The process was rather messy and somewhat uncertain. It was mongered at two guineas, a common fee for information many years ago. The carbon transparency had by this time borne down all opposition by its great superiority for the object in question. The knowledge of the conditions under which it could be successfully made was still in the hands of a few, and it was not till some years had elapsed before all the details were public property. It is, undoubtedly, the transparency of transparencies for enlarging, the points in its favour being not a few. It accurately reproduces all the qualities of the original negative with neither solarisation, halation,

nor other evils to which camera and contact transparencies in silver are subject; and being a contact product itself, made by diffused light, the defects on the outer surface or in the substance of the glass bearing the negative film are not imprinted. It is not so with contact negatives on gelatine plates, for being exposed to artificial light of greater directness, every bit, scratch, and bubble of the glass is impressed in all its details. Its freedom from solarisation and other defects peculiar to silver cannot be made too much of, as it is from these imperfections that the worst evils arise to point the argument against enlargements.

JOHN HARMER.

PHOTOGRAPHIC USES OF URANIUM.

THERE is at present no very extensive employment of the properties of the salts of uranium in photography, although in years past advantage has been taken of certain characteristics possessed by the uranic compounds to found various printing processes which are now practically obsolete. Chief of these was perhaps the well-known Wothlytype. In this, I believe, the uranium salt was dissolved with either silver nitrate or gold chloride in collodion, which was spread upon paper, dried, and exposed as usual. The progress of the picture could be watched, the “developer” being intimately united with the salt to be reduced; fixing and a thorough washing followed. Thus gold or silver, or, if toning were resorted to, both metals formed the completed image.

The chemical principle that governed this reaction was, of course, the familiar one that the uranic salt is reduced to the uranous state by the action of light, and that the gold or silver was deposited wherever such action had taken place. The same reaction holds good in another but simpler form of uranium printing, namely, where a solution of uranic nitrate is brushed upon paper, and this, after being dried in the dark, is exposed behind a negative. Upon development with either gold or silver we have a purple or cold grey picture, due to the deposition of Au or Ag respectively.

Mention of the negative-intensifier recommended I think by Eder, in which uranium nitrate is employed with potassium ferricyanide, possibly exhausts the list of uses to which the salt is or has been recently put; but as I am relying upon memory there may be, and probably are, other photographic formulae in which it plays a part. These, however, are doubtless of small importance, otherwise one might naturally expect to have heard of them. The method of intensification alluded to is frequently employed, and is said to be permanent in its results. Of the latter advantage I am not able to speak, but the capacity of the uranium intensifier for imparting a considerable increase of opacity to the negative is unquestionable. I do not propose further to consider this particular use of uranium in photography, for the reason that next to the admission of its simplicity and efficacy as an intensifying agent the simple fact of its having survived the innumerable changes of photographic procedure during the last eight or nine years seems to my mind to constitute a conclusive piece of evidence in its favour. The following remarks have reference only to the influence exercised by uranium conjoined to other agents over the appearance and constitution of positive impressions.

It is not, I consider, an unreasonable speculation that the second process of uranium printing above alluded to is one that is susceptible of great improvement. Two features of it always seemed to me to commend it to the attention of the experimentalist, namely, the simplicity of working and the rapidity with which the uranous image is formed. In these respects it will bear favourable comparison with several other printing methods now utilised. Those who have tried uranium printing, and published their experiences, invariably appear to have contented themselves with more or less satisfactory pictures in brown, purple, or grey, due respectively to development with potassium ferricyanide, gold chloride, and silver nitrate. In my belief these three tones, neither of which can be ranked as wholly pleasing, except as occasional alternatives, are capable of infinite modification, and certain experiences recently met with point to a confirmation of this view. I take the gold image as the general type of uranium positives. By “developing” with any of the toning baths used for albumen-silver prints, instead of the plain gold solution a variety of tones may be obtained. With acetate of sodium the colour of the picture is a brownish purple, with carbonate a brownish black, with borax brown or sepia, and so on. I find, almost as a rule, that the characteristics of the various toning solutions employed with albumen-silver prints are preserved with uranium pictures, and that one thereby possesses absolute control over the colour of the finished picture.

If perfectly plain paper, Rives or Saxe, be sensitised with the uranium solution the ultimate image will have a sunken appearance that is fatal to gradation of tone and vigour. The picture is, in fact, partly

lost. I have endeavoured to obviate this by selecting a heavy rough paper, such as that upon which architectural drawings are made, and giving it a preliminary sizing of arrowroot. The net result of my attempts convinces me that it is feasible by these or similar means to retain the uranous image practically on the surface of the support, and that the final picture may possess a greatly increased range of tone and plenty of strength. I was impressed with the fact that where a sizing preparation is resorted to there is a perceptible diminution of sensitiveness. While I should not venture to urge that uranium printing has in it the elements that might eventually secure its general adoption, I am of the view that a little research and experiment may not be without profit, and to that end shall further pursue the matter.

In a recent communication to a provincial society upon a cognate subject there is a description of a printing process, termed by the author, *mercuro-uranotype*, which I read with much interest, as it appeared about the time when I myself was engaged in a few attempts of the same nature. Adhering as closely as possible to the author's instructions I was unable to confirm Mr. Reynolds's experiments, save in a partial and unsatisfactory degree. I did succeed in getting a *mercuro-uranotype* impression, but only after lengthened exposure, and then the picture was relatively faint and weak. I observed that in the hands of Mr. Reynolds the picture attained "full strength" in a few minutes, but under no circumstances could I obtain a print as bold as with plain uranium nitrate. My failure was probably due to defective manipulation, and may be avoided upon a repeated trial.

Almost concurrently with the publication of Mr. Reynolds's (to me, at least) extremely interesting experiments was the appearance of a communication to a metropolitan society, embodying some experiences of the toning of silver bromide emulsion pictures with uranium nitrate and potassium ferricyanide, the constituents of Dr. Eder's negative intensifier already referred to. If one may presume to criticise Mr. Eder's remarks they struck me as being very lucid, and I was able without difficulty to arrive at satisfactory modifications of the tones of bromide prints by following his instructions. That gentleman recommends ten per cent. solutions of both salts. The picture after fixation is to be washed in acidulated water and then freed of the acid and treated with equal parts of the solutions named in twenty parts of water. After toning another washing and transference to a new hypo or alum bath. For the latter I do not recognise a necessity, and so in the few trials made omitted it, substituting for it, after a thorough wash and soak, an acid bath to remove any traces of insoluble compounds that may have remained on the print. A personal preference for less marked tones than the deeper browns given by employing the solutions at the strengths suggested led me to considerably weaken them. By this means I obtained what I aimed at, namely, an alteration of the cold black of the untuned print to a less determined hue, brown black, of greater range. I agree that a bromide print may be considerably improved in this latter manner by the application of the uranium-ferricyanide toning solution, which, moreover, possesses great latitude of power in imparting a well graduated series of pleasing tones.

Another useful application of the uranium-ferricyanide toning solution is in the modification of the colour of gelatino-bromide opal pictures. Here, as with paper positives, one may run up and down the gamut of the brown group of shades and tones with perfect success. I have so employed the formula detailed with satisfactory and pleasing results. For those who do not like blacks or cool greys this method of toning may be confidently recommended. It will, of course, not escape remark that with bromide paper and opals that are developed with oxalate of iron very stringent care is required to free the film from ferrous compounds before the application of the uranium-ferricyanide solution, otherwise ruinous blue stains are sure to appear. I attach little, if any, importance to the danger of yellow stains from the toning solution if its action be not protracted beyond a few minutes. In my trials some opals, with plenty of virginal margin, came out of the treatment quite immaculate, although only ordinary precautions were adopted to preserve their whiteness.

THOMAS BEDDING.

SOLARISATION AND POLARISATION.

THE position taken up at the commencement of this suggestive sketch, when a close connexion was assumed between radiant and electrical energy, requires not only that it be shown that more than a merely fanciful resemblance exists in the action of each as manifested in photography, but necessitates some reference to electrical polarisation. And here, at least, the writer is of opinion that a comprehensive grasp of the entire question and a careful examination into the causes of certain minor effects lead, and rationally lead, to the same conclusion.

Before proceeding to sum up, it were well, perhaps, to give some further examples of the mutual meddling of light with the affairs of electricity, and of electricity with what concerns light.

When a couple of holes are drilled through the poles of a powerful electro-magnet, and a polarising prism fitted at one hole, an analysing prism at the other, the analyser being turned so that all light is quenched, the interposition between the poles of a thick rectangular bar of silico-borate of lead (= "heavy glass") will produce no effect, but whenever a current is passed the plane of polarisation is rotated, and light is seen. When the current is passed in the opposite direction the rotation is opposite also. The amount of the rotation is directly as the strength of the current. All transparent solids and liquids exhibit a similar effect. Solutions, such as ferric chloride in alcohol, however, give a rotation in an opposite direction to that of the current. A powerful permanent magnet may be used in the same way. It is specially to be noted that each elementary ray of colour requires a different degree of rotation, which is inversely as the square of the wave-length. Faraday, the author of the *Induction Theory of Electricity*, who was the first discoverer of these phenomena, explained them in a manner more in harmony with the views previously indicated than with the opinions of those who hold that light consists of purely mechanical undulations.

Kerr's experiment is equally instructive. The poles of an electro-magnet being polished, a beam of polarised light is reflected from one of them to an analyser. When the current is passed so that the reflecting pole is positive, the plane of polarisation of the reflected beam is turned one way, when passed so that the pole is negative, the plane is turned in the opposite direction. Kerr also took a couple of plates of brass and placed them parallel at a short distance apart in a cell with parallel glass sides, and filled the space between with carbon disulphide. The plates were insulated from each other and connected with the two poles of an electric machine, and plane polarised light passed through in a direction parallel to the plates, the plane of polarisation of the light being inclined to them at an angle of 45°. The emergent light was examined with a Jamin's analyser, and on working the electric machine the bands moved across the field. It was found that the axes of the emergent elliptic vibrations were parallel and perpendicular to the plane of the plates, and that the difference of phase between the two components in these two directions was proportional to the square of the electric force at each point. Glazebrook, from whose chapter on electro-optics the foregoing examples are selected, states that by placing two small metallic spheres or a sphere and a pointed conductor in a dielectric medium, the same effects can be still more easily produced. When connexion is made between the conductors and an active source of electricity, and plane polarised light is passed through the liquid, it is seen to have become doubly refracting.

Of Becquerel's experiments on the production of electrical currents, by the unequal exposure to light of a couple of iodised plates of silver, &c., placed in a liquid conductor, there is not sufficient space to treat.

There are many other examples of the same kind which might, but which must not be cited. The action of light in diminishing the electrical resistance of crystalline selenium, and the acquisition of electrical polarity by the ends of a crystal of tourmaline on varying its temperature, whereby it has been shown that the polarity in the same end is reversed according as the crystal is heating or cooling, can only be mentioned in passing.

If light be allowed to fall unequally on a couple of similar metallic conductors immersed in an alkaline solution of a silver haloid, and the conductors be connected with a delicate astatic galvanometer, there will be a deflection of the needle in one direction or the other, according to the relative amount of the exposure, and according also to the colour of the light employed. By alternating comparative darkness with bright light, or even by alternating two complementary colours of light, a reversed current, indicated by an opposite deflection of the needle, will be manifested.

In so far as it is true to say that there is no substance which light cannot penetrate, it is equally fair to maintain that there is no such thing as a perfectly conducting or perfectly resisting body. Glass stops light and conducts electricity. Silver opposes resistance to electricity and transmits light, and it is a pertinent parenthetical question to ask how and in what manner it does so. Are the blue rays bent more or less than the red? Iodine, as we have seen, gives a reversed spectrum, in large bulk looks purple, and in small quantity yellow.

Faraday's induction theory is based on the idea that the medium through which induction takes place is not a passive patient, but an active and essential agent; and that induction is due to the polarisation of the particles or molecules of the medium separating the body acted upon from the body or force which acts.

Light-action in photography primarily implies reduction. Reduction in turn implies liberation of the halogen. There is this marked difference, however, between the reduction induced by the printing-out and the development of an image, namely, that in the former case the visible effects are the outcome of a single external and continuous cause, while in the latter case the visible effects are due to two causes, and depend upon the force brought to bear on an internal and inconstant condition accompanying the first. It is, at the outset at least, to the haloid salt itself that light applies its separating force.

While chemical combination frequently accompanies and assists reduction, the centres of the two actions are essentially separate—when the forces act simultaneously.

The conditions which favour the deposition of metal upon metal in one and the same film are not those which promote the union of metal and halogen.

Although it is generally acknowledged that both forms of combination are due to difference of potential, yet the first is usually classified as an electrical, the second as a chemical question. To get at the root of the matter it is absolutely necessary to have a fairly clear conception of the relative merits of Volta's hypothesis—recently very strongly supported by an experiment of Sir William Thompson—that electro-chemical action is due to the mere contact of heterogeneous metals, as opposed to the opinion of almost all the more recent writers on electricity, to the effect that current electrical action is the result of the chemical affinity existing between the more basyious of the galvanic pair and the chlorous element or radical of the conducting liquid. It is not contended here that light begets current rather than frictional electricity, save in so far as it is assumed that light is not a mere mechanical action. Either branch would equally serve to illustrate the parallels which suggest themselves.

To resume. It may be readily seen then that any inequality in the quantities or mass of the elements separated is equivalent to a modification of the direction of the strain of the effective forces, and in so far as the light-obstructing or impeding halogen is dissipated either by escaping from the seat of action, or by recombining elsewhere, the reduction at a given centre will be promoted, while in so far as it remains unaltered in the spot in which it was liberated, it must exert some influence by interposing its specific resistance to the normal action of light as an inducing agent.

Solarisation and halation are not identical, although they may have a common cause. It is quite possible that film photography may show that while lateral spreading may be aggravated by internal reflection it is not initiated by it.

For the present, however, we will leave halation alone, simply emphasising the fact that a mathematical consideration of the laws regulating induction, not only admit of, but insist on, a "round-the-corner" or lateral action of electricity.

In the same way as we would apply the laws regulating the passage of a current of electricity along a wire of unequal density let us now consider the action of a ray of light of a definite wave-length upon a rectilinear chain of molecules of silver bromide, of which one end only is directly submitted to the change-inducing force.

At the outset there will be a difference of potential implying a certain electro-motive force, and a current will be set up, the intensity of which will be equal to the quotient of the electro-motive force by the resistance.

After the lapse of a given time a certain amount of work will be done on both poles, or, as it may be expressed here, on the chain itself, according to the dimensions of the unit of potential.

If at this stage we were to interpose a delicate astatic galvanometer, we should observe a definite degree of deflection on the part of the needle in a given direction, and if in place of such an instrument we apply a developer (another test of electricity) we are able to estimate the intensity and direction of the current by the amount and direction of the metal deposited.

In order to realise the conditions which alter the difference of potential, and that we may form a fairly clear idea of the increments of acceleration and retardation, let us remember that the fundamental conception of electricity—a conception isolating it from every other science save magnetism—is that of attraction and repulsion, acting according to the law of inverse squares, that polarity, whether of mass or molecule, is essentially characteristic of electrical separation, that the induction theory assumes all bodies to be conductors, though not all conductors alike, and that polarisation has an effect as well as a cause.

As familiar examples of the last clause, the case of the reversed polarisation of the poles of a battery, or, in other words, the accumulation of opposite poles on their surfaces, and of the electrolyte whose polarisation they in turn determine, may both be cited. It only remains then to show in what manner this secondary current, referred

to a galvanometer, proof-plane and electrometer, or developer of ascertained resistance, can exceed the primary current in strength to be able to sum up all the factors of normal, neutral, and reversed photographic action.

The key to this is found in the distribution of electric density over a surface variable in size and shape, and of the tension—proportional to the square of the electric density—both of which must be largely determined by the rate of accumulation or diminution of the dielectric condenser or insulator, which in this case consists of the liberated halogen.

1. When the two circuits are quickly brought near each other, the galvanometer is seen to indicate an induced current, which flows along the induced wire in an opposite direction to that of the inducing current. As soon as the approaching movement stops, the needle returns to zero, and remains there as long as the two circuits maintain the same relative position. If now the two wires are withdrawn from each other, a new induced current is set up, but this time it takes an opposite course to the first-induced current.

2. Let us now leave the conducting wires in a fixed relative position, and let us change instead the intensity of the current. If this increases, it develops an induced current in the opposite direction to that of the one inducing it, precisely as if the distance between the wires had been lessened. If the inducing current remains constant, it produces no action; if it diminishes, it gives rise to a current opposite to that originally induced and similar to that caused by separating the wires.

These laws are general, and may be summed up thus:—"There is an inverse current in the induced circuit when the inducing current begins, increases, or approaches. There is a direct current produced by a contrary action, that is when the inducing current ends, diminishes, or recedes. The mean intensity of each induced current is augmented when the displacement or variation of intensity increase in extent and diminish in duration."

Now, since electric density and tension increase as the surface of the charged and insulated conductor is diminished, and since the tendency of the electricity to escape, or induce electricity of opposite sign is greatest at a point, it seems fair to argue that the simultaneous decrease in the effectiveness of the charging force, and the increase in the perfection of the insulation, will produce at one point of the conductor or another, first, a tension sufficient to admit of communication with adjacent particles (not absolutely in contact) and of the establishment, first of equipotential, and next of a secondary current stronger than the original one, of reversed sign, and tending by the consequent re-establishment of equipotential to establish a condition of polarisation, which the comparatively infinite power of the charging force of light would in time (t, t^2, t^3, t^4 , &c.) be able to cause an alternation of recurring phases of approximately normal and reversed currents, with neutral or equipotential stages between each extreme.

Some such course of reasoning is suggested by the repeated testing of the nature of the so-called "latent" image, by what we have here termed a liquid galvanometer, which we have formerly shown to owe its action to the specific inductive capacity of the electro-positive or accelerating ingredient present, the depositor being purely and simply a needle-producer.

HUGH BRENNER.

PLATINOTYPE PRINTING.

[A Communication to the North London Photographic Society.]

PLATINOTYPE, which may be considered to be the most artistic of photographic printing processes, may be separated into its three modifications—the hot bath and cold bath, in which a faintly visible image is developed, and the Pizzighelli printing-out paper. The hot bath process, again, may be divided into the black-and-white and the sepia papers. I intend to give you a rough outline of the preparation of the paper and working of these modifications, concluding by demonstrating the hot bath method, and handing round prints by it.

Platinotype may almost be styled an iron printing process, for while no trace of iron or its salts is found in the finished print, certain salts of iron are mixed with the platinum salt, which is platinum combined with two atoms of chlorine ($Pt Cl_2$) as a means for readily reducing it; this, however, cannot be effected without the presence of neutral oxalate of potash, hence the use of the oxalate bath. There is no platinum in the paper for the cold bath process, it being coated with ferric oxalate, mixed with a very small quantity of chloride of mercury—somewhere about one grain to an ounce of ferric oxalate solution. When dry it is ready for exposure, which is about three times less than with silver printing.

It is absolutely necessary to store all papers for platinum printing in an air-tight tin containing chloride of calcium, which must be dried by heating from time to time. For the cold bath, however, it is important to have moisture present during printing, or it may be after printing and before development. If the paper is left in a dampish room for fifteen minutes

it should be sufficient. Prints made by exposing damp paper, or damping dry paper just before development, must be developed within one hour if the maximum of vigour is desired; by delaying the development some hours, the prints in the meantime being stored in a drawer so that they may retain their moisture, an increase of half tone and warmth of colour will be obtained. If it should be necessary to delay development for a day or two, the prints must be dried before a fire soon after being removed from the frames, and then stored in a calcium tube until wanted for development.

While printing, the lemon colour of the paper receives a greyish-coloured image, which, although faint, can, with practice, be judged as easily as silver printing.

The developer consists of oxalate of potash and potassic chloro-platinite—about thirty grains of the platinum salt to half an ounce of oxalate forming about six ounces of solution; a great many variations, however, may be made in the proportions of platinum salt and oxalate, and different effects secured. Development is effected by sliding the print face downwards on to the developer, which must be rocked after the development of each print to avoid scum marks. To clear the prints they are washed in three or four baths of a weak solution of hydrochloric acid after leaving the developer, to remove all traces of the iron salts, and finally washed for a quarter of an hour in three changes of water: they are then finished, and may be dried between clean blotting paper.

Pizzighelli's process differs from the above in being one that prints fully out in the frame without development; the paper contains the platinum and iron salts as well as the developer, and so prints and develops at the same time. Although excellent prints can be produced with it, for general work the results of the paper, as at present made, will not compare with the hot and cold bath processes. It is, however, excellent for printing from very dense negatives, and occasional negatives that seem extremely suitable for it. The paper should be breathed on before printing, as if it is quite dry the printing will be very slow and irregular. The best conditions for the preparation of the paper have scarcely been decided upon yet, and it is not quite fair to judge the process. The prints are cleared in the acid baths and washed for about a quarter of an hour.

The sepia and black hot bath processes are much alike in the general treatment. There are, however, some special precautions to be observed with the sepia paper, the chief being to protect it from any but the faintest rays of light; the prints, unlike the blacks ones, may be affected by light when in the acid bath. A special solution must be added to the developer to keep the lights pure. Over exposure cannot be corrected by using a cooler bath, as is the case with the black prints, and the paper does not remain good so long.

The paper for the black prints by the hot bath process is washed with a mixture of potassic platinous chloride and ferric oxalate, the proportion being about sixty grains of the platinum salt to one ounce of the iron solution. It will not keep good longer than twenty minutes or so, and must be applied to the paper directly after mixing. The ferric oxalate in the paper is reduced by the action of light to ferrous oxalate, which forms the faint visible image; this, when the paper is floated on the oxalate of potash bath, is capable of reducing the platinum salt in contact with it into metallic platinum; but the ferric salt, which remains unaltered, has no action on the platinum salt, leaving these parts, which represent the high lights of the print, untouched. The ferric oxalate is removed by the acid baths which follow the development. A good temperature for development is 150° Fahr., and when using this so much detail should not be apparent as when printing for the cold bath process, in which all the detail desired should be very faintly visible. There are, however, many methods of exposing the paper and developing it, and no fixed rule can be made, but the development must in every case be suited to the exposure or the result will be a failure. For instance, the paper may be printed until all detail is visible, but a very much cooler development must be used, say 80° or 90°; on the other hand a slightly short exposure may be given, and a temperature of 180° to 200° used. 150° should be taken as the normal temperature, and kept to until some experience has been gained, as employing all temperatures will lead to confusion, and nothing will be learnt. Some negatives require a special treatment, and both printing and development must be altered, while for a very dense negative the paper may be left out in a dampish room for some time, it will then print with less contrast and more half tone. A thin negative is better printed by the cold bath process, but negatives should be good and brilliant for platinotype printing. Any one taking up platinotype and getting only weak prints would do well to look to his negatives instead of blaming the paper, as the high lights should be fairly dense, and the deep shadows nearly clear glass.

Time for complete development should always be allowed; with a hot bath fifteen seconds will be sufficient, but if a cooler development is used, or the prints are solarised in the shadows, more time should be allowed. When the deep shadows are solarised, or appear lighter than surrounding parts, a hot and prolonged development is required to obtain sufficient blackness, as they have a tendency to look like brown paper. I have found breathing on solarised shadows useful, as in the presence of slight moisture they begin to print out and become dark before development, getting black almost directly the print is floated on the oxalate. Three or four acid baths of about ten minutes each are used, and the prints are washed as before. The process throughout takes much less time than

silver printing, and can be kept on all the winter, when it is nearly impossible to print in silver. Prints can be developed in weak daylight or gaslight, and prolonged washing is dispensed with. N. P. Fox.

PHOTOGRAPHY AND THE LAW OF ERROR.*

In my experiments the twenty largest holes were all that were utilised, and in these the error is certainly small enough to be negligible.

I must here put in a word to ask photographers to conduct experiments of this description with as much accuracy as possible. There is a degree of refinement in photographic experiments which is often quite unnecessary; but, on the other hand, the phrase, "about so much," should never be used unless it can be shown that such an approximation is sufficient.

Let me explain how the experiments were conducted. A gelatine or other plate was placed in the sensitometer and exposed for a given time to the light from an equally illuminated surface. It was developed and placed in the apparatus for measuring the transparency of deposit as I have recently described. The number of the holes was then placed as the scale for the base of the curve, and the transparency of each set up as an ordinate; a curved line was drawn through the extremities of these ordinates.

In the formula $A' = A e^{-kx^2}$, x was the number of holes from the first hole in which the action of light was apparently nil. To find k , x was taken some way down the scale, and the value of A' (which in this case was transparency of deposit) was taken from the curve A ; the total transparency was also known. This gave k . Using this value of k , the transparency of deposit was calculated for each ordinate, and, as before stated, the resulting curve was found to agree with that plotted.

I cannot say exactly at the present time why the formula does apply to photographic plates, though the theory would seem to point to a connexion between the transparency and deposit in the way I have indicated. Professor Rücker and myself have both had a try at the adaptation, but have not yet finished our investigations. It is, however, none the less true that the formula holds good when a negative is developed, or when a platinum print is developed, allowing for the light reflected from the platinum as well as from the background of white paper, as the examples I give show. But it does not hold good in the case of a silver print, for reasons which, I trust, you will appreciate. When light acts on chloride of silver it blackens it, and after the first short impact of light, of course, the subsequent light has to struggle through the various intensities of blackness to reach the silver salt below, and this must necessarily modify the result. On the other hand, when a plate is exposed to light, the change in colour is so small, that practically the light has only to struggle through the silver salt in its pristine state. The same applies very nearly to a platinum print, in which the change in colour of the iron salt is small.

In the appended table are two examples of the theoretical and observed curves, one being a gelatine plate and the other a platinum print.†

BROMO-IODIDE GELATINE PLATE.			PLATINUM PRINT.		
No. of Holes.	Observed Transparency.	Calculated Transparency.	Abscissæ (No. of Holes).	Observed reflected light.	Calculated reflected light.
1	124	—	1	45	45
3	118	117	2	45	45
4	114	111	3	44	43.7
5	105	103	4	42	42
6	94	92.5	5	40	40
7	83	81	6	37.5	37.5
8	71	70	7	35	34.6
9	59	59	8	32	31.7
10	50	48.6	9	29	28.8
11	39	38.7	10	26	25.1
12	29.5	30.6	11	22	22
13	23	23.1	12	19.5	19.1
14	17	17.5	13	17	15.9
15	13	13.3	14	13.5	13.3
16	9	9	15	11.5	10.9
17	7	6.5	16	9	8.9
18	5	4.4	17	7	7
19	3	2.8	18	5	5.6
			19	4.5	4.5
			20	3.5	3.4

In the formula—

$$A' = A e^{-kx^2}$$

$$A = 124$$

$$k = .0116.$$

In the formula—

$$A' = A e^{-kx^2}$$

$$A = 45$$

$$k = .0072.$$

CAPTAIN ABNEY, C.B., R.E., F.R.S.

* Concluded from page 316.

THE CAMERA IN SWITZERLAND AND ON THE ALPS.*

From Lauterbrunnen to Grindelwald there are numbers of excellent pictures to be obtained, so many that it would be difficult to particularise them.

At Grindelwald one is in the midst of the mountains, and in the season parties with guides are constantly starting on mountain expeditions. One of the earliest of this season's ascents of the Wetterhorn was made whilst we were there; the party, which left in the early morning, were to arrive at nine o'clock in the evening of our arrival at the hut half way up the Wetterhorn, sleep there the night, and start for the summit early in the morning. They took with them a signal rocket to be sent up at nine o'clock; all the guests of the Bear Hotel, eighty in number, turned out to see the signal; it was duly given and answered from the hotel by a flight of rockets, coloured fires, and fireworks. Amongst the groups gathered there the fatal accident last season on the Wetterhorn was naturally a subject of conversation; the fatal leap was, I think, across a crevasse, the foot slipped, and the young man missed his footing on the opposite bank, and, falling backwards down the dreadful abyss, was dashed to pieces; the guide sprang forward to seize him as he was falling, and actually touched his heel, but was unable to obtain a grasp; possibly two lives would have been sacrificed instead of one had he succeeded in doing so. The guide pathetically said he would have given his life to save his companion.

The Wetterhorn can be advantageously taken from the terrace of a hotel you will find on your left on the way to the Wetterhorn from the "Bear" (f-34, one second), also a little off the pathway on the way to the Gorge, but before reaching the stream.

On your way to the Wetterhorn the Superior Glacier will be taken and the ice cave in it, interior and exterior. The interior should be visited; it is not easy to describe the effect of the soft blue tint of the light admitted through the icy walls and vaulting of the cave and the brilliant white light from the outside reflected on to the sides of the cavern through the entrance. The light is very aquatic, though not so much so as it is on the snow and ice on the mountains. Cap off and on, f-34, I found sufficient at four in the afternoon; the outside of the cave with the face of the glacier was taken about the same time, and in much shorter time. The lower glacier is best taken on the way to the Gorge, half way down the hill from the "Bear" to the stream, at ten to eleven in the morning. You will observe from the photograph that the effect of the light at that hour is as good as could be.

The Gorge is well worth two plates, one from the bridge on the outside, one from the side of the rocky bed of the torrent, showing the wooden platform strutted out from the face of the rock, and taking in the bridge within the Gorge (f-34, three seconds).

Another day must be given to the Mer de Glace and the Schreckhorn Glacier; the latter requires some hours' climbing to reach, and by another route. For snow and ice I had provided myself with a stop which I made out of sheet zinc, requiring three times the exposure of f-34. With the use of this stop I succeeded in getting all my ice and snow pictures by cap off and on exposures, but the weather was dull; for clear weather and bright sunshine I should either have manufactured a smaller stop or given shorter exposures with f-16 or f-34. For instance, the Fiesch Glacier from Zossenburghorn was taken in rain, the guides crossing the glacier; Schreckhorn was taken in a rough storm.

Remember to have your boots spiked if you have to go for miles, as we had, over ice and snow, it may have many an awkward fall.

On leaving Grindelwald we sent a carriage on to meet us at Lauterbrunnen, and walked to that place over the Wengern Alp, some six thousand feet above the sea level. A more delightful walk could scarcely be imagined; the ascent from Grindelwald is gradual for an hour or two, through wood and open country; as the summit is approached the woods are left behind and the path leads through meadows covered in June with flowers of the most varied and brilliant tints, which grow in the wildest profusion—primulas, campanulas, soldanellas, ranunculi, great Alpine columbines, anemones, vetch, pansies, intensely blue gentians of several varieties, including the rarer marsh gentian with its deep blue flowers; here and there were thickets of crimson rhododendrons, known as the Alpine rose. A herd of mountain cattle were browsing, some near, some far away, each with its bell (some of large size) tied round its neck. Climbing by the hour together is tiring work, so, throwing ourselves down on the grass in the warm sunshine, we rested with half-closed eyes, refreshed by the scent of the growing flowers and listening to the soft hum of the bee and the tinkling of the cattle bells, which sounded like the chimes rung from innumerable church towers and borne over the valley from distant villages. These sensations, pleasant as they were, could not be indulged in long; more climbing had to be done before the summit could be reached; higher up the snow was still lying in the hollows, and, though an unwise thing to do, we refreshed ourselves by laying our hands in it and taking a mouthful occasionally.

On the summit is an inn which had only been opened for the season on the previous day; on our arrival we were invited by the hostess to sit down at a table in the front of the house, we did so, but soon found out that the sides and legs of the table had been recently painted red; a clergyman who was taking temporary duty at Meiringen, and was on his way to Murren, and had joined our party, was badly painted, but he congratulated himself on his thoughtfulness in having put on very old clothes for the expedition, and, as the painting appeared to give him very real pleasure on this account, he was not much to be pitied; but one of the gentlemen who had put on a new double-texture waterproof with which to shield himself from the wind found it ruined; he went to the hostess and asked for something to help him to remove the paint. "She had nothing," she said. "But surely there was spirit of wine?" "No." "But the painters were at work; had they no turpentine?" "Yes, they had, but they wanted it for their own use." This gentleman was much put out by what he considered to be heartless and cold-blooded apathy, and swift retribution followed. Finding her near a door-jamb which he previously ascertained had been recently painted, he entered into conversation, and advancing gradually inch by inch she as gradually retreated until her back rested against the door-jamb. "Is the door-jamb freshly painted? If so, Monsieur feared Madame would be in the same predicament as himself. Would Madame turn round? Yes, it is dreadful! Unless Madame can remove it at once with the aid of some solvent the dress will be ruined." Madame retreated hastily, and her voice was heard calling loudly for man and maid, and the result was that a bottle of spirits of wine was produced, with which the traveller, chinking over the success of his ruse, saved his waterproof from utter ruin.

The descent on the Lauterbrunnen side brought us through magnificent mountain scenery. On the way up and from the top we had fine views of the Finster Aarhorn,

Monck, Schreckhorn, Eiger, and, in the distance, the Wetterhorn, all of them from thirteen to fourteen thousand feet high; here and there were revealed stretches of the enormous glacier, which is said to cover one hundred and twenty square miles and to extend from Grindelwald to Brieg, in the Vallais. The inn which we left was directly in front of the Jungfrau, though separated from it by a deep and vast ravine; owing to the clearness of the air, the Jungfrau seemed close at hand, and now and again the avalanches of ice and snow detached themselves from the masses high up the mountain and, moving slowly down the sides, visible by what appeared to be a puff of white smoke, but what really was a mass of snow and ice dashed into a million fragments, plunged headlong over a precipice some thousands of feet high into the abyss below, in volume sufficient to overwhelm a town, and with the sound of a roll of thunder which echoed and re-echoed from mountain to mountain. Further on Murren became visible; it was apparently within half an hour's walk, but we did not see the deep valley of the Lauterbrunnen nor understand that a descent of some thousands of feet and a similar ascent on the other side—which would occupy hours of hard walking—would have to be accomplished before deceptive Murren could be reached. Further down we left the barren and rugged rocks and reached the pine woods again; from thence a line of pack-horses and mules were emerging, laden, probably, with goods and supplies of food for the inn we had left; they made a good subject for the camera.

I have not dwelt on the views suitable for the camera on the Wengern Alp, they abound on all sides. Before leaving the subject of photography at Grindelwald I may say that M. Boss undertook to fit up at the "Bear" a dark room for the use of amateurs; this has doubtless been done.

The descent into the Lauterbrunnen Valley is most trying; the strain on muscles which are rarely exercised by going downhill by the hour together is worse than the fatigue of climbing. In due time we arrived at Lauterbrunnen; our carriage, which we had sent round by road, curiously enough reached the inn there at the same moment as ourselves.

If the return is made by Lansanne or Geneva, Fribourg can be taken on the way. The view from the suspension bridge (f-34, one second) should not be forgotten. There are bits to be had almost anywhere, whether you turn to the right hand or to the left after crossing the bridge.

I must confess that it was not photography so much as the organ at Fribourg—said to be one of the finest in Europe—which attracted me to the place. Recitals are given upon it daily. I have long since come to the conclusion that these Continental organs, of which so much is said, are greatly over-rated; they trade on their ancient reputations. I have heard no organ on the Continent which will compare for a moment with that in Salisbury Cathedral, or the Albert Hall, or with any of our first-rate modern organs. The Fribourg organ possesses stops of much sweetness, as, for instance, a flute and soft reed, though the latter was probably of modern construction, for I imagine no reed made two hundred years ago would be of much value now. The diapasons were full, round, and mellow in tone, of the quality one would expect from pipes of large scale blown on a low pressure of wind, but otherwise there was not much that was remarkable in the organ; and the full organ was not well balanced, the bass quite overpowered the treble. To the persons who frequent these recitals the cor humana appeared to be the attraction. Our best organ builders will not encourage the use of any clap-net stops of that description; the best cor humana is a well-taught choir; and where a good organ is to be found it is generally easy to get that most perfect of cor humanas in the natural form, and few musicians would care to listen to a vile imitation after hearing the original. The recital ended, as these recitals generally do, by an illustration of a storm in the mountains, which opened with an imitation of an Alpine horn, then came the storm with free use of a thunder stop, then the prayer of the peasants, on the cor humana stop of course, then things settled down again. The performance is much regarded by the audience generally. One wonders some enterprising individual does not get up a new sensation in, say, an illustration of "A day in the country." It might commence on a "cock" stop, which, like the Alpine horn stop, would announce the break of day; the precious cor humana might be brought in in illustrating an altercation between the farmer and his men; a "cow stop" and a "pig stop" might be effectively introduced in the course of the piece; and the whole might conclude on the "donkey stop," which, by successive and combined hee-haws, and finally by a chorus of hee-haws simultaneously in different keys, would bring the whole to a fitting conclusion and "bring down the house."

The Cathedral porch possesses a peculiar piece of sculpture over the door which is worth photographing, and you would scarcely leave Fribourg without photographing the Hotel de Ville and the lime-tree of historical interest. The story connected with it is too well known to be repeated at length; the story, I mean, of the young man who ran from the battle-field of Morat to announce to his fellow-townsmen the defeat of the Duke of Burgundy. He reached the market-place, declared the victory, and instantly fell dead from fatigue and over-excitement; a branch of lime-tree which he bore was planted on the spot upon which he fell, and this tree, with its aged limbs supported on all sides by props, is the original slip of lime-tree planted four hundred years ago, at least so it is affirmed.

From Fribourg Lansanne is easily reached. Lansanne is very central for all places of interest on the Lake of Geneva. The cable railway to Onchy is a great convenience; it takes the visitor from Lansanne to the lake-side in five minutes, from whence the steamboats, which are constantly calling, will take him down to Geneva or to any intermediate port, or up to Villeneuve, Chillon, Clarens, Montreux, or Vevey.

The favourite view of Chillon, with the castle jutting out into the lake, which is here three hundred feet deep, with Villeneuve in the distance, and the Dent du Midi towering above it, snow and possibly cloud-capped, always makes a picture, and the usual f-34, one second if fine, two seconds if cloudy, may be safely given. A picturesque view can also be taken from the land a little to the left of the entrance; if a short-focus lens is used the road and railway can be avoided and the little vineyard below it will give a suitable foreground.

The inner court, with its flight of steps on each side and irregular roofs, is worth a plate. The dungeon will, of course, be photographed; the light is said to be best for this purpose at five o'clock, but mine turned out well at a quarter past one with a quarter of an hour's exposure, f-11, though double the exposure would not have been too much. The military chapel adjoining it will require a slightly shorter exposure. There are many interesting rooms in the castle, which should be taken if a complete series is required—as the Hall of Justice (f-16, twenty seconds), the ancient kitchen, and the bedroom of the Duchess of Savoy. (For the last-named a very short-focus lens will be required.)

* Concluded from page 303.

At Montreux the gorge should not be forgotten.

There had been a question at Interlaken whether the camera should be taken to Lucerne and the Rigi or up the Rhone Valley, then to Zermatt, Chamonix, and Mont Blanc; the latter route gained the day, but some people coming down from the Rhone Valley to the Gishon Hotel, Lausanne, where we were staying, discouraged us by saying they had not had one fine day in three weeks. We should have persisted, however, had not cold and broken weather set in at Lausanne also. We waited for a change for three days, but as the fine weather appeared to have taken its departure for an indefinite period we reluctantly returned home, leaving Lucerne, the Rhone Valley, Zermatt, and Mont Blanc to be photographed on a future occasion.

W. MILES BARNES.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7599.—"Improvements in Stands or Tripods for Supporting Photographic Cameras or the like." J. V. HARGER and T. HARGER.—*Dated May 7, 1889.*

No. 7658.—"Improvements in Telescopic Fronts for Optical Lanterns." A. WRENCH.—*Dated May 7, 1889.*

No. 7675.—"New or Improved Holder or Lifters for Photographic Plates, Films, and Papers." T. STANWAY.—*Dated May 8, 1889.*

No. 7700.—"Improvements in Dark Slides, Carriers, or Apparatus for Carrying, Exposing, and Manipulating Glass Plates Coated with Substances Sensitive to Light for Photographic Purposes." A. TURNER.—*Dated May 8, 1889.*

No. 7735.—"An Improved Diaphragm for Photographic Lenses." T. P. WATSON and F. E. EDEN.—*Dated May 8, 1889.*

No. 7747.—"For an Invention for Rendering Cardboard, Paper, or the like, Impervious to the Action of Photographic Chemicals, and therefore suitable for Photographic Purposes." W. F. GREENE.—*Dated May 9, 1889.*

No. 7772.—"An Improvement in Photographic Albums, Scrap Books, and the like." E. POSKE.—*Dated May 9, 1889.*

No. 7829.—"Improvements in Detective or Hand Photographic Cameras and Dark Slides or Film Carriers connected therewith." J. M. TURNBULL.—*Dated May 10, 1889.*

No. 7871.—"Improvements in or appertaining to Photographic Cameras." R. J. APPLETON.—*Dated May 11, 1889.*

No. 7897.—"Improvements in Apparatus for Showing the Illusion produced by Persistence of Vision to Large Audiences." E. S. BRUCE.—*Dated May 11, 1889.*

PATENT COMPLETED.

IMPROVEMENTS IN LENSES.

No. 5194. DR. HEINRICH LUDWIG HUGO SCHRÖDER, 17, Althorp-road, Upper Tooting, Surrey, and JOHN STUART, The Hollies, Clapham, Surrey.—*April 7, 1888.*

THIS invention has for its object to provide a lens in which the errors of curvature of the image and colour correction incident to other lenses are overcome, and this over a large field of view. Lenses made according to this invention give a sharply defined image throughout the field, which is of great advantage in most or all applications of lenses, and especially so for photographic and other like purposes.

Hitherto all achromatic lenses (having either flat or other contact surfaces) that give a positive image have the convex radius shorter than the concave radius.

Now the distinctive feature of the lens according to this invention is that by employing glasses combined as hereinafter described, the radius of the convex surface is enabled to be longer than that of the concave surface, and at the same time a positive image is still obtained. The convex and concave surfaces may thus be arranged to represent parts of two concentric spheres.

According to this invention the objective is composed of a convexo-plano lens made of glass of a high refractive power and relatively low dispersive power, combined with a plano-concavo lens made of a glass of lower refractive power than that of the glass of the convexo-plano lens, but of the same or higher dispersive power than that of the glass of the said convexo-plano lens. The inner or contact surfaces of these two lenses are placed together, and preferably cemented, the convexo-plano lens forming the front portion of the objective.

By proper choice of the radii of the spherical surfaces of the lenses and of the glasses used, and of their thicknesses, an aplanatic lens can be made having a positive focus, that is, a lens giving a real image of an object receivable on a screen, and having great flatness of field and suitable colour correction throughout a considerable angular distance from the axis. The ratio of the radii of the two concentric spherical surfaces will depend upon the refractive powers and dispersive powers of the glasses used, as hereinafter more fully explained.

And, in order that our said invention may be fully understood, we shall now proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the annexed sheet of drawings, the same letters of reference indicating corresponding parts in both the figures.

Figure 1 of the accompanying drawings is a transverse section of an objective made according to this invention, *a* being the convexo-plano lens of high refractive and low dispersive power, and *b* being the plano-concavo lens of lower refractive power and the same or higher dispersive power. The convex and concave external surfaces (marked respectively *e* and *d*) are portions of concentric, or approximately concentric, spheres having their centre at *f*, and the plane internal surfaces are preferably cemented together at *c*.

In order to obtain a plane image throughout a large field of view, the radii of the external surfaces (*e* and *d*) should have a certain ratio to each other dependent on the refractive and dispersive powers of the glasses used.

In practice it is found that the limits of the refractive powers of glass available for the front lenses of the improved objective are from about 1.59 to 1.61, the index being taken to be corresponding to the D line of the spectrum. Similarly the range of refractive powers for the glasses available for the back

Fig. 1.

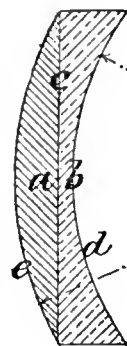
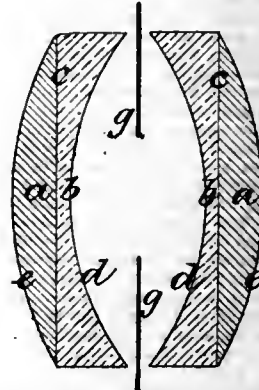


Fig. 2.



lens of the said objective ranges from about 1.50 to 1.53, the refractive index being as before that for the D line of the spectrum. It is to be understood that these figures are given as being what are considered the best with glass as now generally obtainable.

With the before-named glasses the ratio of the refractive and dispersive powers which would produce the best radii, so far as flatness of field and suitable colour correction of the image are concerned, is given by the following tables:—

TABLE No. 1.

Dispersive Ratio = $\frac{w}{v}$	Dn = Index of Refraction relating to the Convexo-plano Lens.			DN = Index of Refraction relating to the Plano-concave Lens.
	1.59	1.60	1.61	
0.916	0.904	0.891		1.53
0.903	0.890	0.877		1.52
0.889	0.876	0.864		1.51
0.875	0.863	0.851		1.50

TABLE No. 2.

Ratio of the Concentric Curves = f

Dn = 1.59.		
DN	$\frac{w}{v}$	f
1.53	0.916	1.072
1.52	0.903	1.086
1.51	0.889	1.100
1.50	0.875	1.115
Dn = 1.60.		
DN	$\frac{w}{v}$	f
1.53	0.904	1.083
1.52	0.890	1.097
1.51	0.876	1.112
1.50	0.863	1.126
Dn = 1.61.		
DN	$\frac{w}{v}$	f
1.53	0.891	1.094
1.52	0.877	1.109
1.51	0.864	1.123
1.50	0.851	1.138

Thus, for example, if the front or convexo-plano lens *a* have a refractive power of 1.61 for the line D in the spectrum and the back or plano-concavo lens *b* have a refractive power for the same line of 1.50, the ratio of the curves of the two spherical surfaces of the lenses (*e* and *d*) should be 1.138, in order that throughout the field of view the image may be plane with suitable colour correction.

Slight deviations may be made from the directions given above, as for example by slightly departing from the plane internal surfaces (*c*), or from the concentricity of the external spherical surfaces (*e* and *d*), or from the ratio of the radii or dispersive and refractive powers of the two glasses (*a* and *b*) given by the above tables without departing from this invention, but we believe that by following the rules given above the best results will be obtained with glass at present obtainable.

With the aid of these tables the requisite ratios of the dispersive power appertaining to the refractive powers of the glasses used and also the requisite ratios of the radii of the lenses may be calculated by the ordinary method of interpolation. The objectives may be used singly, as in figure 1, or combined, as in figure 2 (*g* being the diaphragm between them).

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—1. The combination of a convexo-plano lens made of glass of high refractive power and relatively low dispersive power, with a plano-concavo lens made of glass of lower refractive power and the same or higher dispersive power (the said lenses having plane or slightly curved contact surfaces and outer concentric or approximately concentric surfaces), to form an aplanatic lens or objective giving a positive image, substantially as hereinbefore described with reference to the accompanying drawings. 2. The improved lens or objective hereinbefore described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 20	North Middlesex Club	The Iron Room, Stroud Green.
" 21	North London	Myddelton Hall, Upper-st., Islington.
" 21	Bolton Club	The Studio, Chancery-lane, Bolton.
" 22	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 23	Barton-on-Trent	The Institute, Union-street.
" 23	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MAY 14.—Mr. James Glaisher, F.R.S., President, in the chair.

Mr. A. F. Hare and Mr. K. Ogawa, both of Japan, were elected members of the Society.

The PRESIDENT asked Captain Abney if he had seen a communication from Colonel Waterhouse, on orthochromatic photography, read at the previous meeting of the Society.

Captain W. de W. ANNEY replied that he had read it and seen the nice photographs accompanying it; he thought that the long time of exposure did not promise well for the anthracine blue. The alizarine blue he had tried himself, but was not prepared to stand up for it particularly. Colonel Waterhouse had stated that in one part of a photograph he had touched the line Z, and that was almost the beginning of the invisible part of the spectrum; so he did not think the process of much advantage for the photographing of the spectrum; for orthochromatic pictorial work it might do pretty well, but perhaps not better than cyanine. He thought Colonel Waterhouse's photographs to be beautifully sharp and clean; he did not know whose plates were used.

Mr. JOHN SPILLER remarked that they were Wratten & Wainwright's.

Captain ANNEY continued that photography would show certain lines of the spectrum double which could not be seen to be double by the eye, and that Professor Rowlands had admitted the fact.

Mr. JOHN SPILLER exhibited a specimen of rho-lamine, a deep red-purple dye, and said that Colonel Waterhouse had asked whether it belonged to the eosine group. He (the speaker) would hesitate to give an authoritative opinion, and after stating how it was made, he added that although it was a somewhat similar substance still he did not think it to be an eosine—in fact it was a basic colouring matter; no doubt Mr. Chapman Jones could better answer the question.

Mr. CHAPMAN JONES stated that he had no opinion to express.

Captain ANNEY said that it was dangerous to discuss patents before the Society.

Mr. T. R. DALLMEYER then read a paper upon *The Forms and Applications of Landscape Lenses*, which paper will appear in these pages in due course. In it he gave instructions to enable photographers to test their own lenses. He said that those who send out the Jena new glass tell absolutely what are the optical properties of each specimen forwarded, and on testing the glass himself he found the information furnished by them to be accurate; and some samples are marked in their catalogue as uncertain in their lasting properties. Landscape lenses including but a small angle gave the most pleasing pictures.

Mr. WILLIAM ENGLAND had always been a great advocate of single lenses; he used them whenever he could in preference to other lenses; he employed them for copying paintings and photographing statuary, as well as for landscape and other work in which it was not necessary to get straight lines near the edges of the plate. In many cases he found them to be better than portrait lenses for portrait work.

Mr. CHAPMAN JONES remarked that Mr. Dallmeyer had recommended a thermometer bulb illuminated by a lamp flame in the testing of lenses; he (the speaker) had tried that plan but preferred a candle in a spring socket, so that the flame should always be at the same level, and in front of the flame he placed a screen pierced by a small hole. The old fashioned single lenses were of much larger diameter than those of modern make, and had the advantage that the mount did not cut off the edges of the image. Was the tendency to make lenses smaller due to the demand for increased portability?

Mr. LEON WARRNEKE said that single lenses were usually not sufficiently rapid for studio use, but a friend of his in St. Petersburg had obviated this by turning the whole lens round, and had then obtained good portraits. What did Mr. Dallmeyer think of the plan?

Mr. GEORGE DAVISON thought it to be well to have the power of introducing at will a certain amount of diffusion of focus, and Mr. Lyonel Clark, by using, with a diaphragm of $f/4$, a large single lens of about six inches diameter, he thought, had produced some exceedingly pleasing large heads, better, he thought, than were obtainable with an ordinary portrait combination.

Mr. T. SEBASTIAN DAVIS thought that artists preferred to paint views which did not include a greater angle than sixty degrees.

Mr. FRIESE GREENE had found that portraits taken by the electric light were more out of focus with the same apparatus than portraits taken by daylight. Could Mr. Dallmeyer explain the matter?

Mr. W. E. DEBENHAM questioned whether Mr. Dallmeyer had demonstrated the advantages of spherical aberration, as he claimed to have done.

Mr. DALLMEYER agreed with Mr. Chapman that each lens should be of such dimensions as to give the best results; they were made smaller at the expense of equality of illumination. He had not seen the lens mentioned by Mr. Warnerke, he did not know what its correction for spherical aberration might be, so could not give an explanation.

Mr. DEBENHAM said that with the lens employed as stated, only the central pencils could be used.

Mr. DALLMEYER continued that Mr. Clark's lens would include so few degrees that, although he might get nice heads, he could not get good full-length figures. In answer to Mr. Friese Greene he did not know that there was any difference between solar light and the electric light to produce such an effect as had been stated; the electric light was simply a little richer in ultra-violet rays than solar light.

The PRESIDENT announced that the *conversazione* of the Society will be held on September 28 next, and that the exhibition will open on September 30.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 9.—Mr. C. H. Cooke in the chair.

Mr. G. W. ATKINS exhibited an 8 x 5 Ross' rapid symmetrical lens mounted inside the camera in such a way that the stops could be changed at will from the outside at any moment; he explained the nature of the mechanism by which this was done. One long diaphragm was used with apertures in it of different diameters. With the lens inside the camera, he said, there is no danger of light getting in through the diaphragm slot.

Mr. T. KERR exhibited a new quarter-plate detective camera which, with three backs unchanged with plates, weighed four and three-quarter pounds.

Mr. A. HADDON believed that there was one fault common to all the present detective cameras, namely, that they had no screen to partially protect the finder from extraneous light; he thought that some little opera-hat arrangement might be made for the purpose which would shut down flat on the camera when not in use.

The CHAIRMAN had never felt anything of the kind to be necessary with a detective camera.

The HON. SECRETARY asked if any member present had taken up hydroquinone as a developer and afterwards stuck to it.

Mr. J. J. BRIGINSHAW replied that he had done so.

Mr. H. D. ATKINSON had been steadily using it for the last five months.

Mr. POLLARD GRAHAM said that the effect of developing successively a number of plates in the hydroquinone developer was that the liquid took up more and more bromide until the last plate inserted behaved as if under exposure.

A question in the box asked who was the first to use coloured screens in connexion with photography.

Mr. W. H. HARRISON believed Mr. William Crookes to have been about the first; at all events, about thirty years ago Mr. Crookes interposed a solution of sulphate of quinine to obtain more true colour rendering. Although sulphate of quinine is colourless it cuts off some of the more refrangible rays which act on bromide of silver.

Mr. T. E. FRESHWATER could not get such sharp results on bromide paper as upon ordinary albumenised paper.

The HON. SECRETARY said that he should either roll the bromide paper well before printing or buy a bromide paper with a more highly glazed surface.

Mr. KERR remarked that printing with nearly parallel rays at the bottom of a box would give more sharpness.

Mr. P. EVERETT called attention to a statement in a journal that acetate of soda could be used in developers in place of a carbonate or a fixed alkali.

Mr. HADDON did not believe it.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MAY 7.—Mr. J. Traill Taylor (President) in the chair.

Messrs. C. M. Riches and B. Foulkes Winks were elected members of the Society.

The Hon. Secretary showed negatives on the Beernaert plates.

Mr. E. Clifton showed a photograph of the Eiffel Tower taken with a hand camera.

Rev. E. Healy showed a 10 x 8 negative taken with an eleven-inch focus lens. Mr. W. T. Coventon showed a stereoscopic camera constructed to rotate round any centre desired.

The PRESIDENT stated that this method was devised by Mr. Latimer Clarke in 1854.

Mr. H. M. SMITH then gave a demonstration on *The Carbon Process*.

The CHAIRMAN stated that whatever might be said of the want of permanence of other processes, the carbon print is absolutely permanent. The pigment in which the image is embedded finally becomes vellum, and any coloured pigment may be employed.

A unanimous vote of thanks was passed to Mr. Smith for his demonstration. Mr. F. W. Hart passed round prints of a light blue ornament on a cream ground, to show the advantages of using Edwards's isochromatic plates; they were taken with his flash lamp.

Mr. F. W. Few showed some plates covered with spots in the film, also some plates fogged by a minute hole in the flexible band in an instantaneous shutter.

The next meeting will be on Tuesday, May 21.

HOLBORN CAMERA CLUB.

MAY 3.—Mr. RICE (President) in the chair.

Mr. E. J. WALL delivered a lecture on *Isochromatic Plates*. He sketched out a short history of what had been attempted and the failures that had been made before isochromatic plates were produced, and then explained that this kind of plate was peculiarly sensitive to yellow, and handed round diagrams showing the colours of the spectrum and the colours in the spectrum most

favourable to be photographed with these isochromatic plates, which colours were yellow, green, orange, and blue; whereas in a photograph where an ordinary plate was used blue would come out nearly white, and light and dark yellow would be difficult to detect; on the other hand, with an isochromatic plate, light blue came out easily distinguishable from white, and the various shades of yellow were also clearly defined in their various shades. In a portrait of a sister having sandy hair taken on an ordinary plate the ruddy yellow of the features and hair comes out nearly black, but with an isochromatic plate the face and hair came out just like that of a fair person. Another illustration which showed the usefulness of these plates was an oleograph of a seascape just before sunset. There were three photographs of this—one with an ordinary plate from which it was very hard to discover the difference between yellow and black of the print; the second taken with an isochromatic plate, which gave a very much better result; and the third with an isochromatic plate, there being at the time of exposure a screen of pale yellow glass before the lens; this latter gave a very successful and artistic picture. As regards screens, Mr. Wall explained that they should be made of optically worked glass. They were nearly indispensable when photographing a blue distance and in getting good clouds that were of different shades of blue. He also stated that one of those screens enabled him to get objects clearer when there was a sort of yellow mist in the atmosphere, when such a state of things would be very detrimental to a photographer using an ordinary plate. Mr. Wall recommended long exposures, and showed a photograph of a snow scene—snow-covered road, and houses, and trees—taken without the screen, which was very good. He exposed it, with an aperture of $f/20$, about ten seconds on a medium isochromatic plate. In summer it would require about half a second with the same stop. The screen increases the exposure about three times, according to the various depths of tint; some increase the exposure to about ten times. The screen is to deepen the effect of the yellow and bring out some of the blue. These plates can be developed with almost any developer. He uses pyro, and glycerine, and ammonia himself. Must only be exposed to a ruby light, the darker the better. The plates will keep just as well as other plates. The quicker the plate the greater the sensitiveness to white light and to blue. Recommends the slow plates (if possible) if one wants to get the isochromatic effects. Hydroquinone acted very well on these plates, pyro comes next, and ferrous oxalate last. Isochromatic plates would give excellent results for cloud work.

MAY 10.—A general discussion took place, after which Mr. Fred Brocas developed an opal plate with hydroquinone.

The following were elected members of the Club:—Messrs. W. Ivanhoe Thomas, Thomas Whiting, S. Tingfau Chang, and G. W. Carter.

Mr. F. W. Thomas will give a lecture and demonstration on Friday next in the Club Room, at eight p.m., on *Platinotype*. On the 18th instant the Club will visit Waltham Cross.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

MAY 10.—Mr. D. Rintoul in the chair.

Mr. TOLLETT read a paper on *Working of Bromide Papers for Contact Printing*. He then exposed two pieces of Ilford bromide paper for forty-five seconds at a distance of one foot from an ordinary Bunsen's burner, then developing it in the maker's formula of ferrous oxalate solution. Result good. He next exposed two of Eastman's to the same light for thirty seconds and developed in the same solution as last, with excellent results. Fry's bromide paper was then exposed, one piece thick and the other thin, both making fair results, exposing for fifteen seconds at a distance of twenty-four inches, developed in hydroquinone developer.

There being no time for a discussion, it was adjourned till next Friday evening at half-past eight, when Mr. Tollett, if possible, will bring more specimens of these papers.

The SECRETARY announced the coming outing to Chingford on the 18th instant. Outside Liverpool-street Station, under the clock, at ten minutes to three. Amateurs invited.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

THE meeting of this Society on the 30th ultimo was devoted to an exhibition of lantern slides, and about two hundred slides, the work of the members, were passed through the lantern. The majority of the pictures were of good quality and elicited numerous questions as to method of production, &c. A curiosity in the shape of a cloud picture including the sun perfectly distinct was particularly interesting, and there were some good examples of hand camera work.

THE Society also met on the 7th instant, when Mr. W. THOMAS read a paper on *The Coast of Yorkshire*. This paper, which was illustrated by lantern slides, was interesting, and Mr. Thomas, thoroughly master of his subject, was able to give practical information valuable to intending visitors to this district.

The next meeting, on the 21st, will be a special general meeting for the consideration of the proposed alterations of the rules of the Society.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

MAY 9.—The President (Mr. Paul Lange) in the chair.

Messrs. A. Grillon, Morris, C. Wall, and H. Bebbington were elected as members.

THE PRESIDENT gave an account of the first outdoor excursion to Chester, which took place on Saturday, the 4th instant, twenty-eight members turning out. Through the kindness of Mr. J. Collinge, his steam launch and barge were placed at the disposal of the party, which conveyed them up and down the River Dee. After lunch the party traversed to Eaton Hall, the seat of the Duke of Westminster, where permission to photograph had been granted, the total number of exposures for the day being two hundred and nine.

Mr. Archer exhibited a German hand camera which seemed very ingenious in its construction.

The PRESIDENT then gave a practical demonstration on *Developing Platinum*

Prints with the Hot and Cold Bath Processes. On proceeding to develop, Mr. Lange passed several prints round: No. 1, which he explained was under printed; No. 2, correctly printed; and No. 3, over printed. No. 1, being under printed, was then developed in a bath about 130°, No. 2 was developed in the same bath cooled down to about 100°, and No. 3 when the bath had cooled down to about 90°. On examination of the prints after clearing, &c., Nos. 1 and 2 were excellent in tone, &c., but No. 3 rather dark and hazy. Mr. Lange, replying to a question, stated that a much better result of No. 3 could have been got with a cooler bath. The second lot of prints from the same negative, and printed as above, Nos. 1, 2, and 3, were then developed with the cold bath process, Nos. 1 and 2 coming out very good, but No. 3 only fair, the tone being a very dark brown.

After an interesting discussion on the tones, manipulation of the bath, &c., the majority of members seemed greatly in favour of the hot bath process, the opinion shared by Mr. Lange as well.

A lantern exhibition of slides by the members terminated the proceedings.

LEWES PHOTOGRAPHIC SOCIETY.

MAY 7.—The President in the chair.

The HON. SECRETARY called the attention of members to the list of rules and classes for the exhibition to be held in October next, in which several classes will be open to photographers resident in Sussex.

The PRESIDENT read a paper on *Enlarging*. A bromide print was exposed during the reading of the paper and afterwards developed with a solution of hydroquinone. A collection of enlargements were exhibited by the President.

Mr. Corder promised a demonstration of *The Platinotype Process* for the next meeting, to be held on June 4.

DARLINGTON PHOTOGRAPHIC SOCIETY.

MAY 13.—Mr. G. Newby Watson presided.

A discussion on *Photographic Resorts* was opened by the Secretary, Mr. W. GARRITTE-BREWIS, in which several members took part. A large number of photographs illustrating the places visited were shown, and lent much interest to the meeting.

The judging of the prints sent in for the monthly competition was then proceeded with. Those sent in by Mr. E. B. Mounsey were found to be the best.

The next meeting will be held on June 17, when the subject of *Instantaneous Shutters and Shutter Work* will be brought forward.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

MAY 2.—Several excellent specimen prints from Mr. Valentine Blanchard, by his platinum toning process, were exhibited, as also several by the SECRETARY, who stated that he had found the working of the process simple, and had no difficulty in getting tones quite equal to those of Mr. Blanchard's examples.

In concluding a discussion on *Hydroquinone*, Mr. JOHN ROBERTSON said that he had used it in his studio exclusively for five or six years, but had been obliged to abandon its use owing to the effect it had on his hands, similar to that of bichromate poisoning. On recovering he had tried the developer again, to prove if it were at fault; in a few days the old symptoms returned—first intense itch in the back of the hands, followed by the skin cracking and ulcers. The most efficacious cure was an old-fashioned one of a sugar and soap poultice.

The following were elected office-bearers for the ensuing session:—*President*: Dr. J. K. Tulloch.—*Vice-Presidents*: Messrs. John Matthewson and J. D. Cox.—*Council*: Messrs. W. Baxter, J. C. Cox, W. F. Hill, D. Ireland, G. G. McLaren, L. Ower, J. Robertson, W. Salmond, A. Stewart, and W. D. Valentine.—*Secretary and Treasurer*: Mr. V. C. Baird, Broughty Ferry.

Correspondence.

✉ Correspondents should never write on both sides of the paper.

ELECTRIC VERSUS DAYLIGHT FOR ENLARGING.

To the Editor.

SIR,—Will you kindly allow me to correct a slight error which appears in your last issue? In the report of the discussion following the paper of Dr. Harrison Low and Mr. Hodges, at the meeting of the West London Photographic Society, I am reported to have said that the Eastman Dry Plate and Film Company, after going "to great expense in fitting up the electric light, had abandoned it, and were now using daylight." Evidently the reporter misunderstood me. Although I prefer daylight myself, I was fully aware that the Eastman Company use the electric light exclusively, not only here, but at their American establishment, where daylight is as far more plentiful and constant than it is in this country. They find that by the aid of the arc light they get better and more uniform results than by daylight.—I am, yours, &c.,

22, Goldsmith-road, Acton, W.

E. W. FOXLEE.

FLASH LAMPS.

To the Editor.

SIR,—If I understand the recent correspondence on flash lamps, Mr. Hart claims an exclusive right to the use of several magnesium flashes fed by an air supply from one pneumatic ball.

It may be within the memory of the Editor of this JOURNAL that he described the blow-through flash at a meeting of the London and Provincial Photographic Association early in 1888—by the reports I see that

it was on January 5. After describing the lamp, Mr. Taylor mentioned that several lamps could be used to distribute the illumination. It then occurred to me, as it would probably to most people, that the proper method to use a series of lamps would be to have them fed from a single supply, so that the ignition should be simultaneous. Such an obvious arrangement certainly ought not to be, and would not be under a just and well-considered patent law, the subject for a patent, so that whoever happened to be the first to rush off to secure for himself a monopoly should be legally entitled to prevent others from using a plan which would surely occur to them in the course of practice. Whether such an obvious contrivance can be legally secured by patent it is not necessary to inquire just now, but it occurred to me on the evening in question that it was one of those things that some one might rush off to the Patent Office and secure to himself and debar others from using, and with this idea in mind, and to prevent its being carried into effect, I suggested that evening that when several lamps were used they should be fed from one air ball. Four days after that meeting is, I believe, the date of Mr. Hart's application for patent.

As an illustration of how surely such obvious ideas as that of connecting several lamps with one pressure ball must occur to many, there is a letter in your issue of January 13, 1888, from Mr. Hugh Reid, in which he speaks of using this contrivance. As this letter, however, only appeared a few days subsequent to Mr. Hart's application for patent, it would not suffice to vitiate it—supposing, that is, that at present such obvious contrivances can be secured; but it is otherwise with the public mention of the earlier date that I have referred to, and I think photographers need not fear the threats of being put to heavy law expenses in which Mr. Hart indulges. — I am, yours, &c., W. E. DEBENHAM.

To the Editor.

SIR,—In looking through the letters that have appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY on the above subject, passing between Mr. F. W. Hart and Mr. W. England, I find one of the claims made by Mr. Hart is the attaching of several lamps by means of rubber tubing to one common centre, from which centre the whole of the lamps can be simultaneously ignited. Unless Mr. Hart's patent dates anterior to November, 1887, I claim to have fired several flash lamps at that date from one centre, using a Fletcher foot bellows as the air chamber, and to have given public demonstration of the same at the Liverpool Photographic Exhibition in March, 1888, using four flash lamps, lighted simultaneously from the one centre, and connected by various lengths of rubber tubing, the two outside lamps being twenty-six feet apart, the air being supplied by the Fletcher bellows.—I am, yours, &c.,

25, Williamson-street, Liverpool, May 13, 1889. RICHARD CROWE.

RE PSYCHIC PHOTOGRAPHY.

To the Editor.

SIR,—Miss Power should, I venture to think, have answered my notes before, that they might have been more conveniently read side by side with her own letter. I wrote exactly, truthfully, and somewhat fully of what transpired at our interview, and as Miss Power cannot say the report was unfair or untrue it seems strange she should consider it ridiculous or repulsive. She mentions two mis-statements, as she terms them; one that Mrs. E. gave her the spirit photographer's address. If she reads my letter she will find herself in error, as I there say distinctly she "received a communication from the spirits"—Mrs. E. being the medium, and that is decidedly what Miss P. told me. Again, I never said that "phenomena" were never obtained except when the artist was present. She will, on referring, again find herself in error; I said the spirit forms were never recognisable except when he, the artist, was present. What Miss Power terms "phenomena" are in some cases dots or patches entirely devoid of semblance to any human being.

The lady says she accepted Dr. Norris as the Editor's deputy. The Doctor is himself a spiritualist, and has been physician to Miss Power's family for years, but I believe there are other and ample reasons why he will not act, and it was to give the lady an opportunity of demonstrating that I came forward; the failure has been totally hers, not mine.

The age does require proof, as sagely reasoned by Miss Power, and the statement she made to me that she had seen "lumps of coal passed through a table-cloth without leaving a hole," and had "had letters brought from one room to another, though all doors and windows were securely closed, and had even felt the spirit hands that brought them," I look upon as statements only, but they illustrate the receptive power of the lady's mind.

Finally, Miss Power apparently objects to be looked upon as a "victim." May I ask in what other light she would desire to be looked upon? —I am, yours, &c., EDWIN C. MIDDLETON.

ART AND PHOTOGRAPHY.

To the Editor.

SIR,—Your critic on the Glasgow Amateur Photographic Exhibition kindly notices my pictures in flattering terms; but in reference to one of them, titled *On a Tree Top*, says, "This is a picture of two ladies evidently balancing themselves on a bough, and Mr. Clark has fallen into an error of turning the eyes in the opposite direction to the

head." It would be more correct to say in a side direction. However, I wish to point out that this is no error, but is the very thing that gives character to the picture. I am well aware of the conventional rule that one finds in many so-called photographic manuals for guiding amateurs and others how to pose their models to have the eyes in the same direction as the head. It shows, however, that an artist should not be guided always by such a conventional rule, but rather by that artistic instinct that makes him feel the best position is the most natural, and that if he goes by the conventional rule, he will get nothing but that wearying repetition of position that renders so many portraits quite commonplace. It should be the effort of the artist to avoid this.

It is no error to do as I have done; on the contrary, it is quite a usual practice with the greatest painters of ancient and modern times, as will be found by looking at the works of Rembrandt, Van Eyck, Frank Hals, Greuze, Millais, and many others. I have at hand a splendid work on *Flemish and French Pictures* by the great critic, F. G. Stephens, and I find, out of the seven portraits illustrated by such artists as Carolus Duran, Van Eyck, Frank Hals, Rembrandt, Wattenau, and Greuze, no less than five of these portraits happen to look in a different direction from the head, and that two only look in the same direction.

I would not have troubled you with a personal reference to my work, were it not that, as a very humble amateur, I have taken to photography as a pastime, willing to learn and eager to improve; but my love of art, and the study of it, began long before I had taken my first negative, and I find that it is the artistic side of photography that requires, and is receiving in the present, more attention than it has in the past, and it should be the aim of all photographers to increase their knowledge of the principles of fine art.

At present most of the manuals that have been issued by photographers dealing with this side of the question of picture making have laid down rules which only seem to lead astray, and it must be admitted that studying the great masters is better than blindly falling into the pitfalls that cast-iron rules offer to the unwary. You were good enough to reprint in your last *Year-book* a paper which I read before the Glasgow Amateur Association, in which I endeavoured to show how "Composition" can be applied to photography, but although I then attempted to lay down some rules for the guidance of amateurs, there is no one who is more conscious of their insufficiency than I am, and no one who would wish to direct the photographer more to a study of the principles upon which the great masters composed their pictures by studying their great masterpieces, and endeavouring to analyse the motives of their work by seeing the originals. Apologising for trespassing so far on your space— I am, yours, &c., DAVID R. CLARK, M.A.

Clairmont, Pollokshields, May 10, 1889.

"SWEATING."

To the Editor.

SIR,—As one holding the position of branch manager in the leading firm of photographers producing photographs at popular prices, and who has, among others, been made the object of a scurrilous and inaccurate attack by "Fair Play," in his letter appearing in your issue of April 12, and consequently being in a position to speak with authority from a knowledge of the working of that firm, I beg being permitted through the columns of your JOURNAL to reply to the statements contained in "Fair Play's" letter, and to thereby dispel from the minds of those likely to entertain such ideas consequent upon the perusal of that person's letter that any such malpractices as that of sweating exists in the firm to which I have the good fortune to belong, and which has been so pointedly alluded to by "Fair Play" when he states that the principal firms of sweaters have their studios not a hundred miles from Regent street.

The one thing which must strike the most unobservant reader of "Fair Play's" letter is that from beginning to end it bears upon it the impress of spleen and rage fostered and brought about by an inability to compete with those he so courageously attacks (and that, too, under the regia of a *nom de plume*), either in professional skill or business ability.

His statement that the assistants of such firms are provincials (thereby meaning that they, the provincials, are fools and incompetent), and are galled into an acceptance of service, is, to say the least, astounding; having in mind the fact, as every one possessed of common sense must, that before proceeding to the acceptance of employment they would first make sure of the amount of salary and the permanency or otherwise of the situation in view.

"Who would employ them after being in the employ of such firms?" asks "Fair Play." To that I make answer, No good man need ever fear being out of employment. "Fair Play" also gives it that the principal firms stigmatised by him as sweaters are capitalists, thereby inferring that they can produce photographs at a far less price than can be done by private photographers. Just so, and such being the case might I ask, Where is the necessity for sweating by these firms?

Now, touching the accusation that the *employés* of those firms coming under the ban of "Fair Play's" wrath are paid starvation wages, and made work long hours, may I inform "Fair Play" that in one firm at least, and that the most important, that far from such being the case we are, on the contrary, better paid, and have a less number of working

hours than a great many houses I wot of, styling themselves first class, impose upon their assistants.

I do not speak from hearsay when I make this assertion, for I have had the honour of being employed as first assistant in two of the leading firms of photographers, and am considered not only competent in my work, but a specialist in two branches of our profession, and feel it no degradation, but, on the contrary, an honour, to be an *employé* in a firm, who, by good and skilful workmanship, combined with business acumen, brings to their knees such as "Fair Play."

Now the motive for "Fair Play's" attack must be apparent to all, but the means which he brings to his aid in his endeavour to crush his more successful rivals merits the severest form of punishment, both at the hands of the law and his fellow-photographers.

When it is borne in mind that the public is at the present moment agitated by the disclosures made before the Royal Commission appointed by the Government to investigate the nefarious system of sweating, and that that public would visit with the gravest displeasure and a withdrawal of their support any firm, photographic or otherwise, working their *employés* under such a system, one cannot help feeling for such a person contempt and loathing, and a sorrow that our profession should have among its numbers one capable of such conduct as that of endeavouring by such means to bring into odium and disrepute those whom otherwise than by a cowardly and treacherous attack from behind the protection of a *nom de plume* he is incapable of injuring.

I am bound to say, in conclusion, that a finer adept in the art of calumny than "Fair Play" it has never been my misfortune to come across, and would therefore strongly advise his studying and taking to heart those lines commencing with, "He that steals my purse steals trash," and ending with, "But leaves me poor indeed."—I am, yours, &c.,

JUSTICE.

London, May 14, 1889.

[On Free-trade principles a firm or an individual has a perfect legal right to charge as low a price for their productions as they choose, and this altogether irrespective of its influence upon others of the craft or profession. We are in entire ignorance of what firm or firms "Fair Play" may have had in view when he wrote, but as regards the "sweating" element, it cannot evidently have been that of which our present correspondent is manager.—ED.]

PHOTOGRAPHY AND CUSTOM-HOUSE AUTHORITIES ABROAD.

To the Editor.

SIR,—In your issue of the 19th of last month, I was most pleased to read the letter from Mr. A. Levy on the subject of the Custom Houses on the Continent respecting photographic plates.

Although only an amateur (fresh to the work compared with others) I have had a good many dozen plates through the Customs, both in Belgium and Germany, but have had no experience in France, as I am sorry to say I have as yet had no chance of doing work there. But in the first two named I have had no trouble whatever. In Germany they are a little more inquiring than in Belgium, but a little explanation sets matters all right, even with the most unreasonable official, when you are careful about the way you go about it.

You will find your trouble in Belgium *nil*. A few months ago I had about eight dozen Ilford plates sent over; the box they were in was never touched and there were no inquiries made, so the box was forwarded straight to my lodgings without being opened.

Rather than have anything to say against the Custom Houses on the Continent, I shall always stand up for them. I may say I, for one, have found them most obliging and well-disposed to the unfortunate English amateur. Hoping that this cry of avoiding one country more than another on account of the Customs will soon die out and be a thing of the past—I am, yours, &c.,

EDWARD E. LAWSON.

32, Rue de l'Olivier, Antwerp, May 15, 1889.

IN RE "JUNIUS."

To the Editor.

SIR,—With the view of demonstrating in a practical manner the kind of glass I propose for the sensitive film, I send you by parcel post a 7½ x 5 glass plate; one side marked "x" is the side I propose to coat with the emulsion—it is technically called "smoothed" by glass makers. The other side is fine ground for the back to be worked upon (if necessary); this should remove any "ambiguity."—I am, yours, &c.,

Waverley, Alexandra Road, Birkenhead,

JAS. ALEX. FORREST.

May 13, 1889.

[Glass of this nature will certainly answer well the purpose indicated.—ED.]

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday next, May 23, Mr. Valentine Blanchard will give a demonstration of his new platinum toning process.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, May 22, 1889, will be on *The Keeping Qualities of Photographic Chemicals and Bromide Plates*.

Exchange Column.

Exchange 12x10 double extension camera for 15x12 triplet Ross or Dallmeyer.—Address, CARNELL, Photographer, Nottingham.

Will give lantern slides of Irish scenery and a half-plate ash folding tripod in exchange for dry plates, half-plate size.—Address, EDWARD J. HUGHES, Graigue, co. Kilkenny.

Wanted, half-plate camera, portable; exchange, elegant pair of hand-painted plaques or other valuable works of art. Approval.—Address, LEWIS MILTON, 12, Paul-street, Warrington.

I will exchange a quantity of medallion rims, glasses, and backs, complete, for quarter-plate camera and lens.—Address, PHOTO, 3, Springfield-villas, Palace-road, Bowes-park, London, N.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED:—

J. A. Kay, Bolton.—Three photographs of Rev. H. Enfield Dawson.

D. B.—There is no difference between the permanence of ferrotypies and glass positives. The constitution of the image is alike in both.

GEO. FALL.—Three inches is too short for the focus of a detective quarter-plate camera. Much better to have it nearer to twice this focus.

HOSPITAL.—The camera marked No. 2 on your list is to be preferred on account of its great extension. The lens No. 1, by same makers, will suit it admirably even when used with only one of its components for distant views.

SYMMETRICAL.—The picture would be very good were it not for the clouds. These are printed far too deeply, and, moreover, they are not suited to the subject. The lights on the clouds are diametrically opposite to that falling on the landscape.

S. J. W.—To avoid the cold tones in enlargements you must give a *very* full exposure, and employ a very much diluted developer containing but a small proportion of iron, and that well restrained with bromide. Of course, under these conditions the development will be more protracted than usual.

VINIE.—The delay of a week arises solely from your own negligence of the announcement regularly printed at the head of this column. If A has a copyright in the portrait, and B copies and sells it, A can most undoubtedly enter an action against B, even although the copy he purchased was not marked as being copyright.

J. R. WILSON.—Make a deal camera of the very simplest form, and after you find it to work well enclose it in a case of a suitable form. It is absolutely impossible for us to give you detailed directions, as the element of personal ingenuity must be brought largely into requisition. But if you submit your plans to us we may then be able to advise.

"BUTON."—Your prints must be made from very thin negatives, and contain but little gold when toned if they will not stand treatment with warm water. When the size is removed from the paper they have little tendency to float on the surface of the water, but this should not injure the print. Iodide of starch is the most delicate test for hyposulphite.

A. THOMAS writes as follows: "I find in mounting prints on glass with gelatine that the spotting comes off in the warm solution. I have tried using plenty of gum with the colour, and, at the suggestion of a friend, tried mixing the colour with albumen, but still it comes off. Is there any means of preventing this?"—The best plan is to spot the pictures which have to be mounted in optical contact with glass with oil colour. The tube colours simply thinned with spirit of turpentine answer every purpose.

F. COOP writes as follows: "I purpose taking a cruise along the western coast of Norway up to the North Cape in July; I shall take my tripod camera and a touch detective. I should esteem it a great favour if you or any of the readers of your valuable paper would furnish me in an early issue with any hints as to exposure, objects to photograph, or any information of use on such a trip."—Perhaps some reader who is familiar with this part of the world will kindly favour our correspondent with his experience.

W. T. HAMMOND writes: "While printing off some negatives a few days since I had the misfortune to get some wet with rain, and the result is bad silver staining on the bottom of one of them. Will you kindly inform me the best method of endeavouring to get rid of this stain, as it is a negative I value? I have looked through the JOURNAL for about twelve months back, but have not dropped on the remedy, though I remember reading something about it. Your reply in next issue would much oblige."—If the stain is chiefly on the surface, gentle friction with alcohol, rubbed on with the finger, will sometimes remove the stains entirely.

F. STANLEY DOBSON (Melbourne).—There is no question that in taking interiors very much better results accrue if the plates are backed; also, that in many outdoor pictures their quality would be greatly enhanced if the plates were similarly treated. But we very much question if plate manufacturers can be induced to send out their plates ready backed, even at an enhanced price. They look at the matter from a commercial point of view, and several we have approached on the subject declare that it would involve so much extra trouble that it would not prove remunerative. The only way we can see at present is to treat the plates yourself, although it involves some extra trouble. But for this the improved results obtained will amply repay, particularly in taking interiors, or when the plates are thinly coated with bromide.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1516. VOL. XXXVI.—MAY 24, 1889.

IRREGULAR DEVELOPMENT WITH HYDROQUINONE.

SOME little time back Mr. Lyonel Clark called attention to a peculiar irregularity in the action of hydroquinone in development, and the same subject was commented upon by our correspondent "Junius." The particular kind of irregularity noticed by these two observers seemed to lie in a tendency on the part of the developer to commence its action at the edges and to gradually extend to the centre of the film; and, if we remember rightly, the phenomena in both cases were confined to paper proofs.

Since the publication of the comments alluded to, we have ourselves noticed an apparently quite distinct kind of irregular action, and in our case, too, it seems to affect paper, or rather films spread upon paper; if not solely, at least in a far more marked degree than we have ever noticed with emulsion upon glass. The form of irregularity is so marked that we have been induced to study it somewhat carefully, and though we have not yet been able to arrive at any definite decision, we are of opinion that further investigation may most probably lead to the establishment of some important facts with regard to hydroquinone as a developer; and with a view of enlisting the aid of some of our experimentally inclined readers, we propose to describe the case, and briefly state the opinions we have so far formed thereon.

In the first place we may state, as having a somewhat important bearing upon the case, that the paper with which we have chiefly or in its most intensified form noticed this peculiarity is that known as "Alpha," which, as most of our readers are aware, differs most materially in its character and behaviour from the general run of "gelatino-bromide" papers, containing as it does at least a large proportion of chloride. We mention this simply as tending to support the hypothesis we have formed. We may also say that the particular paper we have used is not new, nor have we any reason to suppose it is very old, but, at any rate, the irregularity is of so definite a character that we can under no circumstances attribute it to partial decomposition or deterioration of the film.

Upon submitting a piece of exposed paper to the action of the developer, which may consist of hydroquinone, with either of the carbonates or hydrates of sodium or potassium, and *without* bromide, the picture will appear gradually and progress steadily, and with moderate rapidity, until the best effect producible, without restraining bromide, has been obtained, and very probably no abnormal appearance will be presented. But if the same solution be applied to a second proof to which the same exposure has been given, the development will, in the first place, be much slower both in starting and in progress; then, when a certain stage is reached, and before full strength

has been attained, or in case of a short exposure before the details have been got out, the deepest shadows of the picture—the hair, the folds of drapery, and the shades of the face—will commence to exhibit a peculiar patchiness, and, as development proceeds, this becomes more and more intense, and gradually spreads until, if continued long enough, it extends to the whole image, even to the lightest details.

If pushed to the utmost extent, as described, the image after fixation will exhibit an abnormal density far in excess of anything suitable for a positive, but if the development be arrested at an earlier stage, and the proof fixed, it will exhibit the appearance of bearing two distinct images of a totally different character. The half tones and lighter portions which have not reached the patchy stage will partake of the ordinary character of the image produced upon "Alpha" paper, while the darker parts will be found to possess an intensity and blackness rather suggestive of a heavily salted and over-developed negative paper.

It will be observed that a freshly mixed developer without bromide exhibits little or no tendency to this peculiarity, but that after the solution has been once used, and consequently derived a certain quantity of bromide from the developed print, the irregularity or double image makes its appearance, and each successive employment of the same solution produces it in a more marked form. If bromide be added to the fresh developer, the first application produces the effect, so that we see the bromide in some manner exercises a direct and powerful action in the matter.

After many experiments and some careful thought, we have arrived at the following conclusions, which we put forward merely as an hypothesis by which the phenomena may be explained. It may be taken as an almost undoubted fact that the "Alpha" film contains a compound silver salt; that is, that it is not composed of pure chloride of silver. Assuming this to be the case, it is easy to believe that hydroquinone possesses widely different developing powers upon the different salts, and also that free bromide exhibits a disproportionate modifying action, and that consequently two distinct images are developed, each having for its basis one of the elements of the compound.

To illustrate more clearly what we mean, we will suppose a film composed mainly of silver chloride with a small trace of silver iodide, which we take as presenting the greatest probable chance of different action. We are not, of course, confined to that combination, nor, indeed, to any compound of the haloids, as several of the insoluble silver salts—such as citrate, tartrate, oxalate, carbonate, phosphate, and a host of others—may be included in the list of possible variations. For our purpose, however, we will take a chloro-iodide film.

Chloride of silver, as is well known, is more easily reduced

by our known developers than either bromide or iodide; indeed, it was for some time considered practically impossible to develop an image by means of alkaline pyro upon plain chloride of silver. Hydroquinone, however, amongst more modern developers, has been found capable of use with silver chloride, so that we may imagine the first delicate image that is produced to result from the action of the developer upon the chloride portion of the sensitive film. But as its action is continued, the iodide or other element comes within its power, and is reduced to form an image of so totally different a character, that it entirely overpowers the more delicate one that preceded it.

With regard to the action of the bromide in the matter, we may assume that its restraining action is proportionately greater for silver chloride than for the iodide or other salt, and that, therefore, in its absence, or when present in only small quantity, the chloride image is developed to full strength before the second image commences to appear; but that when the restraining action comes into force, it acts so powerfully upon the chloride that the second image is able to overtake and overpower it.

We put this forward merely as a feasible explanation of a most curious phenomenon, and shall be glad if any of our readers who may have noticed the action will offer further suggestions. Meanwhile, we may point out that if hydroquinone really does possess so distinctly a discriminating action with the different salts of silver, an entirely new power is placed in the hands of the plate maker, who will thus be enabled to vary the character of his films for special purposes to a far greater extent than hitherto.

The question is certainly worthy of further investigation, and we hope before long to be able to say more upon it.

THE UTILITY AND APPLICATION OF COMBINATION NEGATIVES.

In two previous articles we have shown different methods by which two or more negatives may be made into one. In those articles, although it was not attempted to describe all the plans by which the same end might be accomplished, sufficient was indicated by which any one of average ingenuity might accomplish almost anything that occasion may require in the way of combination negatives, no matter what may be the subject.

In the former articles we treated only the combining of negatives, so as to include laterally a larger amount of subject than could be got in a single negative, such as in making a panorama. But it is manifest that what can be done horizontally can also be done vertically, or in addition to what is done horizontally. For example, four negatives may be combined—two vertically and two laterally. It may be urged that a picture produced under these conditions will not be correct in perspective. Granted. But if the thing be not carried too far—made to embrace an abnormally wide angle—the error will be so trivial as to pass quite unnoticed.

It often happens that a landscape has to be taken in which there are, say, some distant mountains with the sun shining upon them, while there is a very dark foreground which must be included. Now, if the exposure be timed for the brightly illumined distance, the dark foreground will be under exposed. If, on the other hand, it be made for the foreground, then the distance will be overdone. Much, it is true, may be accomplished in the way of judicious local development, but there are, at times, circumstances under which this treatment will not

produce all that is desirable. If, however, two negatives be taken, exposing one for the middle and extreme distance, and the other for the immediate foreground, then, by taking the best portions of each and combining them into one picture, a successful result may be obtained.

Some may possibly be inclined to argue that this is not a legitimate proceeding, and that, moreover, the resulting picture would not be a harmonious one. To the first point we reply "not proven," inasmuch as the aim of the artist is to get the best possible result, and therefore the end justifies the means whatever they may be. As to the second point, this will all depend upon the judgment of the operator. Here is a power at command for use in extreme cases, but, as a matter of course, it must be applied with discretion. If the foreground were made as light as the distance, for example, it goes without saying, the result would be simply ridiculous.

Here is another example of how combined negatives may prove advantageous. In taking interiors it often happens that one portion of the building is much better lighted than another, and what would be the proper exposure?—that for one part might be either too much or too little for another. But by a combination of two negatives the trouble may be overcome. How very much better would many photographs of interiors be if some of the windows—which, as a rule, are always more or less overdone, or show a considerable amount of halation—were taken on a separate negative with the right exposure for them, and then substituted for those in the first! In such cases the junctions are not at all difficult to hide.

In portraiture, too, much may be accomplished by the aid of combination negatives. For example, in taking several persons in a group, it frequently happens that one or more of the portraits are unsatisfactory by reason of the expression, or, perhaps, from movement. This not infrequently leads to the condemnation of the picture, or, at least, to a limitation in the number of duplicates required, as most professional photographers know to their cost. If, however, a second or third negative is taken, the chances are that those portraits which are unsatisfactory in one may be just the reverse in another; while, on the other hand, figures which are good in the one may be the contrary in the other. The larger the number of persons included in the picture, the greater are the chances against a successful whole being obtained. If two or more negatives be taken, it is then easy to take out any faulty portrait and replace it by another from either of the other negatives, for it is seldom that the same portrait will be defective in all alike.

In outdoor groups especially may the power of combining negatives sometimes prove a great acquisition. It is no unusual circumstance that, say, a wedding party, or, possibly, a cricket or football club has to be taken with a background of dark foliage, maybe an ivy-covered wall. Now, what would be the proper exposure for the figures in their light costumes will be far too little for the background. Hence the latter is generally sacrificed entirely, much to the detriment of the picture as a whole. There is, however, no reason why, when one or more negatives of the group have been secured, another should not be taken of the background alone. It could then be introduced in the group negative in place of the under-exposed one.

A notable example of where a combination of the above kind would have greatly improved a photograph is now before us. It is a group of a large number of Royal personages, photographed, as we know it was, under adverse conditions of light. It was taken out of doors, with shrubs and trees as a background.

The figures are fairly well-exposed, but the background is greatly underdone. This has apparently been "dodged" in the negative to prevent its printing as a heavy black mass. But this treatment has made it flat and lacking in vigour. Now if a second negative had been made of the background by itself, and this afterwards substituted for that obtained with the figures, an excellent result might have been secured. Why this was not done it is difficult to imagine, as the whole of the prints issued to the public were, we believe, made from reproduced negatives.

It is really surprising how little is actually done in the way of combination negatives, probably because so many imagine that the operations are both difficult and tedious. But this is not really the case if, as we recommended, advantage be taken of stripping films.

It has often been a matter of some surprise to us that in the establishments of manufacturing opticians, and even in those of dealers in lenses, provision is so seldom made to enable the purchaser to make trial of his lens, and see, on the ground glass of the camera at least but preferably by the more tangible test of taking a picture, just what it can do. We are pleased to be able to announce that one eminent firm of opticians, Messrs. Ross & Co., of 112, New Bond-street, have now met this requirement in a very thorough manner by having their first floor converted into a show room, to which, as an adjunct, there is attached a well-fitted dark room, containing every appliance for enabling the intending purchaser to see the nature and scope of any lens, and, by taking a negative and developing it on the spot, to secure a memento of its performance. This example, of which we cannot speak too highly, ought to be followed by every one.

We have often called attention to the fact that the atmosphere of towns is injurious to the integrity of silver prints, and that, in all probability, the sulphuric acid always present in such atmospheres was the cause, or one of the causes, of the injurious effects. Silver printing is as popular as ever, especially for small work, and we think it by no means undesirable that photographers should take some means of pointing out to their clients that to be looked upon as permanent, or even lasting, all silver prints should be protected from the action of the air. An annoying occurrence which recently came under our notice showed our suggestion to be eminently desirable. A well-known photographer, whose work is most carefully treated to ensure the utmost possible approach to permanency, recently had brought to him a panel photograph not more than two years old, but which yet showed distinct signs of fading. A long investigation failed to point out any cause for this, and the only conclusion he could come to was that the form of frame was answerable for the evil—it was the convenient and pretty form known often as the *Mora* frame, which, as need scarcely be pointed out, allows complete access of air to the picture behind it. It would be unfortunate to condemn these exceedingly effective picture holders, and we should be very glad to have opinions upon the subject by some of our readers who can speak upon it from practical acquaintance.

THAT the question of sulphuric acid in the air is no figment, may be seen from a paragraph in the *Chemical News*, quoting a medical contemporary, to the effect that every day in London three hundred and fifty tons of sulphur are thrown into the atmosphere. This quantity represents upwards of one thousand tons of monohydrated sulphuric acid, not merely wasted, but employed in mischief!

THERE are, of course, photographs and photographs, and there can be no doubt that a large number are produced which no care in etching or in preserving from the action of the atmosphere will preserve from fading, while at the same time there are others which will stand a considerable amount of careless exposure and yet appear to be none the worse. We were lately in conversation

with a gentleman who had been several years in Ceylon, and he gave us a little personal experience on the subject. Shortly before leaving this country he had his photograph taken at two different studios, and he took the *cartes* out with him. He stated that before he had been in the island three months, one of the sets of pictures had "faded into nothing," while the others (taken out at the same time) were apparently just as good when he left Ceylon, after half a dozen years' residence, as when he first brought them in. No amount of explanation about the action of the atmosphere could explain the failure of the first-named set to stand against the climatic condition of the place.

IN *La Nature* of last week there is a long and full account of the inauguration of the new establishment for judicial identification by means of anthropometry and photography, which evidently comprises an elaborate and highly-organized machinery for the prompt multiplication of large numbers of photographs in a short space of time. "On this vast site, thirty metres long and twelve wide, are found in succession—a waiting-room for prisoners; then the studio, allowing a distance between camera and lens as may be needed of from six to twelve metres; thirdly, a special room for the reproduction of documents, with object holder and camera upon rails, &c. Next, a series of rooms for each successive operation of photography—sensitising paper, printing proofs, fixing and washing positive impressions, mounting and rolling. But no retouching room, that operation being rigorously forbidden in all photographs intended for legal purposes.

MODERN modes of quick printing are adopted, bromide paper being employed of course. A method of increasing the rapidity of production and diminishing the cost consists in sacrificing the bust and the breadth of the shoulders. It is thus possible, by means of slight reduction, to group twenty of these heads upon a negative of about half-plate size—postage-stamp pictures, in fact—and, it is pointed out, twenty thousand prints can be made in a night. The reproduction is carried on in the rooms with least light, as artificial illumination is easiest and best adapted for the purpose.

It is evident that in the anxiety to facilitate the production of prints there will, under the influence of the proverb, "the more the haste, the less the speed," be liability to mishaps; but in every way these are provided against, even to the extent of having a separate worker to fix the prints so that particles of hypo may not be transferred or carried about to the production of spots.

AGAIN, too, under such conditions nothing would be more likely than the leaving open of a door, to the injury of large numbers of prints by exposure to light. This also is provided against, by a useful but not a novel manner, by avoiding the use of doors altogether. Each room is kept apart from the others and opens out into the studio by means of a kind of curved lobby or passage, with partitions on opposite sides. There is thus produced a path of a kind of zigzag section which effectually extinguishes the light, the partitions being blackened and necessitating three reflections before light could enter the room, by which time it would be so lessened that the most acute eyesight would fail to perceive it.

THE WHOLE ART OF PHOTOGRAPHY IN A SERIES OF EASY PROGRESSIVE LESSONS.

CHAPTER III.—DEVELOPING A NEGATIVE.

It is perhaps well that at this stage we should apprise the reader, who is presumed to be ignorant of photography, how to take a negative by the one popular method, that is, by means of commercial dry plates.

The camera and lens are supposed to be on hand, and to be made or supplied by a responsible firm. The plates are further supposed to be supplied by a reliable firm, and one of them is still further supposed to have been, by aid of a feeble light from a ruby lamp, transferred from its package to the dark slide. Focus an image

sharply, using, if necessary, a magnifying glass to this end. Draw the dark shutter from the slide, and expose by uncapping the lens. How long? Everything depends upon the subject and the light. If a well-lighted landscape, the exposure must not exceed a fraction of a second. If a figure or group be the subject, the duration of the exposure may be anything from one second to several seconds, this depending upon the intensity of the light—which is supposed to be, in this instance, of a subdued character—and the aperture at which the lens is worked. In a back garden, entirely shaded from the sun, a good negative is frequently obtained with an exposure of one second when the lens is working at $f/8$. But experience alone can dictate the exposure that affords the best result. Anyhow, the plate, having been exposed and brought into the developing room, is removed from the dark slide and placed face up in a flat tray, which should not much exceed its own dimensions. Still protected from all light save that of the feeble red lamp, the developing solution is poured over it in quantity sufficient to ensure the surface being properly covered.

But here we must hark back. There are three distinct and different classes of developers that may be applied—pyrogallie acid, iron, and hydroquinone. When we say that each of these, even among experts, has its own advocates, the reader will naturally conclude that after all there cannot be any great degree of difference—not enough, at any rate, as to very greatly influence him in the choice of the one he is to adopt. This conclusion will not be far from being correct. We will, however, place before him formulæ for compounding developers of each class, and shall make a passing note relative to the behaviour of each, after which each is free to select his own.

We have placed pyrogallie acid in the first position. It is that which is probably employed by the greatest number of operators at present. It is a system which will invariably afford satisfaction when worked with even the most moderate amount of intelligence. Pyrogallie acid is the reducing agent, but it must have allied with it an alkali, for what particular reason we shall not stay here to inquire. If it is to be kept in solution it must also have dissolved along with it some body that will prevent it from oxidising, for pyrogallie acid when dissolved in water without anything else will soon become of a dark-brown colour, and be unfit for use. But at this stage we do not wish to enumber the practitioner with much chemistry, and shall therefore recommend him to make a developer as follows:—

Make the solution as follows:—

Sulphite of soda	6 ounces.
Hot water	32 "
Pyrogallie acid	1 ounce.

(Having dissolved the sulphite of soda, add sufficient citric acid in solution to cause a piece of blue litmus paper inserted therein to become reddened.)

Into another bottle dissolve:—

Carbonate of soda	3 ounces.
Carbonate of potash	1 ounce.
Water	32 ounces.

Note here that the carbonate of soda in this formula is not baking soda, popularly so called, or bicarbonate of soda, but the mono-carbonate as used for washing purposes.

When about to develop, mix these in equal proportions with two parts the bulk of water, or, if the weather be very hot at the time, even a greater proportion of water.

Now watch the progress of development. If the image comes out too quickly the probability is that too long an exposure has been given, more particularly if the deep shadows come out very soon. In a well-exposed plate everything should proceed evenly, the highest lights first of all, these followed by the middle tints, and, last of all, by the deep shadows, which should be slow to appear.

A rather weak developer is the most manageable, because a certain time elapses between each of these parts making their appearance, and time is allowed to remove the plate at any stage. If the high lights only appear even after a considerable time is allowed for the developer to act, it may be concluded that the plate has not received sufficient exposure.

But an under-exposed plate may be got to yield up its dark details by employing a rather weak developer, and allowing it to act for a sufficiently long time. On the contrary, a plate that has had a too-long exposure may be made a tolerably good printing negative by removing the developer by copious dashes of water, and applying another in which the pyrogallie acid shall predominate in a much larger degree than that indicated above; for, speaking in general terms, pyrogallie acid favours intensity, while the presence of an alkali favours detail. The knowledge of this will enable the beginner to so modify his developer as to utilise the latitude which all dry plates possess as regards exposure.

Again, the addition of a retarder, or what is known as such—for instance, a solution of bromide of potassium—will prove a powerful weapon in one's hands. The presence of such a body in the developer retards the action of the developer as between high lights and deep shadows; hence it is well to have always ready at hand a dropping bottle containing a solution of this class of salt, to be employed when necessary. A solution of the strength of ten grains to the ounce of water will be found useful.

It will thus be seen that, by the exercise of a little judgment, the pyrogallie developer may be adapted to meet all contingencies, except that of a very much under-exposed plate, by merely modifying the proportions in which the pyro and the alkalia are relatively mixed.

Ammonia is extensively employed instead of the fixed alkalia just mentioned; but, in the hands of a beginner, we do not consider it quite so good as that given. Both liquor ammonia and the ammonium carbonate become rapidly impaired in strength, unless kept in a closely stoppered bottle from the atmosphere, whereas the other carbonates suffer so little change that a large quantity of solution may be prepared at a time, in the certainty that it will remain good up to the last drop.

In selecting the soda-salt for mixing with the pyrogallie acid, special care must be taken that it is the sulphite and not the sulphate that is employed; and it is also to be noted that the sulphite, when kept in a crystalline state and exposed to the air, decomposes and becomes valueless as a preservative for the pyrogallie acid.

ON THINGS IN GENERAL.

PERHAPS "Junius" is right in calling attention to my remarks upon cloud negatives, as some readers might imagine my words to mean that such negatives taken from an attic window would answer all purposes, an idea quite contrary to my intentions. What I wished to lay stress upon was the fact that for a large proportion of pictures exhibited with printed in skies, attic-taken negatives would suffice. I go much farther than this. I say that very many photographs with double-printed skies, seen in our exhibitions, would be far more true to nature if a cloud negative had been used that had been taken from an attic window, for then by no possibility could such scientific absurdities or such artistic frauds be perpetrated as is far too often seen on the exhibition walls. Free studies or views of picturesque buildings occupying, perhaps, an angular altitude of fifteen or twenty degrees, and furnished overhead with lovely clouds, perfect poems—in themselves—that under no conditions whatever could be seen in such shapes at an altitude of more than fifteen degrees above the horizon. This is a subject upon which I feel most strongly. Several years ago there was exhibited at the Pall Mall Show, by one of our leading lights, a beautiful landscape with figures illuminated from one direction, and clouds lighted from the opposite; yet, I vow, such a drollery gave me less offence than one of the class I speak of, for it was evidently an accident of a character that I have seen paralleled in a clever oil painting; while in the former case it was crass, wilful ignorance, or worse, deception—prettiness of effect obtained by a piece of pictorial mendacity, all the more nefarious because it would not be readily found out. Still I end where I started: it would not do to employ an attic negative for all purposes, for then an opposite error would be introduced.

The new celluloid plates should be admirable for cloud negatives, as they answer even for portraits when printed with the film outwards, and there is then but a trivial difference that many would not notice, and with clouds it would be quite imperceptible, and the stock of

negatives required would be thus reduced by one-half, as the question of right or left lighting would solve itself by the mere reversing the plate or tablet on the printing frame.

The flash light controversy still continues well into the margin of summer; but I am inclined to believe that far more will be expended in patents, and patent contrivances, for burning the light than ever will be made out of the pictures produced by its aid. I do think that the pyrotechnics will, even yet, win the day; for, as has been demonstrated, they can be made both innocuous and non-poisonous. Some of my readers may not have noticed that at one of the American meetings an ardent exhibitor was so determined to show the harmlessness of his particular compound that he actually swallowed enough of his own magnesium flash powder to have sufficed to take a portrait with. It is no uncommon thing to take magnesium oxide inwardly, as many of us well remember happening in the days of our childhood; but the metal itself, and with other things, is a brave undertaking. I should prefer "gun-cotton" to "gun-paper," and the ready prepared gun-sawdust—to coin a word—to either, for the latter you can buy ready prepared, as I think I once before stated, while the loose texture of the gun-cotton would lead to a quicker explosion than explosive paper, seeing that as a certain amount of oxygen from the air is used up by tri-nitro-cellulose—to give the proper designation—when it is exploded by ignition it can obtain it more quickly from the increased area of the pulled-out mass of cotton than from the flat sheet of the explosive paper, which imprisons, comparatively speaking, no air.

Some one recently asked, at a meeting of one of the London societies, if any one had practically adopted quinol as a developer to the exclusion of pyro. I should, on my part, like to ask if any one has adopted orthochromatic plates to the exclusion of the ordinary kind for professional portrait photography? So much has been said about the great advantages these plates, even without the screen, possessed in the rendering of flesh tints, and actually in considerably enhanced rapidity, that one might have expected ere now that the orthochromatic plate would be crowned king of the studio amid shouts of "*Le roi est mort! Vive le roi!*" Yet only the other day, at the Paris Academy, we find a member coming forward to show that with well-selected coloured screens every effect desired could be obtained from coloured objects, and as to screenless productions, no farther back than the 2nd instant, Mr. William Coles, at a London and Provincial Photographic Association meeting, actually brings two portraits of a freckled sitter, one taken with "ortho," and the other with ordinary plate, and it is a complete puzzle to find out which is the better in respect of suitable rendering of the freckles.

By-the-by, I noticed Mr. Swain's denial of the use of a particular photographic purpose in producing the blocks for *Punch*: he is, of course, literally correct in his statement, but his letter read without comment would be apt to lead the unwary astray. True it is that in *Punch*, and other magazines, the highest class of work is done by woodcutting; but it is also true that in *Punch*, as well as these others, photography is largely utilised in producing the illustrations. Before its general adoption the usual mode of procedure for producing an illustrated block was for the artist to draw directly on to the wood (and a beautiful surface it presents for working upon). That was the last of the drawing, as all the whites were cut away so as to give the lights in the print, and the wood left standing for printing the blacks. No matter what kind of a mess the wood engraver made of his work, there was no direct proof; the drawing was destroyed. By the aid of photography the drawing made on paper can be reproduced by photography and placed on the wood, only the photograph being destroyed, with the double advantage of a perfect check upon the engraving work, and a cheque in hand for the sale of the original picture.

FREE LANCE.

ORTHOCHROMATIC PLATES IN COPYING OIL PAINTINGS.—I.

SINCE the introduction, in a commercial form, of a bromide of silver dry plate which has been specially treated, either in the formation of the emulsion or at a later stage, by subjecting the plate to a bath of colouring matter whereby the plate is made more sensitive to the yellow and red rays, undoubtedly much has been done in the way of

placing in the hands of professionals and amateur gentlemen a power which in days gone by was certainly beyond their reach or "ken," and what was often attempted in the past in the way of photographing oil paintings, or other objects where a variety of non-actinic colours existed, and which most frequently resulted in only partial success, if not indeed complete failure in many instances, now becomes an operation which, with the exercise of a little ordinary care and thought, after some practice, is almost certain to yield results at once satisfactory and pleasing.

Any one, however, who for the first time takes it into his head to go in for copying oil paintings or other similar subjects which are composed of various tints of colour, so as to render necessary the employment of a colour-corrected plate, must not imagine for a moment the whole secret of success depends upon the employment of a film specially so prepared, such an opinion is at once false and erroneous; and should a beginner set to work without first giving any thought to other matters which are quite as essentially necessary to the ultimate success as the employment of a specially prepared plate, failure is sure to be the result, with the consequent irritation depending thereon, which very likely will debar the party from deriving much pleasure in this class of work in the future.

In the few remarks which I propose to offer on this work, I shall endeavour to treat the subject in a purely practical way, and strive to point out a few of the many pitfalls which a beginner is most likely to fall into when commencing the practice of this most attractive branch of photography. As to the interesting nature of this class of work, I think but little will be required from me to show how attractive such a branch of photography must be to very many amateur gentlemen who might often feel desirous of treading on pastures somewhat new; while, on the other hand, I imagine there are still not a few professionals who even yet know but little about the employment of colour-corrected plates for the copying of such subjects as oil paintings. True it is that even in the good old collodion days there were those who knew something of the difficulty attendant on this class of work, and who even then were not unacquainted with the employment of coloured screens to cut off the undesirable rays, still I imagine the number of those who but seldom are required to do this class of work in their business are not few, and hence when the time does arrive that they are called upon to do such class of work they are not just at their ease when setting about it. To such also I venture to humbly address a few remarks in the hope it may help them to overcome some of the difficulties.

I was forcibly struck quite recently when being present at one of the charming popular limelight entertainments which have become so famous in Glasgow, chiefly through the instrumentality of the Glasgow Photographic Association. On the occasion in question, Mr. W. J. Finlayson, of Johnstone, was the lecturer, and during the course of the evening Mr. Finlayson made a fresh departure from the usual use and went on such occasions by interspersing among the set of slides which he selected for the evening's entertainment a good many which were copies from some of the finest paintings of both old and modern masters. To my mind, such pictures were not the least attractive of those which were projected on the screen on that occasion, and I know of several of those who were then present that at once made up their minds to go in for a shy at the copying of oil paintings and other pictures which they fancied, and afterwards make lantern slides from their negatives.

So much, therefore, for at least one form of attraction attending such work.

Perhaps, first and foremost, the first question that a beginner will set about deciding, is the best way of getting possession of a supply of suitable colour-corrected plates, and wonder whether it is better for him to prepare them himself or to acquire those prepared by the manufacturers. Undoubtedly, within recent years, much time and thought has been given to this subject by many enthusiastic experimentalists, and those of my readers who had the good fortune of being present at the lecture which Mr. Bothamley delivered before the members of the Photographic Convention, assembled at Glasgow the year before last, must have experienced much that was instructive on this point of the subject, and derived no little benefit from the very complete and lucid description he gave at the time as to the action of the various dyes employed by him in securing the widely different results as shown by him on the screen before the very large audience then assembled. I therefore feel I cannot do better, at the outset of this article, than to recommend those desirous of fully understanding the theory of this subject to become possessed of the reports of Mr. Bothamley's lecture delivered then, and also those given to the public on more recent occasions by him in which he fully treats on this part of the subject.

But, after all (although it is, in my opinion, most desirous that such

knowledge should be possessed by all undertaking this work), is it absolutely necessary that amateurs and professionals should go to the extra bother and worry entailed by preparing a colour bath, and dipping and afterwards drying their plates from such? And although this operation does not of necessity entail much time or even trouble when the operator is possessed of special advantages in the way of a large and commodious dark room, so as to permit of an easy means of drying being employed, still I feel that among the large number of those likely to undertake this class of work, such would, in a great measure, tend to debar them from the practice of it, were such preparation of plates an actual necessity on their part.

Luckily, however, the public are now supplied with these plates of such excellent quality, that indeed no amateur or professional either, for that part, need bother himself about preparing his own supply.

T. N. ARMSTRONG.

PHOTOGRAPHIC INDUSTRIES.

NO. 1.—WATSON'S CAMERA FACTORY.

THE firm of Watson & Sons, 313, High Holborn, London, is now of a respectable age, having been established in 1837.

For a considerable period it was associated with the sale of second-hand optical and philosophical apparatus; but as photography advanced, the then senior partner, the late Mr. W. Watson, had sufficient acumen to foresee the growing importance of the young art, and to throw much of his energy into its direction. To this end he, about eighteen years ago, entrusted his son, Mr. Thos. P. Watson (now the head of the firm), with the entire control of the photographic department, and under his management the business gradually threw off its excrescences, among others that of a lucrative high-class gun and sporting trade, now transferred to other establishments and other hands, and assumed the form of a complete optical establishment in which photographic apparatus occupied a leading position. This department, also, has been amenable to the law of evolution: for whereas it was originally confined to the sale of appliances made by others, the apparatus is now, and has for some time past been, made in its entirety by the firm, who have special factories devoted to this purpose, one of which, that of photographic cameras, forms the subject of this article.

This factory occupies a four-storey large building, and is situated in Fulwood-riots, a *cul-de-sac* off Holborn and directly opposite to the shop and sale rooms. Remembering the last visit we paid to the Watson factory, when it was situated in Dyer's-buildings, Holborn, as recorded in our JOURNAL of October 22, 1886, we could not but be struck by the great advance that had taken place between the *then* and the *now*. Not by any means small then, it is now, by contrast, singularly large and complete.

On entering the door the whirling sound of machinery in motion apprises us of the fact that we are in a veritable factory. The motive power is placed in the basement, and consists of a Crossley gas engine capable of working up to fifteen h.p. In truth it has a good deal to do, for the large floor immediately overhead is devoted to machines of various kinds which have been called into requisition to aid, or in some cases to supersede, manual labour. The nature and objects of these machines, which seem to us the very perfection of workmanship, may be gathered from the following. To one is assigned the labour—and very short work it makes of it—of reducing the wood to any required thickness by planing, or, more correctly, by means analogous to planing, for it leaves the surface somewhat rough, the real planing or smoothing of the surface being accomplished by another machine standing in contiguity, in which the cutter is in the form of a spiral extending from side to side of the bed plate. This imparts a surface so flat, and at the same time so smooth, as to render it almost ready for the French polisher.

A third machine takes cognisance of moulding and grooving, which when once set ensures all work being absolutely identical, so that any one part made for a camera of a certain size would fit any other camera of like size, and also ensures that all parts finished on it will be exactly similar in pattern and length of moulding, &c.

Machine No. 4 is devoted to recessing, and shaping, and trimming the tops of the shutters of the dark slides. We cannot speak as to the speed at which the others are driven, but incidentally we learned that the cutter in this particular machine runs at the speed of 4500 revolutions per minute.

Of sawing machines there are four, each intended for work of a special class. One of them, of the band-saw fraternity, was employed, when we saw it, in cutting out circles for bases of large studio stands. The others are employed variously for cutting up or grooving. One most remarkable saw which was in use was cutting so cleanly as

to lead one to suppose that the portion of wood severed had just left a plane rather than a saw; the oddest thing being that when the saw was stopped we found it composed of huge shark-like teeth, each about three-quarters of an inch long, instead of fine, small teeth, which one would naturally expect to use for such work. Another, of a peculiar construction, acts seemingly by the sides of the teeth of the circular cutter, and is employed for gauging dark slides, the edges of which it cuts and finishes simultaneously in such a manner as to preclude any further touching.

It seems part of the policy of Mr. Watson to make and put together the various parts comprising a camera, and to keep such parts in a state ready for being in any reasonable quantity placed in the hands of the finishers. In one room we saw thus stored away literally immense numbers of such parts. One recess was loaded with baseboards, another with bodies, another with dark slides or their component parts, and so on, and these in all the various sizes that are made. Two advantages are claimed for this: first, that it enables an order from the sale shop to be quickly executed, from six to twelve being usually taken from this unfinished stock room, and given out to be finished together; and secondly, that thus remaining for some time in a partially finished condition still further conduces to the wood being well seasoned.

Concerning the wood itself, there is a great deal in stock, already sawed up to the approximate thickness and stacked up for seasoning. Mr. Watson does not consider the wood fit for employment in camera making until it has undergone this seasoning process for at least two years.

The various floors are each devoted to some special department. On one of these is the brass shop, where all the brass fittings of cameras are made; here are vices, turning lathes, drilling machines, and a staff of assistants. The lathes, saws, &c., in this shop are all driven by steam power, and the same system with regard to fitting to gauges is applied to the brass work as to the wood work, and the pitch of all the screws are made to Whitworth's standard gauges. The brass work for cameras in its entirety is made here, Messrs. Watson considering that the Midland quality goods are neither sufficiently neat nor solid to match their cabinet work; therefore are made hinges, bolts, side rods, &c., in fact all excepting screws, which Messrs. Nettlefold hold a monopoly for, and which must be obtained from Birmingham. In addition to the small camera brass work, the rack work for heavy studio stands is also prepared here throughout.

There is besides, on the premises, a blacksmith's shop, with forge, where are made the various cutters employed with the machines. To such a degree of excellence have these cutting tools been carried, that one piece of wood which we saw tongued into another piece was such a perfect fit as to lead to the belief that if one could put a piece of glue in his mouth and then breathe upon the junctions, they would not only never separate, but would, when trimmed, defy detection as to existence. The whole of the cutters used for the machines have been made at their own factory and from their own patterns, it having been found that ordinary cutters as used in the trade were totally useless for the special high-class work they were required for, and also for the very hard wood that is used.

At the time of our visit a considerable number of hands seemed to be employed on the new "Acme" camera, which is evidently having a run. Although all the individual parts of this camera are made by machinery as far as machinery is applicable to its production, yet after everything is finished it occupies over two weeks for a highly skilled workman to put together and fit a full-plate one for being placed on the shelves of the warehouse. The thinness, lightness, and rigidity of this camera have caused a run on it which severely taxes the output of the factory, although about one hundred hands are employed in the various wood and brass departments.

We ought also to mention that the upper part of the warehouse, 313, High Holborn, is also used as a manufactory—the top floor for lens grinding, and the next for high-class optical brass work, microscopes, surveying instruments, lens mounts, iris diaphragms, &c. The floors below, consisting of shop and first and second floors, are fitted up as show rooms and offices, and the basement as packing room in the front, and this floor being somewhat extensive, the back is partitioned off and serves as a dark room for demonstrations with optical or enlarging lanterns.

Messrs. Watson & Sons have been extensive contributors to various international exhibitions: being confident in their ability to compete favourably in their specialities with, as they allege, any house in the world, they have not hesitated to compete wherever honour and glory (and recompense) were to be obtained; therefore they have shown successively at Liverpool, Manchester, Antwerp, Brussels, Adelaide, Melbourne, London, and various smaller exhibitions; and

this confidence seems to have been warranted by results, they having received no less than sixteen awards, fourteen of which were the highest given, and the other two were the first obtained by them in earlier days, when the present high class of their work was coming only, and was not, as now, in level working.

CAMERA CLUB CONFERENCE PAPERS. ON THE USE OF DRY PLATES IN PHOTO-MECHANICAL WORK.

By W. T. WILKINSON.

TWELVE months ago, when any one asked me if dry plates could be used for photo-litho and kindred negatives, the answer was that there were no plates in the market to be depended upon giving the absolute clear lines so necessary for success. Now I am glad to say that there are two brands of plates in the market that give negatives quite as good as the wet process when working at its best. This word *best* will, no doubt, recall old memories, the reverse of pleasant, in the minds of many who had to put up with troubles that a dry-plate worker of to-day knows nothing about. Now, in the case of both the operator can get out of it by opening a fresh box of plates; then, no matter how much care was taken, the negatives could not be made.

The two brands of dry plates alluded to above are Mawson & Swan's photo-mechanical, and England's rapid chloride, and upon either plate negatives suitable for photo-litho or photo-zinc—line or grained—may be done equal to the best wet-plate negative, and with infinitely more certainty and far less trouble.

These plates may be developed with either pyrogallie or hydroquinone, the last being perhaps the best. For the sake of those who would like the formulae I use, they are here given:—

Pyro and ammonia:—

STOCK PYROGALLIC ACID SOLUTION.

Meta-bisulphite of potash.....	1 ounce.
Bromide of potash	640 grains.
Water	8 ounces.

Dissolve; then add one ounce of pyrogallie acid; then make up to ten ounces with water.

DEVELOPER No. 1:

Stock pyro, as above.....	2 ounces.
Water	18 "

DEVELOPER No. 2.

Liquor ammonia, -880	1 ounce.
Water	19 ounces.

For a normal exposure use two parts of No. 1 to one part of No. 2.

Pyrogallie acid and soda:—

STOCK SOLUTION PYROGALLIC ACID.

Meta-bisulphite of potash	2 ounces.
Bromide of potash	240 grains.
Water	8 ounces.

Dissolve; then add one ounce of pyrogallie acid, and make up to ten ounces with water.

DEVELOPER No. 1.

Stock pyro, as above	2 ounces.
Water	18 "

DEVELOPER No. 2.

Saturated solution, washing soda.

For a normal exposure use eight parts of No. 1 to one part of No. 2.

Hydroquinone developer:—

SOLUTION No. 1.

Hydroquinone	80 grains.
Meta-bisulphite of potash	120 "
Bromide of potash.....	5 "
Water	20 ounces.

SOLUTION No. 2.

Caustic potash, pure stick	200 grains.
Water	20 "

For a normal exposure use equal parts of No. 1 and No. 2.

Do not waste time and plates trying the ferrous oxalate, as it is the same with these as with ordinary plates; if ferrous oxalate gives a good negative, any of the above developers would have given a better, as under no circumstances will ferrous oxalate give as good a result as either pyro or hydroquinone.

For these plates much more light may be used in the dark room, in fact should be used, so that the whole progress of the development can be seen with comfort. Two thicknesses of golden fabric will be found quite sufficient.

The generally accepted idea for a photo-litho negative is that it must

be dense. Never mind about anything else so long as it is dense. This is wrong. Get as much density as you can without clogging up the lines; but the first consideration is absolutely clear lines. Get this, and the density is of little consequence. Of course, it must be understood that a grey negative will err on the other side.

For making grained screens for half-tone type blocks these plates are a perfect boon, it being so easy to get screens free from stains and spots, a condition of things not always possible with wet plates. Besides, the density required can be obtained at one operation instead of the risk of clogging up entailed by the operation of intensifying with mercury, &c.

A few words as to these screens may be acceptable. For the production of half-tone blocks it is necessary to have a variety of these screens ranging in density from a grey to almost a jet black, the lines in each case being perfectly clear. For each picture to be reproduced a screen must be used that will best suit it. For a flat picture use a thin grey screen, whilst for a hard black-and-white portrait use the dense screen.

The grained negatives resulting from the use of the screen must be developed so as to get the lines clear. Density must not be aimed at, it being neither possible nor desirable.

For collotype work the wet process has no advantages over good dry plates, as with care and skill quite as good negatives of ordinary subjects may be made upon dry plates as upon wet, and that with less trouble and more certainty, whilst for colour-rendering the dry plate gives the best results.

Dry plates can be stripped or reversed with just as much ease and certainty as wet plates.

If the mirror be used for making reversed negatives for collotype, patent plate glass must be used, and this would be too expensive from the necessary failures and other causes, so stripping must be resorted to; and I will here give you the method I have used with unvarying success since 1884. The operations are simple and easy, and its certainty may be judged from the fact that I have never met a brand of plates that it does not suit.

1. Clean a few glass plates a size larger than the negatives to be stripped, soak them in weak acid, rub both sides with a clean rag, and rinse under the tap; then coat with the following solution:—

Gelatine	2 drachms.
Water	20 ounces.
Saturated solution, chrome alum.....	5 drops.

Soak gelatine till soft in the water previously mixed with the chrome alum; then melt and filter the flood over the wet plate and stand up to dry. These plates improve by keeping, so a lot may be prepared at one operation.

2. Clean back and edges of negative to be turned.

3. Place upon a levelling stand, and cover with as much collodion as it will hold without running off.

4. Let this film of collodion set thoroughly right through.

5. Immerse the negative in clean cold water, changing occasionally until the greasy appearance is quite removed and the water flows over the film quite evenly.

6. Immerse the negative in a dish containing fluoric acid, two drachms; water, one hundred ounces. Rock the dish until the corners of film show signs of coming loose; then remove and wash under the tap both front and back.

7. In a dish of clean water put one of the gelatinised plates the gelatine film up. Now place the negative face down upon the surface of water, when by a little careful management the film will leave the glass and float upon the surface of water. Now raise the glass plate gently, carefully adjust the film in position, then lift the two slowly from the dish, and with a soft squeegee carefully expel the water from between the glass plate and the film.

8. Flood with, or immerse in, methylated spirits of wine, then place on a rack to dry.

When it is desired to have six, eight, ten, or twelve negatives upon one plate, they are stripped as above. Then a plate the requisite size, previously gelatinised, is placed on the bench and covered with water, the films being lifted from the water and placed in position one by one; when all are in position place a piece of mackintosh cloth over all, then squeegee well.

The process given here is perfectly safe, and if one or two points are attended to there need be no hesitation in turning the most valuable negative.

The important points are, always clean the back and edges of negative, else the tiny shreds of gelatine usually left on the back of gelatine negatives will be detached by the fluoric acid, and will get between the film and glass when stripped, and being so very attenuated will be difficult to dislodge.

Be sure and get a good film of collodion upon the negative, so that the stripped film is easily handled, and any risk of frilling prevented. Be sure the film of collodion is thoroughly set before immersion in the water, else a portion of the film will be opaque. When this does happen, flood the plate with a mixture of ether and methylated spirits, and remove the collodion by rubbing gently with the fingers, then wash and dry and try again.

Stripping films are not dry plates in the strict sense of the term, but are

close enough allied to come under the heading I have chosen, so I will venture upon a few words as to their use.

In making negatives for collotype printing, the roll holder and stripping films will be very useful, as the negatives after development need only be mounted upon patent plate glass, previously collodionised, and when the paper backing is removed the negative is in its right position for collotype, and if afterwards required for silver or platinum printing can be stripped in the usual way. The Vergara films dried upon collodionised glass are just as useful, as also are Pumphrey's films.

Foreign Notes and News.

M. GATMET has published, under the title of *Procédés Photographiques aux Couleurs d'Anilins*, an interesting description of the various applications of aniline colours, with photography, to decorative purposes. Photographs on glass paper, ivory, mother-o'-pearl, &c., are coloured with these pigments, either the picture itself being in some colour, or else the ground upon which it is printed or transferred to. In the first case the sensitive substance is chromated albumen, in the second asphalt. The book gives descriptions of how to decorate articles the surface of which is not flat, and how to prepare the necessary film negatives; also there is a rather minute description of the aniline-lichtpans process.

A CORRESPONDENT of *L'Amateur Photographe* recently found himself in a little hamlet in Normandy with a dozen negatives to develop, and just as he was about to set to work it struck him that the only available water was extremely calcareous, and that he had only four hundred grammes of ferrous oxalate wherewith to develop. After a little consideration he successfully adopted the following expedient:—He took a litre of the water and brought it to the boil, then, adding fifty grammes of the ferrous oxalate, an insoluble precipitate was obtained and filtered off. The filtrate was again brought to the boil, and twenty-five grammes of ferrous oxalate added. A second time the filtrate was taken, and again a third time, thus some water was obtained which, though not pure, still allowed M. Séguin to develop his negatives.

In the *Wochenblatt* Dr. Stolza indicates the following as the best means of modifying a landscape negative. The following solution is prepared:—

Water	100 parts.
Dextrine	4 "
Sugar	5 "
Bichromate of potassium	3 "

Then a few drops of ammonia are added; the liquid has an ammoniacal smell. This mixture is used to cover the back of the negative. It is then allowed to drain, then the plate is dried in an horizontal position at 60°, and while it is still warm it is placed in a printing frame with the image next the glass, and is exposed to daylight until the film has become insoluble in the shaded parts. A photometer may be used. The plate is then heated again to 60° by artificial light, and very fine powdered graphite is applied with a badger brush. The graphite only adheres to those parts which have not been acted upon by the light. When sufficiently retouched the whole is collodionised and exposed to a strong light, then washed until the yellow tint disappears.

In France, M. Nadar has patented a process for rendering photographic prints permanent. According to the patent specification this process renders all photographs in silver salts—whether upon paper, films, or glass supports—absolutely permanent. It is claimed that it may be used for all photographic prints upon gelatino-bromide of silver, or the corresponding silver salts, and, generally speaking, for all gelatine emulsions, whatever the support may be, provided the pictures are:—1. Normally exposed. 2. Developed with pyrogallie acid or ferrous oxalate, so as to be somewhat more powerful than usual. 3. Washed in water acidulated with acetic acid, and then laid in a bath of the following composition, intended to produce permanency, and which is, in fact, a platinum toning bath:—

Water	1 litre.
Platinum chloride	1 gramme.
Pure nitric acid	20 to 30 cc.

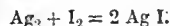
In order to ascertain whether the bath has acted sufficiently a small cutting of a picture treated in the same way is thrown into a ten or twelve per cent. solution of chloride of copper; this should not attack the platinum picture. Thus the hot baths and long exposure of the print required by the platinum process, as it is usually worked, are done away with. Between each of the above operations the print must be thoroughly washed in cold water. The above toning bath may be modified to suit the different sorts of emulsions used. All baths and solutions are used cold, and excellent prints may be obtained by short exposures.

M. LÉFÈVRE is still continuing his experiments in reproductions of spectacular scenes. He has lately taken a series of photographs of the different scenes in *Le Petit Duc*, as played at the Eden Theatre, Paris, which differ from most theatrical photographs by being stereoscopic.

THE CHEMISTRY OF PHOTOGRAPHY.

[A Communication to the Ipswich Photographic Society.]

THE subject our Secretary has induced me to bring forward this evening is one covering a very wide area, and to attempt to investigate the chemical changes involved in every photographic operation which has yet been performed would occupy a very considerable time. I shall merely endeavour, therefore, to explain the part which chemical action plays in the working of photography as most generally practised at the present day. I think you will admit that the gelatino-bromide dry plate is now the article we should be least able to do without in our own photographic work; indeed, it is not unlikely that without the dry plate there would be no Ipswich Photographic Society; this has taken the place of the Daguerreotype, the calotype, and the collodion processes, which, at different periods, have been those generally employed. In the Daguerreotype the sensitive plate was prepared by exposing a silvered tablet to the action of iodine vapour, which combines with metallic silver to form silver iodide—

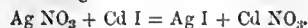


Subsequently bromine vapour was employed with iodine. By a short exposure in the camera a latent image was produced which appeared when subjected to the vapour of mercury. Hyposulphite of sodium was used as the fixing agent as now, though I believe that at the time Daguerre introduced the process no perfect method of fixation was known.

The calotype or Talbotype process, so called from the name of its inventor, Fox Talbot, seems next to have held the field. It seems likely that paper negatives are once again to become popular, though in the calotype the image was formed in the body of the paper, now it is in the sensitive film on the surface.

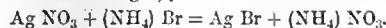
This paper was prepared by floating it on a solution of iodide of silver in iodide of potassium, and washing slightly; the paper prepared was of a primrose colour, and would keep for years. Previous to exposure in the camera it was excited by gallic acid and aceto-nitrate of silver being brushed over it, and afterwards developed by the same chemicals.

This process was superseded by the collodion process of Scott Archer, which is still used to a considerable extent. The glass plates, previously coated with collodion (a solution of gun cotton in ether and spirit) mixed with a solution of an iodide (generally cadmium), were sensitised by immersion in a bath of nitrate of silver, thus forming silver iodide—



The latent image produced by exposure in the camera was then developed by pyrogallie acid with either acetic or citric acids, the free nitrate of silver in the film playing an important part in the operation. The negatives were finally fixed by means of cyanide of potassium or hyposulphite of sodium.

I have now come to a matter with which most of us are better acquainted—the gelatino-bromide dry plate, though I dare say but few of us have ever actually prepared one, and their manufacture on a small scale is scarcely to be recommended; their superior sensitiveness and great convenience soon led to the displacement of the collodion process, though this has still some staunch adherents who maintain its superiority; and I believe that for some purposes, as transparencies, it is admitted to be unexcelled. In this, gelatine (the vehicle) is allowed to soak in water in which bromide of ammonium has been dissolved and then the mixture is liquefied by heat; to this a solution of nitrate of silver in distilled water is added gradually, well stirring, and the emulsion, as it is called, is heated for some time (this and subsequent operations must, of course, be performed in a non-actinic light); bromide of silver is thus formed—



Some more gelatine is then added to the emulsion, which is then allowed to set to a jelly; the next operation is to get rid of the ammonium nitrate, which is done by cutting the jelly up into small pieces and allowing the soluble salt to be washed out with water. After being heated and strained the emulsion is now ready for coating plates.

The next point to be considered is, What change occurs on the film by exposure to light on the camera, so that we can eventually obtain a negative by development? We have bromide of silver in a minute state of division, suspended in gelatine. We know that most silver compounds, when in contact with organic matter, become decomposed by light; we have only to place a drop of solution of nitrate of silver on our hands to ascertain this; and other silver salts are much more sensitive. There are several theories as to the composition of the "latent image," and the question can hardly be considered as finally settled.

The solution that is apparently regarded as the correct one in Hardwich and Taylor's *Photographic Chemistry* is that the change is molecular, i.e., that the molecules of silver salts, when acted upon by light, are altered and rendered in such a condition that they are peculiarly susceptible to the action of the developing agent. A molecule, I may say, is, as the atomic theory has it, the theory which is universally accepted by chemists as affording the most rational explanation of the constitution of chemical compounds, the smallest particle of matter which can exist in an uncombined state; a molecule of silver bromide would consist of one atom of silver, represented by the formula (Ag.), and one atom of bromine (Br.).

A molecule must consist of two atoms at the least, and thus we have a molecule of silver represented by Ag_2 ; the symbols, in addition to being shorthand for the name of the element or compound, also represent the combining weight and the volume.

The theory, which till recently has met with general acceptance, and which

Captain Abney favours in his work, is that the silver bromide is reduced by light to sub-bromide (Ag_2Br), the formation of this sub-bromide of course depending on the intensity of the actinic rays of light upon the various parts of the object; this matter is necessarily involved in great obscurity, and no change can be detected by any means in the film before and after exposure, but we know that there is a so-called latent image which becomes perceptible by the action of developing agents; possibly some day we may have a process in which these will be unnecessary, as we may have a direct image formed in the camera.

Another theory having some supporters is that electricity is sufficient to account for the formation of the latent image, but I do not think that the evidence is very strong.

Mr. Carey Lea has recently been investigating what he calls the photo-salts of silver which he has prepared, and which he states are producible from the haloid salts of silver—i.e., the chloride, bromide, and iodide—by the action of light as well as by purely chemical means, his photo-bromide consisting of silver sub-bromide in combination with silver bromide (Ag_2Br , Ag Br), the sub-bromide forming but a small proportion of the whole. This photo-bromide is insoluble in strong nitric acid, whilst the sub-bromide itself is very soluble in it; and as this theory receives strong confirmation in other ways, it appears to be the one most probably correct.

We now come to consider the action of developing agents, which are all powerfully reducing bodies, greedy of oxygen. I take pyrogallol acid first as the developer in general use; this is more correctly termed pyrogallol, as it is not an acid at all, but a phenol, though it is formed by heating gallic acid when it sublimes; its chemical name is trihydroxybenzene, and, like many other names of organic chemical compounds, not remarkable for brevity, though expressing its chemical constitution as a benzene derivative. We have a series thus:—

Benzene, C_6H_6 .

Phenol.

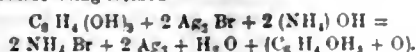
(Monohydroxybenzene, or carboic acid), $\text{C}_6\text{H}_5\text{OH}$.

Paradihydroxybenzene, $\text{C}_6\text{H}_4(\text{OH})_2$.

Pyrogallol (trihydroxybenzene), $\text{C}_6\text{H}_3(\text{OH})_3$.

As I have said, pyrogallol is an energetic absorber of oxygen, and it is used with potash in gas analysis as a means of estimating the quantity of oxygen present.

Pyrogallol is only active in an alkaline medium. Its action on silver sub-bromide with ammonia shows that it reduces the silver to the metallic state, ammonium bromide being formed—



The action of the ammonium bromide which, in addition to pyro and ammonia, is used in this developer appears to consist in diminishing the amount of silver sub-bromide capable of being dissolved by the ammonia. But, if much be employed, the effect produced by light is in a great measure cancelled, owing to the formation of a compound with the sub-bromide, which is as little acted upon by the developer as the bromide itself; hence the amount of bromide admissible is limited.

By using stronger ammonia more silver bromide is dissolved. If amount be in excess of that necessary to supply a gradual aggregation of silver on those parts on which the deposit has already taken place, a veil must result over the whole surface.

By using a stronger pyro solution a more rapid reduction of the bromide will be effected; hence a too strong solution would cause fog.

In place of pyrogallol, a new developer, hydroquinone, or, to give it its proper medical name, paradihydroxybenzene, is meeting with much favour.

Its formula is, $\text{C}_6\text{H}_4(\text{OH})_2$. As will be seen it is a near relative of pyro; in development it becomes oxidised to quinone—



which is a light yellow body, and consequently this developer is free from the unpleasant staining properties of pyro. With hydroquinone ammonia appears unsuitable, and consequently the carbonates or hydrates of the fixed alkalis are used.

Hydroxylamine hydrochlorate ($\text{NH}_2\text{OH HCl}$) has also been used, but during development nitrous oxide gas (N_2O) becomes formed, which is said to cause injury to the film.

The ferrous oxalate developer needs a word. This is a solution of ferrous oxalate in excess of potassic oxalate, ferrous sulphate mixed with potassic oxalate forming ferrous oxalate and potassic sulphate, the former being dissolved by the excess of potassic oxalate present—

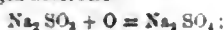


This is also a powerful reducing agent, becoming oxidised to ferric salt—



The difference in the state of the iron, before and after development, is readily shown by the action of reagents.

Sulphites of sodium and potassium are often used to preserve pyro in solution, and also to prevent the film becoming stained during development; they appear to act as oxygen absorbers—



though I prefer to use pyro dry, as the presence of sodium sulphate, a great restrainer, can hardly be considered desirable in a developing solution.

The use of alum subsequent to development appears to have a toughening effect on the film, preventing frilling, and tending to remove pyro stain. It is impossible to represent this action by a chemical equation, though gelatine and alum have probably the property of entering into some kind of chemical combination.

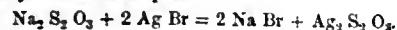
In addition to the various reducing agents employed as developers, the alkalis—ammonia, potash, and soda, and their carbonates—are variously used as accelerators; ammonia appearing to act most energetically. When the fixed

alkalies (potash and soda) are used, the films do not appear to be so much stained with the developer as with ammonia.

The next operation is to place the negative in the fixing bath so-called, as it renders the image permanent by removing the silver bromide unacted upon by the light: were this not done, of course the image would be impartially reduced on exposure to light. Hyposulphite of sodium is the fixing agent in general use, though other salts, as potassium cyanide and ammonia, can be used. This salt is properly called thiosulphate, it being considered to be sodium sulphate (Na_2SO_4), in which one oxygen atom has been replaced by sulphur—



This salt acts by double decomposition—



This silver hyposulphite combines with excess hypo, sodium forming the soluble double salt—



There is another double salt formed when the hypo is not in excess—

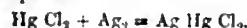


which is but sparingly soluble; hence it is of great importance that the hypo be not too much economised.

After fixation, a clearing bath of acid and alum is frequently employed, but care should be taken to thoroughly wash off the hypo first or the hypo will be decomposed thus:—



An operation sometimes necessary to perfect or improve a negative is intensification. This is generally done by the application of a soluble mercuric salt (as the chloride) to the film, whereby a deposit of mercury by galvanic action takes place—



The ammonia next applied converts the mercurous chloride into mercurous ammonium chloride.



On the other hand, negatives may be reduced by application of a solution of potassium ferricyanide and hypo; the action taking place here would probably be reduction of the ferricyanide ($\text{K}_3\text{Fe}(\text{Cy})_2$) to ferrocyanide ($\text{K}_4\text{Fe}(\text{Cy})_2$), the oxygen formed, combining with the silver of the image, would as silver oxide (Ag_2O) be removed by the hypo.

Having reviewed the various chemical reactions involved in the production of a negative, I now come to the consideration of positive prints, the end to which the negative is the valuable means. Printing on albumenised paper is probably the method with which the majority of us are best acquainted, and is entitled to first mention.

The ordinary sensitised paper of commerce is paper which has been coated with ammonium chloride and albumen, and then floated on a solution of silver nitrate, so that in addition to the silver chloride formed by reaction between the ammonium chloride and silver nitrate—



silver nitrate shall also be present. This nitrate of silver is responsible for the milkiness noticeable when prints are immersed in water before toning, owing to the chlorides, sulphates, and carbonates present in ordinary water precipitating the respective silver salts.

At the same time when the paper is floated a compound of silver and albumen, termed albuminate of silver, is formed; the albumen has also a mechanical action in keeping the layer of sensitive salts on the surface of the paper.

Albumen is, as we know, white of egg, and as eggs are seemingly more abundant on the Continent than here, the greater part of our albumenised paper is made abroad.

The commercial ready sensitised paper has also, I believe, a small quantity of acid added to improve its keeping qualities.

Chloride of silver on exposure to light, when in contact with organic matter, as albumenised paper, becomes darkened to subchloride—



This liberated chlorine, if nitrate of silver be present, combines with its silver, forming chloride of silver again and free nitric acid.

The albuminate of silver present is reddened by exposure to light to a suboxide (Ag_2O). This suboxide when acted upon by hypo is converted into metallic silver and silver oxide, which is dissolved to a great extent. The hypo also removes the subchloride of silver, leaving a certain amount of metallic silver from it.

Toning consists essentially in the deposition of gold or some other metal upon the silver of the print; before toning it is desirable to get rid of the free nitrate of silver, otherwise nitrate of gold and chloride of silver would be formed by double decomposition. The toning bath generally used consists of a solution of chloride of gold and any salt in which a fixed alkali is combined with a weak acid. Acetates and alkaline carbonates are capable of precipitating gold from a neutral solution in the presence of organic matter. In the acetate bath the following change takes place—



Bicarbonate, phosphate, tungstate, borate, and possibly other salts of sodium or potassium may be used, but the action in all cases is the same, viz., a gilding of the silver particles of the print with a deposit of gold. The varying tones obtained with different salts is no doubt due to the fineness or otherwise of the precipitated gold particles, as well as to the amount precipitated.

In addition to gold, other metals, as uranium and copper, may be used where uranic salts are. Used with gold they become reduced to uranic and

precipitate gold, and are reconverted to uranic; but there are other processes in which uranium itself is deposited on the print.

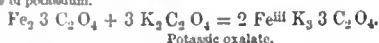
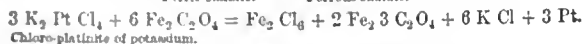
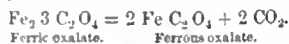
In fixing prints the chemical change is mainly the same as that in fixing plates viz., by formation of soluble double salts, but other reactions are involved as stated. It will also be noted that from the decomposing action of acids on hypo it is advisable that the alkalinity of the fixing bath be assured; this is, of course, easily ascertained by using litmus paper. The thoroughness of the subsequent washing is also of the utmost importance, as the slightest trace of hypo left in the print is fatal to its permanence, owing to the instability of this salt. A ready test for the determining its absence is to add a little of the so-called iodide of starch, made by adding a solution of iodine to starch paste to some of the washing water, when if any hypo be present the colour will be instantly discharged, owing to formation of iodide and tetrathionate of sodium.

The sulphocyanides of ammonia and potassium are also occasionally used for fixing. Other methods of silver printing are typified by bromide and Alpha paper; in these gelatine is used instead of albumen, and subsequent development is necessary. The bromide paper is, as we should expect from the superior sensitiveness of silver bromide to chloride, as well as to its conjunction with gelatine instead of albumen, much more sensitive to light than that just referred to.

The Alpha paper is gelatino-chloride, and though not so sensitive as bromide is yet much more so than albumen chloride paper. The reactions occurring are of the same nature as described.

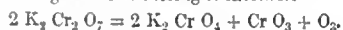
Platinum printing is a method having probably a great future before it, owing to its absolute permanence, and is already taking the place of silver to some extent.

The rationale of this process is that the salts of platinum are reduced, i.e., the metal is set free, by ferrous salts, and that ferric salts when exposed to light, under favourable conditions, become reduced to ferrous. The reactions are thus represented—



The ferro-prussiate process is another method of printing from the negative, also much used. This also depends on the sensibility of ferric salts to light. A paper brushed with ferric citrate exposed to light, has its iron, where exposed, reduced to ferrous salt. Now ferricyanide of potassium gives a blue precipitate (Turnbull's blue) with ferrous salts but not with ferric; this reagent is accordingly applied to the print after exposure, and the light-affected parts become proportionately coloured.

I have now another process to consider, one not in general use by amateurs, though our Society has been fortunate in having a practical demonstration brought before it by Mr. Cade. This, the carbon or autotype process, depends upon the sensibility of the bichromates to light. The paper is prepared by coating with a solution of pigmented gelatine; it is then floated on a solution of bichromate of potassium or ammonium. By the action of light in presence of gelatine, these bichromates become reduced, some of their oxygen combining chemically with the gelatine rendering it insoluble—



By the action of hot water the soluble parts, i.e., those unacted upon by light, are removed, and the image remains in pigmented gelatine.

The bichromates are dangerous poisons, and may be absorbed through the skin. I saw it stated in print the other day, that half the employees of the principal carbon works suffered with this disease.

I think I have now touched upon the chemistry of the majority of photographic processes, and if I have not made myself clear in any way I shall be glad to give any further explanation that is in my power. I only hope that I have shown that the photographer who sets to work with an intelligent appreciation of the chemical changes he sets in motion has a considerable advantage over one who views these interesting reactions as merely mechanical and has no other method than "rule of thumb." J. C. WIGGIN.

VEGETABLE DEVELOPERS AND ORGANIC DEVELOPERS.

In *La Science en Famille* M. Mercier, a chemist, writes regarding vegetable developers:—"In the course of recent studies of photographic developers I was led to experiment with a variety of vegetable substances which possess the property of becoming oxidised in contact with the air, under the action of light, gradually assuming a deeper and deeper degree of colourisation. Such are, for example, *ésérine* or *calabarine*, a derivative of the Calabar bean, of which it is the active principle, and which is much used for the treatment of various diseases of the eye. *Esérine*, when pure, has a considerable resemblance to gelatine, absorbs moisture with great facility, and is rapidly transformed into a strongly coloured violet black substance. The solutions keep badly, especially in bottles which are not quite full, and take on there also a deep violet colour. My experiments were made with a solution of one gramme to a hundred, to which was added ten grammes of sulphate of soda and ten grammes of carbonate of potassium. In this solution, which is perhaps rather too dilute, the image develops very slowly, but still it develops, and in from ten to fifteen hours a negative is obtained which, instead of being black like those developed with iron or hydroquinone, is of a beautiful violet colour. In this way positives upon glass may be obtained of a very remarkably delicate shade. If the addition of sulphate of soda be omitted the negative develops

more rapidly, but the solution becomes very rapidly altered. Unfortunately, *ésérine* is expensive, costing no less than ten or twelve francs per gramme; therefore, it need only be mentioned as a photographic curiosity. It is also as a matter of curiosity that I mention certain vegetable infusions which give results that are appreciable, if not very practical, such as the infusion of mullen—flowers. These flowers, when freshly pulled, are of a beautiful yellow colour, but become black when exposed to air and light, and should be stored well heaped together in bottles covered with tinfoil. If an infusion of them be made in water containing five per cent. spirit, and ten per cent. carbonate of potassium, be added to it, and then the infusion be used to treat an exposed gelatino-bromide plate, one will obtain, after a certain number of hours, a negative in which the parts which have been subjected to the action of the luminous rays will stand out visibly. A concentrated infusion of green tea gives sharper results: an image is obtained in which the details are perfectly distinct. One may, for example, take fifty grammes of tea and infuse it in a hundred grammes of water, and, after having squeezed out the infusion and filtered it, one may add fifteen to twenty drops of pure ammonia, after which nothing more remains to be done except to place the exposed plate in the liquid, and to wait a few hours. Chinese ink gives analogous results; in this case it is the tannin which acts, just as in the tea and the mullen. A warm infusion of these substances reduces nitrate of silver, and a cold infusion reduces bromide of silver exposed to light. It is probable that many other vegetable substances, such as fresh walnut water, the juice of which rapidly darkens when exposed to air, would have a similar developing action. *Guaiaicum*, which contains a very easily oxidised resin, produces much more rapid effects. It is sufficient to pour a warm solution of ten grammes of carbonate of soda in a hundred grammes of distilled water upon thirty grammes of *guaiaicum*, which has been previously moistened with alcohol at 90° (but not turned blue by the action of light), in order to have a developing liquid. When an exposed plate is dipped into it the image appears in a few minutes, and a negative is obtained full of details, excessively light, and with a very peculiar yellow tint." With regard to the foregoing and organic developers, M. Eugene Ackermann writes in *La Nature*:—"Having read a recent notice concerning vegetable photographic developers, and thinking it might interest your readers, I wish to point out other two substances which possess the property of becoming gradually oxidised under the action of air and light, and of consequently assuming a deeper and deeper colour. They are *thalline* and *kaïrine*—two substances recently introduced as *materia medica*, and said to be antipyretics. These substances, whether in aqueous or alcoholic solution, when placed in contact with a little paraldehyde, are not long of becoming coloured. This is especially the case with *kaïrine*, which is the subchloride of methyltetra-hydride of oxyquinoleine. The colour assumed by the thalline is a brownish green, gradually becoming brown, while the colour of *kaïrine* is at first red, then a brownish red. It was in the course of certain researches concerning the alkaloids that I had occasion to verify these two reactions, which took place even when the quantities of the substances employed were small. The price of these solutions would be moderate, and one would have the advantage of using solutions of an exact composition, which could hardly be the case with vegetable infusions. With regard to the reaction, I think that the paraldehyde becomes retransformed into the aldehyde for the reduction of both substances."

THE EFFECT OF ELECTRICITY ON DRY PLATES.

[A Communication to the Society of Amateur Photographers of New York.]

I was much interested a short time ago in an account of a demonstration given before an English Society by Mr. F. Greene, wherein he intended to prove that a facsimile of a coin could be impressed upon the moist film of a dry plate by the action of a current of electricity passing between the terminals of a battery, one of which was immersed in an acid solution and the other connected with and rested upon the coin laid on the film of the plate, the latter being also immersed in the solution. After the current passed for a short time, the coin was removed and the plate put into a developer. Soon a distinct negative image of the coin appeared. The experiment showed that by electric action and without the aid of light an impression was made.

Knowing from some experiments made by a friend of mine, Mr. John R. Paddock, of the Stevens Institute, on the electrical conductivity of the bromide film of gelatino-bromide paper, resulting in proving that it was nearly a non-conductor, I hesitated to believe that the result obtained by Mr. Greene was entirely due to direct electric action, but imagined that it might be the result of some secondary effect induced by the electric current. With a view of investigating the subject further, I invited Mr. Paddock to carry on a series of experiments under my direction, and supplied him with a dozen $3\frac{1}{2} \times 4\frac{1}{2}$ gelatino-bromide, and also the same number of gelatino-chloride plates, the latter being of English manufacture. He has recently handed me a report of some of his experiments, which is substantially as follows:—

FIRST SET OF EXPERIMENTS.

A bath of muriatic acid, two drachms; water, ten ounces, was first made. Two gelatino-chloride plates were placed in the bath in a hori-

zontal position, films upward, and on one rested a silver half dollar coin, and on the other a silver dime. The battery consisted of five Leclanche cells, connected in series. The electric current was then passed through the solution for thirty seconds, from the positive platinum pole in the solution to the negative platinum pole on the coin. After keeping the plates in a pyro and potash developer for from ten to twenty minutes the image of the coins was faintly discernible. Plate marked No. 1 shows the result. Merely a faint outline of the coins will be observed.

A third gelatino-chloride plate was immersed in the solution, having the coins resting on the film, but no current was passed through. No impression was obtained on development.

A fourth plate of the same brand was suspended film side downwards, horizontally, in a bath of water. A rubber tube was carried under the solution until the mouth of it was one-fourth of an inch away from the centre of film. Then a current of hydrogen gas was sent through the tube, and in emerging at the mouth gradually spread over the film. When placed in the developer the plate turned a deep black colour over the entire surface.

SECOND SET OF EXPERIMENTS WITH GELATINO-BROMIDE PLATES.

The plates were all immersed in a muriatic acid bath as before, and connected in the same way. On the first plate was placed a half dollar silver coin, having the edges and one face protected with wax. The unprotected face was placed in contact with the dry film, and cemented at the edges with wax, and then immersed in the acid bath, the negative pole being connected to the coin. The current could only act on the under side of the coin next to the film. The current was then passed through for two minutes. In raising the coin from the plate a small portion of the solution worked in under the edge, which appears in the peculiar book appearance shown in the resulting disc; but prior to immersion in the developer nothing was observed on the plate. After development for several minutes a dense black disc, with a faint marking of the dots on the coin, was obtained, but it was nothing like a satisfactory image or facsimile of the coin. In plate No. 2 the peculiarity of the disc will be observed.

Other coins of copper, a German coin (alloy twenty-five per cent. of copper), and an engraved copper plate resting on the film, with the electric current passing as before were tried, but on being placed in the developer no impression appeared.

A third set of experiments included the immersion of chloride plates in a chloride of ammonia bath, using the same electric current and silver coins as above, but the results were not as satisfactory, only indistinct, blackened impressions appearing during development.

A plate was moistened and coins of various kinds pressed down upon the film. On development the impressions came out as good as when no electricity was employed. Plate No. 3 shows the effect very clearly. It should be mentioned that if a chloride or bromide silver film be stripped from a support and be subjected to a current of electricity passing directly through a cross section, the film will blacken at the negative pole by reason of the silver salt in the film.

The opinion of Mr. Paddock and myself is that the blackening effect produced in the film is the result of the reducing action of hydrogen gas, generated in its nascent state, in contact with the film by the current of electricity passing between the two poles, and not to the current alone, as stated by Mr. Greene. This he, in part, proves by causing a stream of hydrogen gas to impinge against the film, immersed in water; when developed the film blackens precisely like the disc obtained with the waxed coin.

Passing next to the effect of a high tension current (such as is obtained by an induction coil) on a dry plate, I have been much interested in an article by J. Brown, "On Figures Produced by Electric Action on Photographic Dry Plates," published in the *London Philosophical Magazine*, and reproduced in the January, 1889, issue of the *American Journal of Photography*. In photographing the discharge between the electrodes of an induction coil, Mr. Brown was led to further experiment on the effect of the current when applied directly to the film. He obtained some interesting results, the most important of which was the discovery that an induced current so slight as to be invisible to the eye produced an impression on the film of sufficient strength to be developed out. He says: "The foregoing results would go to show that actual disruptive discharge over or in the film is not needed to produce an effect visible on development, but that the figures and markings are produced partly, at least, by direct electric action on the sensitive film, without the intervention of a visibly luminous action, or what would be usually understood as a purely photo-chemical cause. Possibly further investigation may show that we have here a new kind of experimental evidence on the relation of electricity to light."

It is presumed the experiments were carried on in absolute darkness, so that the eye might easily detect the least trace of the inductive current. Nothing in regard to this, however, is stated. If a faint red light were used, it might prevent the indistinct electric sparks from being noticed. Plates of extreme sensitiveness were employed, and it is possible they may have been impressed with the faint light not seen by the eye.

A short time ago, with the assistance of Mr. George M. Hopkins, of the *Scientific American*, I tried a few experiments, more especially with a view to determine, first, what the actual electrical resistance of a section

of an undeveloped and developed gelatino-bromide film is; and, secondly, to satisfy myself as to what effect an invisible induced electric current has on a wet and dry surface of a gelatino-bromide film.

First, then, I prepared two sections of plates of exactly the same length and width (four inches long by one inch wide), wrapping tinfoil around each end, and marked respectively A and B. A is the developed and fixed section; B is the plain, undeveloped portion. These in turn were laid upon a block of pure paraffin wax, and then connected with a battery of six standard gravity zinc and copper battery cells, a Bergmann Wheatstone bridge, and a Thompson reflecting galvanometer (the most delicate that is made), and carefully tested as to the amount of current they (the plates) would conduct. After spending nearly two hours in conducting these experiments, the conclusion reached was that there is no conductivity in the gelatine film containing the salts of silver. The only measurement we did obtain amounted to over a million ohms resistance, which is equivalent to infinity. There was no difference either in a developed or plain film.

From an eight by ten gelatino-bromide plate of medium rapidity we cut off four strips, one inch wide and eight inches long. These we respectively laid on a paraffin block and experimented with an induction coil run by five cells of a medium sized bichromate plunging battery. We wrapped the tinfoil about an eighth of an inch in width around the end of each strip, and connected them with the fine wires from the secondary poles of the coil. The by-pass points of the coil were separated about two inches, to force the current to pass over the wires and across the section of the strip. The wires were covered with a piece of silk cloth to prevent any light that might come from them from striking the plate. A very weak induced current was generated and kept up for two minutes. The strip marked C was thus treated. Next a strip marked D, subjected to the same current for the same time, was moistened with water. In each case no current in the darkness of the room was observable to the eye, but when looking closely at the strip the nose detected the peculiar odour of ozone. A third strip, marked E, was then held in the air at right angles to the passage of the spark passing across between the two by-pass points of the induction coil, these being about one and a quarter inches apart. Numerous discharges were allowed to play against it for about a minute, and seemed enough to fog it badly. Lastly, a fourth strip, marked F, was laid on the paraffined cake, the by-pass points drawn apart and the full force of the induced current put on. A bluish light glowed all around it; the current was observed to leap across in the air about half an inch above the strip, showing beyond a doubt that the film had no attraction for it. The distance between the wires connecting it to the strip was decreased one-half; still the current would prefer the air to the plate.

I placed all the four strips (C, D, E, F) in one tray, and poured over them a pyro and potash developer, containing two grains of pyro and four grains of carbonate of potash to the ounce. In about a minute and a half the films of all commenced to turn, and after three minutes' development they were all pretty well blackened.

C and D show no markings other than a general turning of the film. E shows the distinct tracing of the sparks as they flew over the film, the points of contact and departure being very foggy. F shows the effect of the light very plainly at the terminals where it was surrounded by the wires.

In the cases where there was no electric spark visible and where the plate was in total darkness, I cannot account for the turning of the film in the developer, unless it was caused by some subtle influence of the current not fully explainable, or to chemical fog. I at first attributed it to the atmosphere of ozone which must have been over the film, but to prove it I had Mr. Hopkins to generate ozone by running a series of electric sparks between needle points enclosed in a paper cylinder. Rubber tubes passed from each end of the cylinder. At the end of one tube was placed a sensitive plate protected with a metal shield having a star cut in it. After the electric current had generated sufficient ozone in the paper tube, air was blown in one end, which forced the ozone out against the sensitive plate at the end of the other tube. This was kept up for one minute, during which time the ozone was continuously generated. The experiment was carried on in total darkness. The plate marked G was thus treated. After being kept in a pyro and potash developer for ten minutes the entire film simply darkened slightly, but no impression of a star was brought out. The star marks on the edges of the plate developed out very distinctly, as they usually do. From this experiment I am able to conclude that ozone has no effect on a dry plate. Three other plates, marked respectively H, I, J, were next subjected to the induced electric spark by placing them on a cake of paraffin and resting the terminals of copper wire parallel with the edges. Curious discharges of the spark across the plates were easily developed out, showing that a very faint electric light is sufficient to produce an impression. The sensitive plate thus affords a convenient means of recording the varying forms and shapes of electrical discharges.

In order to confirm my conclusion as to the effect of ozone, I supplied Mr. Hopkins with two other plates of one maker, Cramer 40, 4 x 5, and had him expose one in absolute darkness for five minutes to the ozone, and the other for two minutes. These I placed in a hydroquinone developer (ten grains hydroquinone, fifteen grains carbonate of potash to the ounce), and kept them there for half an hour, covering the dish during development. Nothing appeared except a slight darkening of the

film all over; not a sign of the star I had hoped to obtain was visible. Plates marked *K* and *L* were thus treated.

Taking into consideration the excellent electrical conducting qualities of metallic silver, it is rather surprising to note that its salts, when inclosed in a gelatine film, appear to be such a good electrical insulator.

If electricity is ever to be employed in transmitting photographs by telegraph, it will have to be done by some method of controlling the variations of light, and not by any direct action of the current. Mr. Paddock and myself are about to experiment in this direction. The field is an interesting one, and there is room for several useful experiments. What I have said is the latest in this line, and I trust my work may stimulate others to experiment further.

F. C. BACCH.

PHOTO-MICROGRAPHY.

[A Communication to the Glasgow Photographic Society.]

PHOTOGRAPHY has become the handmaid of many arts and sciences, and of none more so than of microscopy, which itself has of late been raised to the rank of a distinct science. The art of photographing the image of a microscopic object, which image has been enlarged by the microscope, is called by the unphonious name of "Photo-micrography," in contradistinction to "Micro-photography," which name has been given by common consent to the art of producing microscopic photographs of large objects, which microscopic photographs require the aid of a microscope to render their details visible. Photo-micrography has probably been practised since photography received its practical application. No one who has used a microscope can have escaped the desire to keep permanent records of the wonders it reveals. Dr. J. W. Draper, of New York, is supposed to have been the first to take a photo-micrograph by the daguerreotype process, as he was also the first to take portraits by this method. Mr. Dancer, of Manchester, produced, about 1840, photographs by the aid of the oxyhydrogen lantern microscope. In 1841 Mr. Richard Hodgson obtained excellent daguerreotypes of microscopic objects, and the Rev. J. B. Reade and the Rev. Charles Kingsley, as well as Mr. Talbot, also devoted their attention to the subject in question at an early stage. Dr. Donné, of Paris, presented, in 1840, to the Academy of Sciences copies of photographs of various microscopic objects on daguerreotype plates, and in 1845, as Moitessier tells us, Dr. Donné "publiait avec Monsieur Léon Foucault un magnifique atlas relatif à l'étude des fluides de l'économie et contenant un grand nombre de figures gravées d'après des images daguerriennes."

In this country one of the earliest publications on the subject of photo-micrography was a paper presented to the Microscopical Society in 1852 by Mr. Joseph Delvee, which was followed by some beautiful prints taken from his collodion negatives, which were issued with the following number of the *Quarterly Journal of Microscopical Science*. The short time at my disposal this evening does not permit me to enter further into the history of my subject, and I will confine myself to mention the names of some of the principal workers in the domain of photo-micrography. These are Messrs. Shadbolt, Hignley, F. H. Wenham, Dr. Maddox, the inventor of the gelatino-bromide dry plates, Barry, Davies, Dr. Wilson, Dr. Abercrombie, Dr. Herapath, George E. Davis, Dr. E. M. Crookshanks, J. Mayall, jun., E. M. Nelson, and many others. In France we have, besides Donné and Moitessier already mentioned, Foucault, Dubosq, Dr. Miguel, Bertsch, Roux, the assistant of Pasteur, &c.; in Germany, Gerlach, Albert, Mayer, Reihardt, Pohl, Siebert, Dr. Koch, Dr. Roderich Zeiss, Professor Cohen, Reinseh, and many biologists and physiologists of the present day; in Belgium, Neyt, and, in recent times, Dr. van Heurck, Director of the Botanic Gardens in Antwerp; in Italy, the Abbé Count Castracane; and last, but not least, in the United States of America, Rood, Draper, Fowler, Crehore, Dean Rutherford, Seiler, Mercer, Dr. Sternberg, Dr. Colonel Woodward, and Dr. Curties, of whom the latter stand pre-eminent as masters of photo-micrography. The number of those practising this art to-day has probably to be counted by thousands.

The object of photo-micrography is to produce a faithful photograph of the enlarged image of a microscopic object, which shall not only show everything apart from colour what we can see in the microscope, but even more. The microscopical image can also be drawn by means of a camera lucida, but this process requires a great deal of time and a hand skilled in the use of the pencil. Frequently, however, we are unable to delineate the image in this way, owing to rapid changes in the constitution and the shape of the object under observation. A drawing is, moreover, always open to the objection that the draughtsman may not have copied faithfully, and may have drawn upon his imagination. From this reason retouching is not permissible in photo-micrography. The negative must remain untouched; intensification or reduction of density are the only changes which, in some circumstances, may be made in the negative. The importance of photo-micrography is obvious, as it is the most reliable and easy means of making faithful records of the appearances and measurements of microscopic objects, be it for the illustration of scientific books or for lantern slides to illustrate lectures, or for supplying evidence in law courts in cases of adulteration, forgery, murder, &c. In the domains of botany, biology, physiology, pathology, bacteriology, chemistry, petrology, &c., in fact, wherever the microscope is used, there photo-micrography is destined to become daily of more service and im-

portance. It is also an agreeable and useful pastime to the possessor of a microscope and of a camera, and can be practised independently of the weather and of the light of day, for even at night plates may be exposed and wasted to satisfy the most enthusiastic amateur. As a means of practising the virtues of patience and perseverance, photo-micrography is, in my humble opinion, almost unsurpassed, for endless are the failures and troubles which the beginner in this branch of our black art will have to encounter. There are the difficulties of finding suitable objects; of their correct illumination; of suitable objectives; of equal illumination of the plate; of obtaining the correct chemical focus; of correct exposures, varying from a fraction of a second to several hours; the chances of vibrations during exposures over which the photo-micrographer has no control; the difficulties of development and of printing, and so on. Owing, however, to many important improvements in microscopical lenses and apparatus, as well as to the greater perfection and sensitiveness of the dry plates, and thanks, also, to the experience of those who have practised photo-micrography for years, and of whose experience the younger disciples are reaping the benefit, photo-micrography is now very much easier than it was even five years ago, and, indeed, it may be said that when practised with low and medium powers offers few difficulties, if any.

The *modus operandi* of taking a photo-micrograph consists chiefly in the following operations:—

1. Focussing and illuminating the object in much the same way as for visual examination.
2. Connecting the eyepiece end of the microscope with the camera.
3. Focussing the image on the focussing screen.
4. Replacing the latter by the carrier containing the sensitive plate, and making the exposure.
5. Developing the negative.

Many articles on photo-micrography have appeared, chiefly in photographic publications, which really do not contain more information on the subject than what I have just enumerated. In the February number of a quasi-scientific journal appeared again one of those shallow articles, in which the writer of it stated that he was greatly pleased and astonished that he had succeeded in producing at once some passable photo-micrographs.

To command success in photo-micrography requires not only the possession of a good microscopical apparatus and camera, but also an intimate acquaintance with the principles of microscopical illumination and of photography.

Regarding the necessary apparatus, the *microscope stand* claims first our attention. It need not be large and complicated, but it must be good; above all, it must be steady and free of tremour, as all vibrations imparted to the stand supporting the object will make themselves the more felt the more the object is magnified, and will result in a blurred image. The stand must possess a good and extra sensitive fine focussing adjustment, which keeps the objective strictly in the optical axis of the instrument, and does not move the image about in an eccentric fashion on the focussing screen. As regards the general plan on which an instrument for photo-micrography should be built, I consider it most desirable that it should be built on the old Ross or crane-arm model as far as the support of its body or optical tube is concerned, because you can then replace the ordinary single or the binocular body by a short or a long body tube of about two inches in diameter, which prevents the projection of a luminous flare spot in the middle of the light sensitive plate, and which flare spot is caused by the internal reflection of the narrow body tube, and is generally not much noticeable on the screen. All microscopes are provided with one or two mirrors; in the latter case, one is plane the other concave, but in photography it is generally preferable to use the light direct. A diaphragm, i.e., a plate pierced with a series of holes of different sizes, or an iris diaphragm, is an indispensable adjunct of a microscope, as it enables us in many cases to give sharpness or depth to the image by stopping down the angle of the illuminating cone of light, provided always that in doing so we do not sacrifice the amount of resolving power requisite for the display of the structure of the microscopic object.

The mechanical and concentric rotating stage is a luxury if it is of the best possible workmanship, but an inferior mechanical stage is an abomination to which a substantial plain stage is infinitely to be preferred. In order to display successfully the delicate structures of microscopical objects, we must have recourse to all the refinements of illumination which we can command, and we must bear in mind that the intensity of the illumination of the image projected on the focussing screen decreases in inverse ratio with the superficial magnification of the object. Thus, if we magnify an object 1000 diameters, or one million times superficially, the intensity of the illumination of the image on the focussing screen or on the sensitive plate is only the one-millionth part of the intensity of the illumination of the object itself, and from this we have further to deduct the losses which the light suffers through absorption and reflection in passing through the lenses of the microscope. In order to increase the intensity of the illumination of the object, we require to make use of various appliances which serve for the concentration of a greater quantity of light on it than what it would receive without these appliances, and which are termed condensers and reflectors. The simplest condenser is the stand or bull's-eye condenser; generally a plano-convex lens of large diameter, and sometimes a Herschellian condenser, which is composed of two such lenses, and which arrangement is capable of giving a larger and flatter illuminated field than the single lens. The stand condenser is an indispensable and most useful piece of apparatus, and if properly under-

stood can be turned to excellent account. By its means we are enabled either to fill out the aperture of a low-power objective with light, or to focus an intense bright and sharp image of the source of light on the object, which is one of the axioms of microscopical illumination under medium and high powers. For these latter, achromatic substage condensers are required which project an illuminating cone of great angular aperture on the object. They consist generally of two or three plano-convex superimposed lenses, and one or two diaphragm discs, the one containing a number of apertures, sometimes from the $\frac{1}{16}$ th of an inch in diameter, as in Powell and Lealand's condenser, to the full size of the anterior lens. The second diaphragm contains various central spots to produce dark-ground illumination, and a number of single or double slots, so as to give only marginal or oblique light from one or two directions. Some of these condensers, such as Abbé's, as well as certain specially constructed condensers for the use of immersion objectives, the nature of which I shall explain later on, require to be united with the under side of the object carrier or slide by means of a drop of fluid of far higher refractive power than air, such as water, glycerine, fennel oil, cedar-wood oil, &c.

Apart from these achromatic condensers, we have diffusion condensers for low powers and dark-ground condensers—such as the spot lens, the dry and immersion paraboloids, Wenham's reflex illuminator, &c., which make transparent objects mounted on transparent ground appear brilliantly illuminated by reflected light, leaving the ground quite black. The principle of dark-ground illumination is to send the light rays so obliquely on the object that in passing through it they do not enter the front lens of the objective, but pass on beyond it. In this way only rays which are reflected from the irregular surface of the object itself reach the objective, all axial illuminating pencils being stopped off.

Correct microscopical illumination depends, first of all, upon the choice of the illuminator, and, secondly, upon its proper adjustment and focus, and, also, upon the relation of the aperture of condenser to that of the objective, the rule being that the aperture of the condenser ought to be the same as that of the objective, if we wish to obtain critical images.

The micro-polariscope is an accessory which serves to illuminate objects by polarised light, and is especially useful for differentiating the structure of certain classes of microscopical objects. It consists in its usual form of two prisms of Iceland spar, of which the larger one is called the polariser. The polariser is always placed below the object to be examined, whilst the smaller prism, termed the analyser, is placed above the object, either between the objective and the body of the microscope or above the eyepiece. In the latter position of the analyser, the definition is better than in the former, but it cuts off two segments of the field of view. Both polariser and analyser must be capable of rotation round the optic axis of the instrument.

Opaque objects may be illuminated by the bull's-eye condenser, by prisms, or by reflectors, which are generally made of so-called speculum metal. Such reflectors are the parabolic side reflector, the cylindrical reflector, and the Lieberkuhn. This latter is an appliance resembling in shape the mouthpiece of a trumpet; its parabolic surface is silvered and it slides over the objective, the focus of its parabolic surface coinciding with that of the objective and the position of the object on the stage. The Lieberkuhn has to be illuminated by rays parallel to the optical axis, and the objects for it must be mounted, so that the light from the mirror can pass around them and fall on the silvered parabolic surface, from which it is reflected downwards on the object.

The compound microscope consists of objective and ocular or eyepiece, and the former is by far the most important and essential part of the instrument. Micro-objectives are achromatic combinations of lenses, because it is impossible to produce single lenses free from chromatic and spherical aberrations, which defects make themselves most felt in lenses of great apertures. Micro-objectives are designated by their focal lengths, expressed in inches and fractions of inches, or in millimeters; thus we speak of lenses of 4, 3, 2, 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, &c., and $\frac{1}{10}$ inch focus, but these foci do not represent the actual foci or working distances, which are far shorter, but they represent the focal lengths of single lenses having the same magnifications as these compound systems—in other words, these figures represent the equivalent focal lengths of single lenses. A micro-objective possesses certain qualities in a greater or less degree. There is, first of all, the defining power or definition, by which is meant the completeness of its corrections for spherical and chromatic aberration, which quality is easiest attained in lenses of moderate aperture. The flatness of the field of an objective enables us to see the central and the peripheral portions of the field simultaneously equally well defined. The penetration or penetrating power, which is called depth of focus in photographic lenses, enables us to see parts of an object lying in different planes well defined, and this without alteration of the focus. The penetrating power of a micro-objective is very limited, and becomes the more so the wider the angle, and consequently the greater the resolving power. This want of penetrating power is the weak point of a photo-micrograph, because only one plane of the object is in focus. The penetrating power decreases in inverse ratio with the aperture of a lens. One of the most valuable properties of a lens is the resolving power, by which closely approximated structural details and surface markings, such as lines, gratings, dots, and apertures are separately discerned or optically resolved. The resolving power, proper corrections of the lens granted, depends upon the angular aperture of the objective, or upon its capacity of collecting oblique image-forming rays proceeding from the object, provided always

that these rays pass through the object glass and assist in forming the image. Hence opticians strive to make micro-objectives with as wide apertures as possible, the largest in air being obviously 180°. Not content with this, they are supplying immersion objectives, whose front lenses have to be immersed in a drop of water, glycerine, or oil placed on the thin glass covering the object.

ADOLF SCHULZE, F.R.S.E., F.R.M.S.
(To be continued.)

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7939.—"Improvements in Combined Instantaneous and Time Shutters for Photographic Cameras." J. T. DANIELS.—*Dated May 13, 1889.*

No. 7983.—"Improvements in Cameras for Making Lantern Slides or Copying Photographic Pictures." W. GRIFFITHS.—*Dated May 14, 1889.*

No. 8054.—"Improvements in Photographic Cameras." J. H. SKINNER.—*Dated May 14, 1889.*

No. 8085.—"Improvements in the Production of Developers for Photographic Use." H. W. JONES.—*Dated May 15, 1889.*

No. 8274.—"Improving the Means of Focussing Photographic Cameras." C. O. ELLISON.—*Dated May 18, 1889.*

No. 8474.—"Improvements in Holders or Carriers for Flexible Sensitive Photographic Films." W. B. BOLTON.—*Dated May 22, 1889.*

PATENTS COMPLETED.

A PORTABLE TRIPOD STAND AND HEAD.

No. 9518. WILLIAM MAVITT, Unity-cottage, Heathfield-road, Birchfield, Birmingham.—*June 30, 1888.*

THE stand is composed of three portions, one part folding with nick and spring joint, and the other sliding, the combination when closed being perfectly square and solid, and practically indestructible by ordinary fair usage—the material to be either of wood, metal, or other substance, or combinations thereof—and the dimensions immaterial.

The head is different in form from most other arrangements of the kind, the legs being connected inside the ears of the head, instead of outside, and the traversing set screw or pin and bolt render the attachment so rigid and perfect that only by a breakage can the legs become detached.

IMPROVEMENTS IN APPARATUS FOR PRODUCING AND DISCHARGING CURRENTS FOR WASHING PHOTOGRAPHIC PLATES AND PRINTS OR OTHER ANALOGOUS PURPOSES, CAPABLE OF BEING ATTACHED FOR USE UPON OR TO ANY ORDINARY VESSEL.

No. 9711. WILLIAM TYLER, 57, High-street, Aston, Birmingham.—*July 4, 1888.*

THIS invention relates to apparatus used for washing photographic plates and prints, or other similar purposes, and the object of my improvements is the construction and arrangement of such apparatus to agitate and cause the water to flow in several differently directed currents, so as to thoroughly wash the said plates or prints, &c., and also for the discharge of the overflow or impregnated liquid, by means of a pipe which is made to work automatically, or otherwise, at the will of the operator; and, further, so constructed and arranged that it may be readily attached to, or carried upon, any ordinary tank or vessel.

I provide what may be generally termed an inverted U-shaped hollow box, or syphon-like pipe, which permits of its being readily hung or carried upon the side of, say, a bucket, or other vessel; that part of the said pipe overhanging the outside of the bucket, &c., being the discharge part or pipe.

At the upper end of the discharge pipe the box is divided off into two separate compartments; the compartment of the discharge pipe continuing on again further, downwards to the other end of the box, lying within the vessel, which said end may be open or covered with a perforated plate, or such other perforations as may be desired may be made in such pipe near the end; thus, there is a continuous but independent passage from the one end in the vessel to the other end outside the vessel forming a syphon.

Again, at the crown, or upper part of the box, an opening is formed into the second division or compartment, which said opening is provided upon its exterior with a nozzle or its equivalent, whereby it may be connected to a water main or other supply. This supply would enter and pass with more or less pressure. This second compartment is then continued on as far as the inner end, or thereabouts, of the syphon pipe, and its end closed or blocked up, or, if preferred, it may be formed of a separate pipe, connected to the syphon pipe at its crown or upper bent part.

Near the lower end of this second pipe, which I will term the current producer, and in its interior, I provide short angular outlet pipes or tubes; three of such outlet tubes I find to answer well, but I may add more or put less. These said tubes are placed at various desired angles to each other, so that as the water, &c., passes through them into the vessel it shall issue therefrom in differently directed streams, thereby producing considerable agitation or whirling in the water in the vessel, in order to thoroughly wash the plates or prints, &c., placed therein. Upon the exterior of the current-producing pipe, and in suitable proximity to the outlet openings of the angular tubes, ballie plates may be used so as to still further direct the issuing streams.

Again, at the upper part or crown of the syphon pipe a communication is made from the supply chamber thereto, so that when such communication is open the water may also pass down the outer portion of the said syphon pipe; provision, however, is made so that at will such communication may be cut off by means of a valve or its equivalent operated from the exterior. Thus, when the apparatus as already described is in action and the valve open, the passing of the water down the discharge pipe exhausts the air from the whole of its.

length, and consequently produces the syphon action, when the valve may be closed and the syphon action would automatically continue, discharging the surplus water, &c., from the vessel or tank.

By these arrangements an apparatus is made which is simple, effectual, and convenient, as it may be applied to any ordinary vessel or tank.

IMPROVEMENTS RELATING TO THE MOUNTING OF PHOTOGRAPHS, AND TO THE PREPARATION OF FAC-SIMILES OF PUBLIC AND PRIVATE RECORDS, DEEDS, AND THE LIKE.

No. 5173. DANIEL KINDLE ZUMWALT, Visalia, Tulare, California, U.S.A.—
March 26, 1889.

My invention relates to an improved method of mounting photographic proofs or prints in such manner as to neutralise the tendency of the sheets to cockle or curl up, which in connexion with other steps of my said invention, as hereinafter fully explained, is particularly adapted to the production of fac-simile copies of public records, deeds, and legal instruments of record in a form suitable for convenient handling and reference, and as a substitute for and an improvement upon the mode or method of copying such papers and instruments by hand, as heretofore generally done in public offices.

The objects sought to be attained in and by my invention are to reduce the size and bulk of record books, to give fac-simile copies of all papers and instruments, whether written or printed, with every erasure, interlineation, peculiarity of handwriting, and every characteristic of the original, to prevent fraudulent alterations in such records, and to greatly reduce the cost of preparing the same.

To attain the ends of my said invention I mount the photographic proofs or prints of the papers or instruments previously taken in the usual way by means of a camera, and place and fix the sheets in pairs back to back without any intervening card or sheet, so that the tendency of the sheets to cockle or curl up is neutralised, and the prints preserve a flat condition at all times.

By photographing deeds, mortgages, and like instruments of record, and then mounting the prints back to back in the manner named, and binding or uniting the mounted sheets in book form, with the pages properly following one another, I prepare and produce reduced fac-simile copies of such papers, which are exact in every respect.

In the case of a deed or other instrument presented for record, instead of being copied by hand into a record book, as heretofore, I now take a photograph of it, and from the negative obtained I print copies in the usual way upon albumenised paper. A print is obtained in this way of each page of the instrument, and then every two prints or copies are firmly pasted together back to back to produce a single leaf or sheet. As many leaves or sheets are formed in this manner as it requires to produce all the pages or sides of the instrument, and all the copies thus prepared of instruments filed for record from time to time are made of uniform size, and are bound together in book form to produce a volume of convenient size.

By mounting two sheets of the albumenised paper back to back in such manner I am enabled to dispense with cardboard or paper mounts, because the tendency to cockle or curl is entirely overcome, and the sheets will lie flat and smooth when the book is opened. In consequence of this it is practicable to bind a considerable number of these leaves or sheets together. A volume of these photographic copies will be more compact and of less bulk than a manuscript volume of the same matter.

This method of producing and forming fac-simile copies of public records is particularly applicable to the preparation of abstracts of title in a complete form. In such case of application of my said invention copies of the deeds and other instruments in the chain of record are prepared as before described, and the photographic copies thus obtained are mounted, as before mentioned, and then bound together in the order of their dates. An abstract thus produced will present a reduced fac-simile copy of every deed, transfer, mortgage, and other instrument affecting the title in question, and will be produced at much less expense in many cases than could be done by hand.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The within-described improvement in the art of mounting photographic proofs or prints, consisting in mounting such proofs or prints back to back in the manner set forth, whereby the tendency of the sheets to cockle or curl inward toward the albumenised or printed side is neutralised, as set forth. 2. The herein-described improvement in producing and preserving fac-simile copies of deeds, records, and other legal documents and instruments, which consists in first obtaining a photographic print of each page of the document to be recorded, then mounting every two sheets back to back, and finally arranging and binding such leaves or sheets in proper order into book form.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 28	Great Britain (Technical)	5A, Pall Mall East.
" 28	Bolton Club	The Studio, Chancery-lane, Bolton.
" 28	Burley	Bank Chambers, Hargreaves-street.
" 29	Photographic Club	Auderton's Hotel, Fleet-street, E.C.
" 29	Halifax Photographic Club	Mechanics' Hall.
" 30	Liverpool Amateur	St. George's-crescent North.
" 30	Oldham	The Lyceum, Union-st., Oldham.
" 30	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 16.—Mr. Elgar Clifton in the chair.

Mr. P. EVERETT reported that he had tried comparative experiments to test a statement in a photographic journal that acetate of soda would do in place of

a carbonate or an alkali in development, the result being that he found that acetate of soda would not act at all.

A question in the box asked how gold could be prevented depositing itself in the bottle containing the toning solution.

Mr. A. MACKIE said that if the toning bath had not a tendency to deposit gold it would not tone at all; the deposition could be prevented by making the solution in the bottle slightly acid and making it slightly alkaline again whenever required to be used for toning purposes.

Mr. W. ENGLAND asked the cause of some spots on a negative on one of Carbutt's films which he produced.

The CHAIRMAN thought that the glycerine in the film to keep it flexible might perhaps cause the spots by dampness; the pictures produced on the rapid Carbutt films were wonderfully free from halation, but the film must not be supported in the dark slide by a plate of glass; the latter would give great halation because of its reflecting surfaces.

Mr. A. HADDON remarked that there was plenty of camphor in the Carbutt film; scraping the film with a knife brought out the smell.

Mr. A. COWAN thought from the look of the celluloid film that it had been roughened by the sand blast before coating.

Mr. F. P. CENBRANO thought the roughened surface to be made to hide the fine lines which on close examination could be seen crossing the film.

The CHAIRMAN supposed that the films might be shaved from large blocks, and that the fine lines might be caused by the blade of the cutting instrument.

Some slides by Messrs. Everett, England, Atkinson, and Freshwater, were then exhibited by the aid of the lantern.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

MAY 20.—Mr. Hiscock in the chair.

Negatives were exhibited by Mr. Walker, and slides by Mr. Davall.

On the question being raised as to the best means of preventing halation, Mr. HAYMAN said that Messrs. Samuel Fry & Co. had introduced a plate ground on the back which almost entirely overcame that difficulty.

A print was passed round of the interior of a room facing a window, one-half of the window being on plain and the other on ground glass, and taken by an amateur; that on the ground side being entirely free from any trace of halation. Another means of obtaining the same end was to use celluloid films.

One of Blair's whole-plate cameras was also shown by Mr. Hayman, weighing only five and a half pounds, and yet including every motion necessary to a good camera. A half-plate camera and three slides complete weighed about five pounds, the slides weighing three ounces each. He then exhibited a novelty in the way of a frame for transparency and lantern slides, which it was their intention to bring out in the coming season. It was a small nickel-plate metal frame, which was adjustable by means of a metal rod which formed the side, and passed through a small ball at the top and bottom corners, and was grasped in position by a screw at the back.

It was suggested by Mr. BRADLE that if the sides were made the same as the top, so as to grasp it all the way round (which could easily be done by a slot in the ball), it would be a decided advantage.

The first outing of the members and friends will take place on Saturday next, May 25, to Totteridge, working to Mill Hill. Train from Finsbury Park, at a quarter to three. Visitors invited.

HOLBORN CAMERA CLUB.

MAY 17.—Mr. F. W. EDWARDS gave a demonstration in the Club Room on *Platinotype*, developing some four dozen prints, many of them being 20 x 12.

MAY 18.—A party of twelve visited Waltham Cross and secured some very pretty views of the Abbey and other places of interest. There were four ladies in the party, three being members of the Club.

On Friday next there will be a lantern display in the Club Room; all who like may attend.

UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

MAY 18.—Abstract of paper on *The Applications of Photography to Book Illustration*, by Mr. W. North, M.A., Hon. Secretary.

The object of the paper was to set out the principles on which the various photo-mechanical processes depend, without discussing technical details. In this way all direct methods for the production of prints from individual negatives were excluded from consideration. Light has an action upon ordinary paper which, though well known, does not attract quite so much attention as it deserves. This action is really upon the size, and though perhaps not understood is appreciated by painters in water colour, who have learned by experience that an old paper is safer for their purposes than one but recently made. The reason is not far to seek; in a new paper the process of oxidation of the size involves the colours used upon it, and they suffer accordingly, whilst in an old paper the process is complete, and any action which may take place is on the colours alone. This action can be made more manifest by treating the paper with certain salts, and especially potassium bichromate. In this case, according to the authorities, one molecule of chromic oxide and two molecules of potassic hydrate are produced, the result being a visible image of a dirty orange colour. But not only is there a visible image; the film of bichromated gelatine has its physical qualities altered in such a way that the parts which have been exposed to light become insoluble in water, and refuse to absorb it. Nor is this all; the result of wetting such an exposed film is to produce an image in relief from which a cast can be taken in plaster. And, moreover, if the film be inked with a printer's roller, it will be found that the ink will only adhere in those parts which have been acted upon by the light. [Films were shown, and the effect of wetting in producing an image in relief was demonstrated. A collotype plate kindly lent by the manager of the Automatic Engraving Company was then inked, the process of collotype printing briefly described, and a number of specimens of work handed round. A mould in high relief and a cast from it were also shown.] The method of preparing lithographic transfers from line negatives was then

described, and examples of photo-lithography passed round. Next the Woodbury process was described and illustrated by gelatine reliefs, metal moulds made from them by hydraulic pressure, and a quantity of Woodbury prints in various styles kindly lent by the Company for the purpose. The method of producing zinc blocks by means of the action of light on bitumen was then described, and illustrated by the actual development of exposed plates. Examples of blocks and prints of various kinds from zincs lent by Messrs. Paterson & Co. were handed round. The use of grained negatives and the processes for the production of printing blocks in half tone were briefly described, and the paper concluded by some general remarks as to the progress made in book illustration by photo-mechanical processes.

Mr. Davis then exhibited some exceedingly beautiful examples of the Fretsch process, the general principles of which he shortly described, and after a lengthy discussion and the answering of a number of questions by the author of the paper, the meeting was brought to a close by a vote of thanks to the author and to the various firms who had so much contributed to the interest of the meeting by the loan of material for the illustration of the paper.

The next meeting will take place on Tuesday, May 28, when a paper will be read by Mr. J. T. Leon on *Direct Printing Processes*.

The Society held its first field excursion on Saturday, May 18, when a number of the members went to Pinner. It is hoped that a large number of the negatives taken will be on view at the next meeting, and that members will avail themselves of the opportunity of comparing results.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

MAY 7.—Mr. B. J. Taylor in the chair.

It was announced that arrangements had been made with a local artist to criticise, from an artistic standpoint, the work of members monthly, with a view to raising the standard of the art side of photography.

A demonstration was given by Mr. J. W. CHARLESWORTH on *Platinotype Printing (Hot Bath Process)*. This process is rapidly coming into public favour, and the ease with which the prints can be produced was ably shown by Mr. Charlesworth.

Several members expressed their intention of taking up the process.

Arrangements have been made for an excursion to Haddon Hall on Thursday, May 30.

On Tuesday, May 14, the slides sent to England by the Boston Camera Club, U.S.A., were exhibited, and were much admired, the lecture which accompanied the slides adding greatly to the enjoyment of the evening. A number of slides of New York were also shown.

BRADFORD PHOTOGRAPHIC SOCIETY.

RELATIVE to the judging of pictures at the Society's exhibition, it was proposed that the members of the Manchester Photographic Society be asked to appoint two of their members to act as judges.

Mr. WALTER LEACH, F.C.S. (Secretary to the Society), then gave a short lecture on *Photographic Lenses*, dealing first with the single lens, and explaining the cause of distortion and chromatic aberration. The construction of achromatic lenses to do away with the latter difficulty was then explained. Compound lenses, such as landscape, rapid rectilinear, wide-angle, &c., were also illustrated, and the proper use of each class of lens indicated. The diaphragms or stops were then alluded to, and their utility in forming the most suitable effect in a picture explained. A simple way of calculating the relative value of the stops, so that exposures could be more easily calculated, was then explained, and attention drawn to the fact of very few photographers knowing or understanding the value of a large or small stop, as they are generally called.

Two new members were proposed and elected.

Correspondence.

Correspondents should never write on both sides of the paper.

THE PLATINOTYPE PROCESS.

To the Editor.

SIR,—In a paper recently read by Mr. W. Lang, jun., that gentleman makes a statement which we think we are justified in assuming infers that the patents connected with our process are no longer in force, for he is made to say, "Being protected by patent, although this no longer applies, for all are now free to use it." Mr. Lang may have intended a different meaning to be conveyed from what we consider to be the natural interpretation of the words. We will ask you to permit us to state that the patents still "apply," and that only those who use our manufactures are "now free to use" the process. In fact, the only practical difference now from former times is that we do not require a fee of five shillings to be paid by licencees in the ordinary way.—We are, yours, &c.,

THE PLATINOTYPE COMPANY.

29, Southampton-row, High Holborn, W.C., May 24, 1889.

PHOTOGRAPHING IN NORWAY.

To the Editor.

SIR,—Your correspondent, F. Coop, is not very definite in his requirements about Norway. As to exposure, it is about the same as in England. Thus, in exposing for the Old Stavkirke at Borgund at 3.15 p.m., *f*-61, exposure was three seconds on Ilford (yellow) extra rapid plate; exposure for North Cape at midnight was for same aperture twenty-five seconds

With the same plates and *f*-16 I got a good many views with one-sixteenth of a second by hand from deck of steamer. Your correspondent does not say whether he is yachting or not, nor the time he has at his disposal, so one is unable to advise him much. I should say, get Cammermeyer's Reise Kart (travelling map) for North and South Norway (five sheets), and mount on linen as pocket maps. As to objects to photograph, he will find them every few yards on land. If he only sticks to the ship I think the Lofoten scenery the grandest. If only for a short visit I would recommend the Hardanger Fjord. I would not go up to the North Cape, unless to be able to say I had done it. Nor would I go above Tromsø. I shall be glad to answer any question upon any part of the coast I know.—I am, yours, &c.,

West Lodge, Galway, May 17, 1889.

R. O'H.

THE METRIC SYSTEM.

To the Editor.

SIR,—I have the pleasure herewith to submit to you the Report of the Sub-Committee of the Photographic Club on Weights and Measures, and to ask your co-operation in getting the Metric Decimal System adopted, especially by those photographers with whom you are associated.

The confusion arising from the methods of weighing and measuring at present in use makes the accurate translation of formulæ impossible; for example, the term ounce is represented by two distinct weights, the Troy ounce being 480 grains, and the Avoirdupois ounce 437½ grains, or that by which chemicals are usually sold; the term ounce being used indiscriminately in writing formulæ. The Photographic Club, in making this attempt to secure uniformity in weighing and measuring, trust that the accuracy that will be secured by the general adoption of the Decimal System in writing and translating formulæ will be sufficient to overbalance any little inconvenience that may be incurred in the early stages of its use.—I am, yours, &c.,

EDWARD DUNMORE, Hon. Secretary of the Photographic Club,
Arderton's Hotel, Fleet-street, May, 1889.

REPORT OF THE SUB-COMMITTEE ON WEIGHTS AND MEASURES.

WE, the Sub-Committee appointed by the Photographic Club to consider the desirability of adopting a uniform system of Weights and Measures, having fully discussed the matter in all its bearings, have come to the unanimous decision to recommend the adoption of the Metric Decimal System, pure and simple.

The demerits of the present British System require but little consideration to condemn it. The absence of any definite unit or integral subdivisions, and the different values attaching to the denominations, lead to vagueness and error, while the difficulty of making calculations and of translating foreign formulæ is a constant source of trouble, and no modification of the present system has come before us which is free from these faults.

On the other hand, a very little experience of the Metric System proves its simplicity, and the fact that it is universally adopted in scientific literature and practice, and that it has always been in actual use on the Continent for photographic purposes, points to it as the only alternative to our own defective system. It may be mentioned that the cost of the decimal weights and measures does not exceed that of those now in use.

It is hoped that the Photographic Club, in adopting this system, will have the support of all the metropolitan and provincial societies of the United Kingdom, and if at the same time the representatives of photographic literature, and plate makers generally, some of whom have already signified their acquiescence, can also be prevailed upon to lead their aid, it would, perhaps, more than anything else tend to the universal employment of the Metric System amongst authors and users of photographic formulæ.

Signed on behalf of the Sub-Committee,

May 8, 1889.

W. ACKLAND, Chairman.

Exchange Column.

Will exchange electric bell and fittings for backgrounds, posing chair, or 10×8 view lens.—Address, W. A. BROOKS, Photographer, Frouce.

Rustic stile, head and body rest, and office copying press; want pneumatic time shutter or wide-angle lens.—Address, W. CUTTNER, 31, Highgate-hill, London.

Wanted to exchange, interior and exterior backgrounds for two others; also old single view lens, by Postings, and ship mast, for posing chair or backgrounds.—Address, BROOKS, Photographer, Frouce.

Wanted, first-class detective camera; will exchange lantern slides (Woodbury and others), Chadwick's oxygen generator, or splendid forty-cell medical battery.—Address, W. A. BEZANT, 12, Victoria-terrace, Leamington Spa.

Various lenses, cameras, electrical apparatus, gas bag, backgrounds, and other apparatus, in exchange for a seven or eight-inch single or double compound condenser, mounted or unmounted.—Address, WALSLEY, Bold-street, Liverpool.

Will exchange a leather pocket case of drawing instruments by Shanley, of London, for a rapid rectilinear lens of seven-inch focus, by any first-class maker, iris diaphragm preferred.—Address, WILLIAM HENRY PRATT, Regent-lodge, Regent-street, Nottingham.

I will exchange one volume each of *Illustrated London News*, *THE BRITISH JOURNAL OF PHOTOGRAPHY*, *Ally Sloper*, and half-plate rapid rectilinear lens, for a good whole-plate camera or lens.—Address, ARTIST, 10, Anberley-villas, Russell-road, Bowes-park, N.

Will exchange first six volumes of *Journal of Microscopy and Natural Science* for a Newman or a Kershaw shutter to fit a lens with inch and a half hood or under; also a well-bound edition of Darwin's *Origin of Species* for smaller shutter by good maker; or will exchange both works for a quarter-plate Eastman-Walker roller slide.—Address, ERNEST LAMBERT, Photographer, Bath.

Answers to Correspondents.

• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

R. Symons, Tenby.—Photograph of the Swansea Wesleyan District Committee at Tenby, May 15, 1889.
R. Cash, Ipswich.—The "Phantom photograph" of the River Gipping, Ipswich.

W. HARDING WARNER.—Received.

KAMSET.—Yes, if they are on private property. Not otherwise.

SIR J. D. MARWICK.—Thanks for the hint, which shall be acted upon.

R. H. ELDER.—We shall submit your letter to a friend in France, and publish the reply.

Z. BLUNT.—Ordinary water colours mixed to match the tone of the prints, whatever that tone may be.

J. W. COULBOURN.—We have not the work in question on our shelves, so cannot say who are the publishers.

A. MILLER.—A bad case of halation. On the next occasion either back the plates or procure some more thickly coated.

S. A. J.—Tools for grinding lenses, so far as we are aware, are not articles of commerce. Any engineer will construct them for you if you give him the curves you require.

HENRY WILLIAMS.—There are really so many instantaneous shutters in the market, the majority of which will do all you desire, that we could not attempt to recommend any particular one.

A. G. FIELD.—It is impossible to say whether the salt sent is pure or not without making an analysis.—2. No.—3. First find out what is the impurity, if any, and then describe it to dealer. That is the only way you can complain.

W. GUTTENBERG.—We do not think that professional photographers are likely to suffer from the introduction of automatic machines for taking and delivering portraits by dropping a certain number of coins into such machines.

IN A FIX.—To obtain more density in copying, increase the proportion of pyrogallic acid greatly and use bromide freely. It is quite possible that, for your purpose, the hydroquinone developer will be best. Try it, and give it plenty of time.

GWENT.—1. It prevents oxidation of the pyrogallic acid.—2. The proportions you use are all right.—3. The white deposit will do no harm.—4. The stops are, or should be, marked according to the equivalent focus of the lens—and not the back focus.

W. N.—There is so very little platinum in the paper as to render it altogether inexpedient to attempt its recovery or conversion into the chloride, which salt can be much more economically and easily prepared by dissolving the metal (which is now cheap) in *aqua regia*.

W. BISHOP.—You had better write to "the powers that be" at the different places at which you wish to photograph. They will tell you the proper parties to apply to. You will get the names from the *Post Office Directory*. We only know one or two on your list.

JAVA.—1. Unless the rain water is caught in the open country, as a rule it is less pure than the ordinary water supply, and its purification is scarcely worth the trouble.—2. In all cases, if sufficient exposure be given, the image will be visible. It may be used for printing out.

R. C. HARDING.—Opal glass with a polished surface may be had from any house that makes a speciality of the ordinary article. The polished kind is known under the name of patent plate opal. It is not so suitable for pictures which have to be coloured as the matt surface; it is also much more expensive.

G. NORREXY asks if there is any way by which a negative can be dried more quickly than allowing it to dry spontaneously.—Certainly. If the wet negative be immersed in methylated spirit for a few minutes and afterwards transferred for a similar time to a fresh lot the negative can then be dried before the fire or by the sun in a very short time.

W. H. JONES.—Your pair of plano-convex achromatics will best serve your purpose by mounting them close together, their convex surfaces next to the sensitive plate, and a diaphragm about an inch in front of the outside one, that is, next to a plane surface. The lens for a finder may be formed of a cheap single lens, which need not be achromatic.

CONSTANT SUBSCRIBER asks: "How long should a bichromate of potash bath last? Should it be made fresh for every batch of carbon tissue? When sensitised, how long should it keep soluble?"—The sensitising bath may be used several times, but it should be discarded when it begins to acquire a brown tint. If the tissue is not dried too slowly it should keep soluble for a fortnight or more, that is, if it be kept with ordinary care.

F. WALLER.—Thanks for letter and drawing. We have long been acquainted with Brewster's suggestion, which was afterwards more fully elaborated by Sir John Herschel, and it has still more recently been carried into practical effect as a telescopic object glass in Germany. But the principle involved in the construction of the photographic lens referred to is somewhat different, and was explained by Goddard when he constructed his double periscope lens in 1861.

ERNEST LAMBERT wishes to know if there is any way to get an under-exposed negative strong enough to print from without the usual long time in the developer. He says he is "continually annoyed at having to keep on developing an immense time."—There is no way of dealing with an under-exposed negative but patience in the development. If this be hurried the result will suffer. Moral: Do not under expose. We are not familiar with the manufacture of inks. Consult one or other of the receipt books which treat on such matters.

WM. S. (Guildford).—The spots on the prints enclosed all have a black speck as a nucleus, and this shows, in many instances, more strongly on the back of the paper than it does on the front. This would seem to indicate that the paper itself contained particles of foreign matter which reduced the silver. We should advise you, after sensitising and drying some of the paper, to examine it in a good light and see if the spots are discernible at that stage. Also slightly tint a piece by a brief exposure to light. If the spots show under these conditions you had better try another sample of paper.

A. NORFOLK AMATEUR writes: "I have often heard that better tones are obtained on paper which is sensitised at home than on the ready sensitised of commerce. During the last week or two I have been sensitising my own paper by floating it for two minutes on a bath of sixty grains of nitrate of silver to the ounce of water and nothing else. I find with this paper that I get far better tones than I could with any paper I have tried before. But, at times, I am troubled with marbled-like stains on the paper, like enclosed, but only with occasional sheets. Can you account for this?"—The marbling is caused by floating the paper when there is a scum upon the solution. If the solution, after use, is allowed to stand for any length of time in the dish a scum is sure to form upon the surface. When this is the case, it should be removed by drawing a strip or two of blotting paper over the solution before any more paper is sensitised. The finished prints are very good indeed. The tone is excellent.

EXPERIENCE puts the following queries: "1. What the strength should be of the strengthener used for strengthening a sensitising bath of sixty grains?—2. What to add to get rid of the acid in the silver bath?—3. What advantages are gained by sunning the sensitising bath?—4. What advantages are got by adding liquid ammonia? and what quantity?—5. What advantages are got by adding methylated alcohol? and what quantity?—6. How many sheets can be done in a sixty-grain bath before it is necessary to add any strengthener? and what quantity should be added?—7. Is it necessary to put in kaolin every day after use to rid the bath of impurities?"—In reply: 1. Any strength will do so long as sufficient solution is added to bring the bath up to the sixty grains to the ounce. Use an argometer.—2. A dilute solution of carbonate of soda.—3. The organic matter becomes precipitated.—4. None if the acid be neutralised by carbonate of soda.—5. Said to prevent blisters—a drachm or so to the ounce.—6. All will depend upon the size of the sheets and the quantity of solution.—7. Not unless the solution is discoloured.

R. C. McLEOD says: "May I ask if there is not a mistake in your statement that five grains of bromide of potassium to the ounce is what you recommend for a normal developer (ferrous oxalate)? I fancy you must mean five drops of a ten per cent solution, which I find gives very good results with England's slow plates.—In reply: We mentioned three grains (not five), which is not excessive with many plates, especially when employing the energetic developer we recommend. We have had no experience with the plates named under iron development.—"What is the relative power of soda (common washing) and potash? You mention that of purified crystals and the anhydrous but not the washing soda."—Ten grains of washing soda if not effloresced, and the same quantity of pure crystals, are equivalent to 4.75 grains anhydrous carbonate of potash. In reply to your question regarding the French Custom Houses and photographing in France, see a letter from Mr. Albert Levy in our issue of April 19. With regard to the charge of chlorate of potash, it is not advisable to fill the retort more than one-third full, although that rule is frequently broken.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting at 5A, Pall Mall East, on Tuesday, May 23, at eight p.m.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, May 29, 1889, will be on *The Keeping Qualities of Bromide Plates*. Saturday outing at Chigwell. Trains from Liverpool-street.

THE *Revised Catalogue* of J. Robinson & Sons, 172, Regent-street, W., which we have just received, is replete with good things manufactured or sold by this firm. It contains numerous illustrations.

THE Tondeur developer (sold by Mr. Sharland, Thavies Inn) is chiefly remarkable for having eosine as one of its components, hydroquinone being the active agent. Without waiting to inquire the part played by the eosine, we tried a sample sent us and find that it gave a good clean negative of fine colour.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1517. VOL. XXXVI.—MAY 31, 1889.

MEANS OF PRODUCING COLD.

THE approach of summer, with a possible accompaniment of heat, induces ideas respecting the production of cold. Of the many uses of refrigeration during a torrid, sultry, tropical state of the atmosphere it is needless here to speak; those who work with gelatine plates, and especially those who have to manufacture them when the thermometer is in the vicinity of the nineties, appreciate full well the desirableness of being able to convert dog-day heat into hyperborean chill, and the great value of any means by which such conversion may be effected. The production of cold is merely the abstraction of heat from the body that is being operated upon. The means for effecting this have of late been undergoing advances towards perfection; it is only the other day since we saw in a well-heated manufacturing engineering shop a considerable quantity of mercury frozen quite solid while it was exposed to the warm atmosphere of the workshop. This, it must be admitted, indicates a high advance in the art of congelation.

Concerning methods of producing cold, there are three of which we shall here speak. The first is the well-known one of imparting cold to water by dissolving in it certain substances, of which there are none which in our estimation can vie with nitrate of ammonia for general efficiency and undoubted convenience. In addition to this, it is also the most economical of all saline bodies, as it is not wasted during use, but may be employed over and over again. If a thermometer is placed in a tumbler of water, at, say, 50° Fahr., and some crushed crystals of the nitrate of ammonia are then thrown into the water, the column of mercury will be found to descend with singular rapidity until it reaches 26° to 27° below the freezing point, or about 5° Fahr. There are several mixtures which can be made by which a much greater degree of cold can be obtained, but these when once used cannot be used again. But with the ammonium nitrate it merely suffices to pour the solution out into an evaporating dish after being done with, and having driven the water off by heat, or otherwise, place the crystals into a bottle, when they are ready for future use in a similar way.

We here give an illustration of one way by which the knowledge of the above-mentioned fact may be serviceable. We had once some gelatine plates to develop in a semi-tropical country at a time when the heat was intense and the water so warm as to endanger the film during development. We placed the developing solution in a japanned tin developing tray, and placed that tray inside of another slightly larger, and in the bottom of which we scattered a few crystals of nitrate of ammonia, afterwards pouring in a little water. This reduced the previously high temperature of the developer to one that

could not possibly affect the too soluble gelatine of which the film was composed.

A second system for the production of cold consists in the compression of air. Thus compressed, and forced into a reservoir, it becomes heated, as every one knows who is familiar with the working of an air gun. But when cooled down again, before it is suffered to escape, its expansion is attended by great cold. "If when compressed it is allowed to cool down to the ordinary temperature and then to escape, it will be cooled below that temperature just as much as it was heated by compression. Thus, if in being compressed it had been heated 100°, say from 60° to 160°, and then allowed to cool to 60°, on escaping it will be cooled 100° below 60°, or to 40° below zero, which is the temperature at which mercury freezes." This is the principle of the cold air chambers now so extensively employed on shipboard for the transport of frozen provisions from Australia and New Zealand.

The ingenious photographer who dreads the preparation of gelatine plates in hot weather will in this discover the means by which he may be enabled to keep his coating room at fifty degrees or sixty degrees during the most sultry months of the summer, aided by a small gas or petroleum engine. We have devised a most perfect means of effecting this, by manual power if desired, and that only applied at occasional intervals, but a detailed description of it would be out of place in this article.

It is well known, by some at any rate, that the condensation of certain vapours is attended by extreme cold. On the principles actuating this phenomenon we do not here enter, but confine ourselves to giving a brief description of one of the machines—if machine it may be called—by which the principle has obtained its latest outcome. This apparatus, which has received the trade name of "The Arktos," consists, roughly speaking, of a tube bent \cap -shape, at the end of one limb being a reservoir which contains strong liquor ammonia. This ammonia should be as strong as possible; although that so well known among photographers as 880 will do, yet Mr. Loftus Perkins, the inventor of the apparatus, informs us that he prefers it much stronger—say 875; a strength he certainly manages to obtain. This bent tube has its air abstracted, and is hermetically sealed, and heat is applied to the ammonia reservoir, by which the ammonia liquid parts with its gas. When the source of heat is removed and the gas re-enters the water, the cold is produced at the farther limb of the apparatus in a degree of such intensity as to cause a deposition of the moisture in the atmosphere in the form of dry snow. So great is the cold produced that, as previously hinted, we have seen, and that, too, in a warm room, the solidification of mercury in

the vessel into which the end of the tube was dipped. One end of this tube may be called the boiler, and the other the refrigerator; and a condition of success is that the connecting pipe between the two shall be kept cooled while the boiler is being heated, so that all gas passing to the refrigerator may enter it in a comparatively cool state. When this is used on a large scale it suffices that a fire be applied for two or three hours once a day, by which the refrigeration is rendered singularly perfect. There are minor mechanical details connected with this apparatus, but the general principle is as above stated.

Thus is solved the problem of a process for attaining cold and ice without mechanical aid, and as the inventor says, "Its abounding efficacy is made evident in its freezing of mercury in the open air."

FERROUS OXALATE.

Our mention, in the closing paragraph of an article on *The Development of Transparencies* a fortnight since, of the "original method" of making the ferrous oxalate developer by dissolving oxalate of iron in hot solution of oxalate of potash, seems to have puzzled some of our readers, and we cannot help confessing to a feeling of considerable surprise that so little acquaintance should be exhibited with the real composition of a developer so commonly used and so little recollection of past history.

It is now some twelve years since Mr. M. Carey Lea, then a regular contributor to our columns, first published his formula for a new developer, which has long borne the name that heads this article, and though the process now generally adopted in its preparation was given as an alternative method, Mr. Lea more particularly recommended what we have termed the "original" method, because it was the one that was adopted and remained in use for several years. It is, indeed, the more scientific method, and the one calculated to give the best results, since, when properly carried out, it constitutes a pure solution of oxalate of iron in oxalate of potash of the highest degree of concentration, and without any artificial restrainer.

The modern method is simply one of convenience, and though very workable, is comparatively but a makeshift, as by the mixture of sulphate of iron and oxalate of potash a compound is made of very variable strength and composition, and containing a large proportion of active restrainer in the form of sulphate of potash, formed by double decomposition. The solution never contains the full quantity of oxalate of potash it is capable of holding, because even if a saturated solution be employed to start with, a great portion of the potassium salt is converted into ferrous oxalate, leaving only perhaps a half-saturated solution of oxalate of potash to dissolve the iron. This, considered in conjunction with the presence of the sulphate of potash, renders it clear that the original method must give by far the more energetic developer.

For the benefit of those who seem to be ignorant of this method, we will shortly describe it. The same ingredients only are required, namely, ferrous sulphate and oxalate of potash, but the plan of mixing them is different. In the first place, weigh out three parts—say, ounces—of neutral oxalate of potash and five parts, or ounces, of sulphate of iron, and dissolve them separately in any convenient quantity of water, not however making the solutions too dilute. When dissolved, mix the two solutions. At first the mixture will

take a bright yellow colour but remain clear, and it may be some time before any precipitate begins to form, and then it proceeds but slowly; if the vessel be set aside, however, for a few hours, a dense, bright yellow precipitate will settle to the bottom, leaving the supernatant liquid perfectly clear and colourless. This deposit is the oxalate of iron or *ferrous* oxalate (for the *per* oxalate or ferric oxalate is a soluble salt), and the clear liquid contains only sulphate of potash, which is poured away as practically useless. Pour off the upper liquid and stir the precipitate well with fresh water, and allow it to settle again, which it will now do in a very short time. Repeat this washing, and then the yellow powder may be collected on a filter and dried, in which state it may be preserved indefinitely.

The next operation, the making of the developer, is conducted as follows:—Take, say, a quarter of a pound of oxalate of potash, and pour on to it from a glass flask or beaker ten ounces of distilled or rain water, and heat the vessel until the salt is dissolved. While still hot, add to the solution and stir well some of the yellow oxalate of iron. At first a mere or less deep red, clear solution will be formed, but as more of the oxalate is added the mixture will become muddy and of a pale colour like the oxalate. As this dissolves, however, the deep colour appears, and this will be a guide as to the quantity of oxalate to add. When the solution retains the pale, muddy appearance, after stirring for some time, it may be considered to be saturated, and is then set aside to cool, when a few crystals and a quantity of reddish-brown "mud" will be deposited, leaving a rich, deep red, clear solution of oxalate of iron in oxalate of potash.

A single experiment will suffice to give an idea of the approximate quantity of yellow oxalate to add to a given quantity of solution, or the latter may be poured on to a considerable excess of the powder and boiled for two or three minutes, then allowed to cool and clear. In this case the undissolved oxalate of iron should be at once washed in two or three changes of hot water and re-dried, or it may be preserved in the moist state.

The solution so formed constitutes the ferrous oxalate-developer in its purest and probably most energetic form, and for ordinary purposes will no doubt be all the better for a considerable addition of restrainer, though for extremely rapid work it may be employed in its nearly pure state. In this form, if properly restrained, it gives far stronger and richer negatives, as well as purer and finer blacks in positives, than can be obtained by any proportions of the mixed solutions of iron and oxalate of potash as usually employed, hence those who appreciate a rich-coloured print will do well to "prospect" this developer.

But the solution so formed does not long retain its energy under ordinary circumstances, being even more liable to change than that made by the simple mixing of the two solutions. Many dodges have been suggested for its preservation and regeneration when oxidised, but they are mostly only palliatives. The solution should always be kept in daylight, which prevents the oxidation, or reconverts the ferric salt to the ferrous condition when it has been oxidised. Another plan consists in keeping a hank of bright iron wire immersed in the solution. A third in adding small quantities of tartaric or oxalic acid and placing in a strong light; while in a fourth the deoxidation is performed by means of a solution of sulphite of soda.

The plan, however, which we have found most efficient as

well as the most scientifically correct, is one that is unfortunately rather troublesome, since it depends upon the employment of ferrous sulphite, which is not readily obtainable commercially, and, consequently, has to be made. This, however, is not a formidable operation. The ferrous sulphite is itself an insoluble and unstable salt, but it is freely soluble in excess of sulphurous acid, the solution apparently keeping well. The mode of preparation we adopt is as follows:—

A quantity of ferrous sulphate is precipitated by means of carbonate of ammonia, and the semi-gelatinous mass washed as well as may be to free it from the sulphate of ammonia, though this is a very tiresome job. The presence of a trace of the sulphate, however, is not of great moment. An apparatus for the generation of sulphurous acid is next provided. This consists of a bottle provided with a cork, through which a couple of holes are pierced—the one to carry a funnel for the introduction of acid, the other a bent tube to lead the sulphurous acid over. In the bottle place a quantity of crystals of a soluble sulphite or bisulphite, or even of "hypo," and cover them well with water. Insert the cork with its funnel and tube, and let the latter dip into the vessel containing the precipitated ferrous carbonate. Now, by means of the funnel, add, a few drops at a time, strong sulphuric or hydrochloric acid, which will liberate SO_2 in the form of gas, and this passing over into the carbonate of iron converts it into sulphite, with change of colour from dirty green to greyish brown. Continue the passage of sulphurous acid, however, until the contents of the iron vessel become clear and nearly colourless, when the operation is complete. A funnel with a glass tap in the stem, known as a "separator," should be used; if not provided with the tap, some means must be adopted for plugging the aperture after each addition of acid to prevent the escape of sulphurous acid that way.

A little of this solution added to the ferrous oxalate developer, when freshly made, will arrest its oxidation, as no sooner does the ferrous oxalate become ferric—if it ever does in the presence of ferrous sulphite in excess—it is decolourised by the sulphite, which, being converted into sulphate, is acted upon by a portion of the oxalate of potash, and reconverted into ferrous oxalate and precipitated as such if in excess. In this manner a constant interchange of elements may be supposed to go on until the sulphite is exhausted, the only effect produced being a precipitation of ferrous oxalate equivalent to the sulphite originally added. As the ferrous sulphite is itself a powerful developer, it must be used sparingly or it will produce fog; the sulphurous acid, too, has a tendency in that direction, but this can be kept in check by the use of restraining bromide.

THE METRIC SYSTEM.

Still advances the tide of reform in our system of weights and measures, and it is with gratification we record that two of our most active London Societies—the Photographic Club, and the London and Provincial Photographic Association—have signified their intention of adopting the metric system.

In a former article (March 15, p. 174) we have explained the meaning of the Greek prefixes employed to denote the multiples of units and the Latin prefixes which denote their fractional parts. We now enter a little into detail respecting those weights and measures pertaining to the operations of the photographer. As we have already mentioned, the Greek prefixes

denote the multiples of the measure to which they are united. Thus:—

Metre	equals	1 metre.
Dekametre	"	10 metres.
Hectometre	"	100 "
Kilometre	"	1000 "
Myriametre	"	10,000 "

In the same manner the Latin prefixes denote subdivisions, as will be seen by the following proportions:—

Metre	equals	1 metre.
Decimetre	"	$\frac{1}{10}$ "
Centimetre	"	$\frac{1}{100}$ "
Millimetre	"	$\frac{1}{1000}$ "

For general purposes it will be found to be sufficiently near to consider a metre as $39\frac{1}{2}$ inches, and a decimetre as $3\frac{1}{8}$ inches.

In order to aid in the more ready introduction into practice of the decimal means of calculating, we will give the relative values in inches from the millimetre to the metre:—

Millimetre.	Metre.	Inches.	Centimetre.	Metre.	Inches.
1 =	·001 =	·03937	6 =	·06 =	2·3622
2 =	·002 =	·07874	7 =	·07 =	2·7560
3 =	·003 =	·11811	8 =	·08 =	3·1497
4 =	·004 =	·15748	9 =	·09 =	3·5434
5 =	·005 =	·19685			
6 =	·006 =	·23622	Decimetre.	Metre.	Inches.
7 =	·007 =	·27560	1 =	·1 =	3·9371
8 =	·008 =	·31497	2 =	·2 =	7·8742
9 =	·009 =	·35434	3 =	·3 =	11·8113
			4 =	·4 =	15·7484
Centimetre.	Metre.	Inches.	5 =	·5 =	19·6855
1 =	·01 =	·3937	6 =	·6 =	23·6226
2 =	·02 =	·7874	7 =	·7 =	27·5597
3 =	·03 =	1·1811	8 =	·8 =	31·4968
4 =	·04 =	1·5748	9 =	·9 =	35·4339
5 =	·05 =	1·9685	1 metre =		39·3685

But what is the metre itself? It is the standard length, of which the $\frac{1}{10000000}$ of a quadrant of the earth's meridian is equivalent to 39·371 inches.

The standard of the weights by which chemicals are calculated is the gramme, which is, roughly speaking, the equivalent of 15½ grains. It is subject in the same way, as previously mentioned, of adding a Greek or Latin prefix to denote its multiples and subdivisions of the same.

The unit of fluid measurement is the cubit centimetre, based upon the gramme, the weight of one gramme of water at maximum density being termed one cubit centimetre.

The proportions of fluid measurements on this basis will be apparent by the following table:—

Names.	No. of Grammes.	Weight of Water.	Avoirdupois Weight.
Millier or tonneau	1,000,000	1 cubic metre	2204·6 lbs.
Quintal	100,000	1 hectolitre	220·46 lbs.
Myriagramme	10,000	10 litres	22·046 lbs.
Kilogramme or kilo	1,000	1 litre	2·2046 lbs.
Hectogramme	100	1 decilitre	3·5274 ozs.
Dekagramme	10	10 c. centimetres	·3527 ozs.
Gramme	1	1 c. centimetre	15·432 grs.
Decigramme	·1	$\frac{1}{10}$ " "	1·5432 grs.
Centigramme	·01	10 c. millimetres	·1543 grs.
Milligramme	·001	1 c. millimetre	·0154 grs.

Into the equivalents of miles, acres, and gallons we will not enter, as they are entirely out of the range of photographic requirements.

The following table will perhaps aid those desirous of acquiring

giving a knowledge of the relations of the various measures and capacities:—

1 litre	= 1000 c.c.	(liquid measure).
1 kilogramme	= 1000 grammes	(solid weight).
1 metre	= 1000 millimetres	(length measure).
1 litre	÷ 100 = 10 c.c.	
1 kilometre	÷ 100 = 10 grammes.	
1 metre	÷ 100 = 1 centimetre.	

It may be said that all this is somewhat technical, but the proportions in the formula given below will simplify matters.

A	.....	100 c.c.
B	.....	5 decigrammes.
C	.....	1 gramme.
D	.....	1 centigramme.
E	.....	1 kilogramme.
F	.....	1 litre.

In order to ascertain the relative quantities from an English point of view, it is necessary to have a starting point. As it is immaterial what the quantity to be mixed is, we will presume that the largest measurement is, say, 1000 ounces.

It is of multiples and parts of this as a standard that we must work, and all the proportions will be the same if it had been termed ten instead of one thousand ounces.

As a litre and a kilogramme are the same equivalent, we have—

E	.....	1000 ounces.
F	.....	1000 „

A	being 100 c.c.	is $\frac{1}{10}$ of a litre, and will be 100 ounces.
C	„ 1 gramme	„ $\frac{1}{1000}$ „ kilogramme „ „ 1 ounce.
B	„ 5 decimetres „	$\frac{1}{2}$ „ gramme „ „ $\frac{1}{2}$ „
D	„ 1 centigramme „	$\frac{1}{100}$ of A „ „ 5 grains.

To those who have been used to halving, quartering, and counting by the dozen, this system will at first appear rather strange, but as soon as the principles are thoroughly understood the great advantages will become manifest. Any one used to the subdivisions of pounds, shillings, and pence, upon going abroad, say to America, finds at first the decimal system of currency in use there rather peculiar, but only until the relative proportions are thoroughly understood, when it at once becomes apparent that the system is of greater simplicity than that in use in this country, and thus will it be with the metric system of weights and measures.

Fluid measures of various capacities, graduated in English and also in metric values, have now been introduced into commerce, and these, together with the requisite weights, are to be had cheaply.

“HYPO” AND “HYPO” SOLUTIONS.

A SLIGHTLY foggy sentence in an article upon hyposulphite of soda, in Watt's *Dictionary of Chemistry*, has been made the text for many a lecture and a peg for trade purposes; we are afraid to hang up many an excuse for sophisticated samples of the salt, commonly so-called. The exact wording of the sentence we refer to (it occurs in vol. v., p. 636), is as follows:—“The aqueous solution cannot be preserved unaltered, even in closed vessels, but deposits sulphur, and is partly converted into sulphate of sodium; in contact with the air, it is gradually but completely oxidised into sulphate.” The question is, “Does the last assertion refer to the salt in crystals or the solution?” We take it that the salt in solution is undoubtedly intended to be spoken of. To put the matter to the test, we obtained a

sample of hypo crystals of known purity, and exposed it to the air for a period of twelve months in a room whose temperature fluctuated exceedingly, and at the end of the time it was, excepting a coating of dust, exactly in the same condition as when first exposed. There is thus established a very ready means of ascertaining whether a number of suspected crystals are pure hypo, or contain a proportion of ordinary sulphate of soda, the Glauber's salts, largely used for veterinary purposes. (*En passant*, it may be stated that hypo itself had a reputation for a short time among veterinarians. At the time when the rinderpest was making such havoc among the cattle of this country, hyposulphite of soda was extolled as a complete prophylactic, and became instantly in such demand as for a time to affect the market price of the salt. At the present time, indeed, it has a certain limited use in medicine.) It suffices to place the crystals for a few days in a fairly dry and warm room and observe whether they effloresce or not. If they exhibit a white surface, it may be taken as a certainty that sulphate is present, while an absence of change implies that the sample is free from the salt.

The bearing of these simple facts is important. Glauber's salts are not much more than half the price of “hypo” crystals, hence largely adulterated samples of the latter might be sold at the price which true “hypo” would cost a manufacturer to make, and would then leave a profit. The practical effect of such adulteration is much more than the dishonesty of the transaction, as above all things it is, in fixing prints, essential to use a liberal quantity of “hypo” for its staple photographic use, the fixing of albumenised paper prints; and if the proportion, too frequently brought to a minimum on account of business competition, be reduced below the point of safety, we thus have an insidious means of interfering with the permanency of the prints so treated. As the reputation of this class of work is already on the wane in public estimation, it behoves every photographer to look into the matter, and if he finds his cask of hypo crystals beginning to effloresce before he has half finished it, he may be sure that he ought to use a larger proportion in his fixing solutions. As to the business relations betwixt him and the dealer who supplied it, that is not a question for us here to enter upon.

Turning now to the solution of hypo itself, we must read the sentence from Watts as being a very early indication of the un wisdom of keeping solutions of hypo for any length of time before use. It is not necessary at the present time to explain the exact method in which the use of such changed solutions would be injurious. It is sufficient to say that any sample of solution of hypo that has undergone decomposition is unsafe for fixing prints or negatives if permanency be any object. The hypo sulphites of silver formed during the operation of fixing are of themselves so very unstable, and liable to change in the light always, and, in presence of an insufficient amount of hypo, in the dark also, that it would be folly to introduce another disturbing element.

The strange tendency to use so-called “saturated solutions” is especially unwise in the case of the chemical under consideration, as a day or two would, unless an undue amount of time and attention were given, be quite needed to ensure saturation, the first steps would be taken towards decomposition, and as it is to be assumed that solutions so made would naturally be stored away for future use, there would then be introduced a second incentive to change.

With regard to paper prints, it is, however, we believe, the common practice to adopt the only proper method, viz., the

making of fresh solution every day, or each time a batch of prints is got through, and the chief neglect of measures of safety is shown with regard to the fixing solution for negatives, which in so many places are unwisely allowed to remain in use till quite "exhausted." Seeing that this is so, the question naturally asked is, Can the change be arrested altogether, or prevented? Fortunately, hyposulphite, or, as it is now more accurately termed, thiosulphite of soda, is a chemical of some considerable analytical importance, and this question can, to a certain extent, be replied to by reference to existing authorities on analytical matters, and their opinions shall be put before our readers. As it would unduly prolong our remarks to quote these opinions at length at the present time, we will defer describing these opinions to a future issue.

PHOTOGRAPHERS, particularly those who take their cameras abroad with them, will hail with satisfaction what took place in the House of Lords on Friday last. Lord Ribblesdale asked the Government whether they considered the Custom House regulations, with respect to undeveloped photographic plates, were reasonable. He said a friend of his arrived at Plymouth, some time back, from a foreign port with some undeveloped negatives. There was no dark room in which the plates could be examined. Explanations and entreaties were in vain, the Customs officials were obdurate. Eventually, the plates were then locked up for the night and the owner delayed. The next day the use of a dark room was obtained at a local photographer's, and the plates duly examined and passed. The Marquis of Salisbury's reply was one which will meet with the approval of every travelling photographer; and it is by no means complimentary to the official who caused the inconvenience. The noble Lord said: "It falls to my lot to defend the Government, and I defend it by saying that this particular Custom House officer appears to be a man of inconceivable stupidity. I hope a misadventure of this kind will not happen again." In conclusion, Lord Salisbury remarked, somewhat sarcastically, "I am sorry that the knowledge of advancing science has spread so little among certain branches of Her Majesty's service."

LORD SALISBURY, it is well known, takes a lively interest in all pertaining to every branch of science—photography included. It can, therefore, well be imagined that any unnecessary inconvenience in its pursuit, caused by an over officious Government *employé*, would certainly meet with the reverse of his approval. It is a fortunate circumstance that the gentleman who experienced the annoyance at the Plymouth Custom House had a "friend at court" who could bring the grievance so prominently forward to the benefit of all. Possibly, had the trouble been caused to a more humble individual, or perhaps to a professional photographer, to whom time is money, and whose pecuniary loss would be greater than in the case cited, nothing would have been heard of the matter. Thanks are certainly due to Lord Ribblesdale for taking up the subject.

REGULATIONS have now been issued to all Custom Houses to the effect that, if sensitive plates are to be examined, "they should be examined in a dark room by the light of a red lamp." At some ports dark rooms have for some time been provided, so that, if considered necessary, undeveloped plates can be examined without risk of injury. Now, however, it is to be the rule at all ports. Every one would, as a matter of course, prefer not to have his plates opened at all. But it must be confessed that a large number of contraband articles could very well be smuggled through the Customs disguised as packages of dry plates. However, it was suggested in the House of Lords that a declaration, made under certain conditions, that the parcels contained nothing but *bond fide* photographic plates might be accepted. Such a thing might, we imagine, easily be arranged. As it is, it is seldom that the Customs officials really demand to see the plates.

THE unusually hot weather for the season experienced last week caused considerable trouble to those workers in gelatine photography

who were not prepared for it. In collotype, Woodburytype, and other processes in which bichromated gelatine is employed, serious inconvenience is often met with in an abnormal rise and temperature. One plate maker remarked to us somewhat dryly, that "using plates and making them this weather means two totally different experiences."

REMOUN has it that an attempt is being made by certain manufacturers to combine together to raise the price of dry plates, and that, too, considerably. That the present price of plates is barely remunerative, except when working on an extensive scale, systematically, and with the greatest economy, one can readily believe; but if the price be raised to the extent we have heard mentioned, there is little doubt that fresh manufacturers will quickly enter the market. A number of small makers have succumbed to the present keen competition, but they may again enter the field, and possibly be more successful in the future. If a rise in the price be deemed necessary, manufacturers, in their own interests, we think, will do well to take this point into consideration and not make it too great; certainly not so great as that rumoured. Of course, every one knows quite well that the present prices are remunerative to some manufacturers.

WILL the name "Kodak" eventually become a generic one for detective cameras? We put the question inasmuch as we have, several times, heard the term applied by the uninitiated to different forms of detective cameras which in no way, either in appearance or principle, have resembled the widely advertised instrument. However, a rose will smell as sweet by any other name, and "detective" is not altogether an euphonious title for a camera.

COTTONS entitling their holders, when a certain number have been obtained, to "presents" are common enough among tea grocers, and the like. Until recently we were unaware that anything of this kind was practised in connexion with photography. However, such appears to be the case. Passing the shop of a tobacconist, who appears to combine photography with the tobacco business, we saw the announcement that all purchasers of twopennyworth, and upwards, of goods would be presented with a coupon, and when a sufficient number of these were acquired the holder would be entitled to have his portrait taken gratuitously. There is novelty in the conception.

PHOTOGRAPHS of medals and coins are not always so satisfactory, when taken by many photographers, as could be desired. They are by no means easy subjects to depict photographically. Excellent photographs of them, however, are to be frequently met with in some of the publications in which numismatology is made a feature. It may not be generally known that these photographs are rarely, if ever, taken direct from the coins themselves, but from plaster of Paris casts, made specially for the purpose. The plaster employed is slightly tinted with burnt sienna, or similar pigment, to destroy its excessive whiteness, and thus render the casts specially suited to photography. This will fully account for the difference in the published photographs of this class of subject as compared with the work of an ordinary photographer when he is suddenly called upon to photograph the metallic articles themselves, as he frequently is with prize medals, for advertising purposes. When gold, silver, and bronze medals or coins have to be included in the same negative, and plaster casts of them are prepared, a difference should always be made in tinting the plaster. The casts from the silver should be made lighter, and those from the bronze darker, than the gold ones.

"THE INFLUENCE OF THE STEREOSCOPE."

MY notice has just been called to a weak and misleading article headed as above, over the initials "F. M. S.", in the columns of a weekly contemporary. As it occupies a portion of the space assigned to "Editorials," and as the initials are those of an "Editorial Contributor," the article in question goes forth to that portion of the photographic world which sees it as having the authority of one who is amongst the scribes.

It is, therefore, perhaps worth while to offer something in the nature of a reply to this, the latest and silliest of the tirades against Photography for the Stereoscope. "F. M. S." affirms that in the past stereograms have prevented the progress of photography in its fine art direction, and as an evidence of this he gives the opinion of an "old worker," who says that to his mind "there is nothing pictorial more valuable than a stereograph of some well-chosen view with a group of familiar friends in the foreground."

It may be, perhaps, worth while remarking here, that the world does not exist for the gratification of people who think with dreaminess and talk with obscurity about fine art, but that, on the contrary, fine art—notwithstanding the dreaminess and obscurity of its expositors—exists for the gratification of the world.

That some one man or some thousand men should regard a stereographic group in front of some well-selected view as the *beau idéal* of pictorial art is certainly no argument against the stereoscope, on the contrary, it is an evidence that the illusion of solidity which the instrument affords was in these instances so genuine and so enchanting as to altogether outweigh, as a source of gratification, the fine art efforts of the producer of the stereogram. This, however, is not a matter for surprise, for at the "time of day" to which "F. M. S." alludes the art status of photography, as a whole, was extremely low, and that not because photography was a "foe to graphic art," as the punsters of the time averred, but because, as a rule, men of artistic capabilities were too prejudiced to employ photography, and because (as "F. M. S." allows), "it took a man all his time to keep his silver bath in order" then.

There were, however, even in those days, some few who made artistic stereograms—of which I have examples before me now—pictures that charm, not only by the illusion of solidity, *obtainable in no other way*, but by the composition of their lines and the magnificence of their effects of light and shade.

Well do I remember how with almost bated breath I gazed for the first time upon a stereogram of a pool of water overhung by trees, whose shadows were thrown upon its surface, and whose forms were reflected in its depths.

The whole composition was a picture, double or single, but as seen in the stereoscope, the illusion of reality was so great as to be simply overwhelming at the time.

In the days when "the kitchen, the scullery, the tool house" were ransacked in search of "accessories," and when "watering cans, garden rollers, warming pans, pails and buckets, long brushes and short," were all pressed into the service of the stereographer (surely the warming pans were only metaphorically employed, and are in reality but coverings for hidden fire) who sought to "give relief" that heaven might bless his store, the single picture photographer, it should be remembered, frequently depicted our artisans in a grimy state and smoking "clays," sitting with a poor pretence of ease on furniture of terrifying grandeur disposed in front of an array of marble domes and battlemented towers.

Even these bizarre results, however, have not kept back photography as an acquisition to the arts; on the contrary, they have advanced it, by making the millions conscious that pictorial incongruity is absurd.

At the present time commercial dry plates and rapid processes give the operator a chance of attending to artistic excellence such as he had not in the days of yore. The consequence is that thousands upon thousands of photographs are now produced altogether superior, from an artistic point of view, to the average work of those who describe themselves as "artists;" and with that resurrection of stereography which is now inevitable, an order of pictures will most certainly obtain, totally eclipsing, from a fine art point of view, anything in the monochrome which the world has thus far seen.

Some people are still to be found who sneer at the "slides" of the lenticular stereoscope on the ground that they are small, as though artistic merits were a quantity, and could be measured by the yard; removed to a distance the largest pictures dwindle in their apparent size, and ultimately disappear, whilst the smallest, when viewed with proper appliances, and from a proper point, present a seeming size equal to that of the original itself, whether this be a man, a mole hill, or Mont Blanc.

Artists who trouble themselves to study aerial or geometrical perspective, do so that they may get something of the effects of solidity and distance in their works. The illusion of solidity, however, belongs to photography, and to the stereoscope alone, and it is from stereograms properly taken, properly mounted, and properly viewed, and from these only, that we gain a just and adequate idea of the dimensions of such objects as we properly describe as "Vast."

To decry the advantages of the stereogram, even from an artistic point of view, is merely to proclaim one's ignorance of its use.

W. I. CHADWICK.

ECHOES.

It is rather curious that in the same number of the JOURNAL in which I criticised a new "automatic" portrait machine hailing from France the description of another one appears, this time of British extraction, and oh! of such fearful and wonderful construction that it takes three pages of "THE BRITISH" to hold the specification. I hope it will repay somebody for the trouble of reading it through, though I must confess I got wearied long before I reached the eighth handle stage. All I can make of it is that it must be worth three-pence—the amount proposed to be charged by the inventors—to have your portrait taken by this machine, if only for the sake of the gymnastic exercise provided in turning the various handles. But surely the inventors have committed a great oversight in not providing a ninth handle, by means of which to let down an opaque screen to shut off the victim temporarily at least from the vulgar crowd.

I have never ventured to "try my weight" automatically for fear of the "B. P.," which, I believe, is the slang term for "British public," but the very thought of publicly and "automatically" "portraiting" myself at, say, Charing-cross Station, brings out a cold perspiration. I can fancy the anxiety that would be exhibited by the rapidly swelling crowd to see the result of the turning of each handle; the eagerness to read the fresh directions brought forward by each such operation, only rivalled by the eagerness displayed by the bystanders to read all the day's messages when some *bonâ fide* or merely curious one drops a penny into one of the automatic message cabinets. Yes, I can imagine all that anxiety, blended with a certain amount of kindly feeling shown in the desire to assist with advice at each operation, as well as suggestions as to the personal appearance of the sit—I mean victim—and possible improvements. My imagination can compass all this, spread over a very *mauvais quart d'heure*, but it does not rise to any attempt at description of the frantic struggle that would ensue to see the result, nor even to what that result would be like under the circumstances. I think it would possibly operate well for the machines and their owners if, after securing the "coppers," every portrait turned out a failure. The specification is worth the money!

I should like to ask Mr. Cosmo Innes Burton—after reading his article on *The Preservation of Solutions of Pyrogallol—Cui bono?* After telling us that the effects of caustic soda, potash, and ammonia upon pyro solution are so well known as to require no description, and that the carbonates behave in a similar manner, he proceeds to describe his experiments with a large number of substances that no photographer who was a chemist would ever dream of employing as preservatives or anything else. Why the article was written, unless for want of something better to do, puzzles me.

By the way, is the writer of the leaderettes on the subject of the overweight of pyro in ounce bottles correct in mentioning so large a possible excess as twenty to thirty per cent.? I venture to think that, cheap as pyro has become, the dealer who retailed it so carelessly would soon have to put up his shutters if he conducted his whole business on the same scale. It does not follow that because a thing is cheap it can be given away at that rate. In these days of "cutting" prices—and no one is a better exemplar of how close they can be cut than the photographic dealer—it is necessary to weigh even cheap things carefully if a profit is to be made, but of course, if the object is only to give away chemicals in order to secure customers for worthless cameras at a high price, the system is plain enough. But even then I do not think that the danger to the consumer would be so great as the writer of the paragraphs in question seems to think. Many people even yet take the trouble to weigh their pyro, but even if they do not the substitution of four grains for three would not have a very alarming effect, even in the hands of a "beginner."

The leading article a week or two since on *The Effect of Reversing Landscape Lenses* is one that provides a very useful hint to many young amateurs who possess only one lens for all purposes, and that a single one. How to use it to the best advantage for portraits is the question, and as few amateurs, owing to the absence of accessories and the usual conventional "fixings" of a full-length portrait, ever care to go beyond vignette busts, the employment of the single lens in the manner described, *i.e.*, convex side to the object, and stop between lens and plate, will generally give a better result both as regards sharpness and rapidity. Of course, for a full or three-quarter

length the lens should be used in the ordinary manner, and with a comparatively small stop. For mere busts a stop of $f/6$, or even larger, will answer if the lens be a fairly good one.

Appropos of this question of makeshift lenses, I some years ago heard an old and presumably experienced photographer affirm and strenuously maintain that for portrait purposes, where a long-focussed objective was required, the *back* combination of a portrait lens gave a better result than the front similarly employed. I could not at the time recognise the probability of this, and I must say that a subsequent trial with the components of the only portrait lens I could put my hand on at the time utterly failed to corroborate the claims. While the idea is moving in my head, therefore, I should like to again raise the question in the hope that some optical authority may tell us the truth of it. If it really be the case the thing is worth knowing.

When a case reaches the House of Lords it is usually considered to have reached the Court of Final Appeal—to have, in fact, arrived at finality. In the case of photographic plates and the Custom House, however, things appear to have commenced at the wrong end. One day last week—I cannot find my “evening paper” to refer to it—a noble lord asked a question on the subject of the difficulties experienced by amateur photographers in passing their plates through the various Custom Houses, notably our own. The speaker instanced the case of a friend of his, who, returning from a tour on the Continent, experienced no difficulty until he reached Plymouth, where, in spite of his protestations, the authorities insisted on examining his undeveloped plates—not that they suspected anything contraband, but because being pictures they might be indecent, and therefore unfit to be passed. No dark room being immediately available the traveller was detained for twenty-four hours, during which he managed to have the plates developed, when “the most indecent picture discovered was a picnic party on the edge of a crater!”

So much for the sort of annoyance met with. Lord Salisbury's reply was as vaguely encouraging as such replies usually are. He supposed he ought to support the Customs officials, and proceeded to do so by saying that this hard-worked class of individuals could scarcely be expected to be walking encyclopaedias of science, but, having said so much, he was fain to confess that in this particular instance the officials had acted with unwonted stupidity, and that now the matter had been mentioned, *perhaps* something would be done. That is, briefly, my recollection of the newspaper report; and now the matter has been raised “in the Lords,” let us devoutly hope, with the Prime Minister, that something will be done soon and effectually.

I notice in last week's JOURNAL my colleague, “Free Lance,” alluding to the use of “gun-cotton,” “gun-paper,” and “gun-sawdust,” speaks of the first and last as being likely to excel papyroxyline in rapidity of flash. That is quite my view held from the first, and now confirmed by experiment; the closeness of texture of the papyroxyline causes it to burn slowly, but at the same time we must remember, as Longfellow says,—

“Though the mills of God grind slowly,
Yet they grind exceeding small;”

or, as Herbert put it at a much earlier date, “God's mill grinds slow, but sure.” So the slow burning and the intense heat of the thick close paper ensure the complete oxidation of the magnesium, instead of blowing much of it away unchanged, as is invariably the case with gun-cotton. No doubt the prepared sawdust would form a nearer approach to rapidity and efficiency combined, but my recommendation of papyroxyline was, if I remember rightly, made in connexion with time exposures, not for sudden flashes.

I get some singular information from the column of “Foreign Notes and News” at times. For instance, I find that “a correspondent of *L'Amateur Photographe*” had the misfortune to get nervous over the water he was obliged to use when travelling, and which, from its hardness, he did not think would agree with his ferrous oxalate developer, so he set to work to boil it three separate times with a portion of his ferrous oxalate—that reads like sufficient to precipitate a whole kiln full of lime—though only a litre of water was operated upon, carefully filtering each time, and, at the finish, he had some water which, “though not pure, allowed him to develop his negative.”

I very seldom use ferrous oxalate myself, but if I did so, and were

placed in the same circumstances as this truly smart “correspondent of *L'Amateur Photographe*,” I should economise my developing solution, and not waste unnecessary time in boiling and filtering a few ounces of water. Commencing with water as I found it, “though not pure,” I would trust to its allowing me to develop my negatives, and if, after my return home, or to the regions of purity, any signs of lime appeared on the negatives, I would submit them to a weak bath of hydrochloric acid. The plan, perhaps, does not sound so well nor so scientific as the foreign one, but I think it would answer.

Then again, “Dr. Stolze indicates the following as the best means of modifying a landscape negative.” Then follows a description of the application of the “dusting-on” process to the back of the negative. Oh, Mr. Werge! how many years is it since you first described that method? and how many photographers are there in this country who have aspired to journalistic fame who would think of now putting it forward as a novelty? But, perhaps, the *Wochenblatt* wants filling, and it is hard work. But the compiler of the *Notes* need scarcely repeat such old stuff for the benefit of English readers!

JUNUS.

PAPYROXYLINE FOR FLASH-LIGHT PURPOSES.

I HAVE not noticed until the matter was briefly alluded to by “Free Lance” last week that any comments have been passed upon the proposal to substitute papyroxyline for ordinary pyroxyline in the combustion of magnesium powder for photographic purposes. Undoubtedly at first sight an inflammable or explosive material in the form of a continuous sheet seems to offer palpable advantages over such a disconnected material as unwoven cotton; but I think, when the subject is examined more closely, other elements will be found to operate in a contrary direction.

The suggestion of “Free Lance,” for instance, with regard to the greater supply of oxygen available in the case of ordinary gun-cotton, has one important bearing upon the “flash-light” question, since it materially affects the rapidity of combustion; but that the outward supply of oxygen is necessary for the purpose of explosion is negated by the fact that the explosive force increases as the material is shut off from outward influences. In fact, in the discussion that has already appeared on the subject, combustion and explosion have been taken as synonymous, whereas they are totally distinct.

For instance, it was suggested as an objection to Mr. A. L. Henderson's proposal to dissolve pyroxyline, and having incorporated it with magnesium powder and chlorate of potash to work it into sheets, that the most explosive kinds of gun-cotton are quite insoluble. Then it was proposed, by “Junius,” I believe, to form such sheets by cementing magnesium powder between two separate sheets of papyroxyline of the highest explosive power in order to secure rapid and perfect combustion; but in both cases I think the mistake is made of assuming that high explosive power is synonymous with, or accompanied by, quick combustion in the absence of pressure. My own recollection of occasional experiments with different kinds of gun-cotton, spread over many years past and including some made quite recently for this purpose, induces me to say that there is not the least connexion between the two, or that, if there be a difference, it is generally in favour of rapidity of combustion of the *least* explosive kinds. Theory, too, would seem to point, if not to the absence of any rule on the point, at least to the fact that the chemical changes that go on during explosion and combustion respectively are materially different, and therefore that the processes are different.

The controversy was commenced, as I have said, by Mr. Henderson's proposal to incorporate magnesium and chlorate of potash with pyroxyline in the form of celluloid; but an objection was raised against this on the score of its probable slowness of combustion. We all know how difficult it is to burn celluloid in the mass, and also that even when in extremely thin sheets, as in the waterproof collars and cuffs now sold, it only burns slowly like paper if a light be put to it. But it seems to have been forgotten that the presence of chlorate of potash in Mr. Henderson's compound, by supplying the oxygen needed for combustion, and by the consequent increase of temperature, would vastly increase, not only the rapidity, but also the intensity of the combustion of the material, which without it would, perhaps, be but slowly inflammable.

Turning to the proposition of "Junius" to employ highly explosive papyroxyline, I cannot see that matters are at all improved unless precisely similar measures to those of Mr. Henderson are adopted, namely, the incorporation of chlorate of potash as well as magnesium with the compound sheets. As "Free Lance" points out, the atmosphere, and therefore oxygen, has fuller and freer access to pyroxyline in its ordinary form than it can possibly have in the case of papyroxyline, the close texture of which tends to explosiveness and intensity rather than to rapidity of combustion. For the perfect consumption of the metal without scattering it in the unburnt state, no doubt papyroxyline would be superior to guncotton, and where a slow exposure, not a flash, was required, most likely the former would get more light out of a given weight of metal simply because it wastes none. But for "flash" exposures I imagine guncotton must remain supreme.

I have recently been amusing myself by making various kinds of explosive guncotton, or, rather, I should perhaps put it, guncotton of various degrees of explosiveness, from different materials, and a brief *résumé* of one or two such experiments purposely made will go further than much theory to clear up the question. It is well known that paper or any manufactured material requires a far longer immersion in the mixed acids than is the case with raw cotton, in order that the fibres may be thoroughly acted upon, and that for explosive purposes the acids employed must be in their most concentrated form in order to secure the highest degree of nitration. It follows merely as a working detail that the temperature of the acids should be kept as low as possible in order to prevent solution of the material.

The strongest commercial sulphuric and nitric acids of s.g. 1.45 were mixed in equal volumes, and, when quite cold, as much thin unsized paper, cut in small sheets, as the liquid would well cover was pressed in with a glass rod and left for twelve hours. It was then pressed, drained, and well washed, being finished with very weak ammonia, and dried. The result was a thick, tough papyroxyline, resembling stout parchment paper in appearance and practically quite insoluble in equal parts of ether and alcohol, though it swelled and became semi-transparent after long soaking. It burnt almost completely, leaving but a faint trace of ash, but so slowly, as compared with another sample of papyroxyline made for photographic purposes with more dilute acids and higher temperature, that I should estimate the relative rates of combustion at about six to one. This difference was undoubtedly due to the closer and denser character of the explosive compound, due to the parchmentsing action of the concentrated sulphuric acid, the photographic sample being far more open and pulverulent in texture.

Another experiment consisted in treating a quantity of soft lamp wick, and in this case I adopted Von Lenk's method in its entirety. This consists in an immersion of the perfectly dry cellulose in the mixed concentrated acids for a period of twenty-four hours, after which it is transferred for a similar period to a fresh quantity of unexhausted acid. In this manner the very highest degree of explosiveness is obtained. Lamp wick so treated, thoroughly washed and dried, burnt so slowly that a piece an inch long occupied two or three seconds in combustion, but underwent perfect consumption, as scarcely an atom of ash remained. The colour of the flame was intensely yellow, far more so than is usually the case with guncotton of only moderate explosiveness. The colour, however, I am inclined to believe, is entirely due to the slowness of combustion, or, in other words, to the insufficient supply of oxygen. I say this not merely because the more open guncotton burns more rapidly and with a white flame, presumably in consequence of its freer contact with the atmosphere, but because of the closer texture. Lamp wick being impregnated with chlorate of potash, its flame becomes considerably whiter and its combustion much more rapid. But it is possible that the colour may be due to quite a different though still not unconnected cause.

Pyroxyline—of whatever form—differs from gunpowder in that its products of combustion are, with the exception of faint traces of carbon and of ash, wholly gaseous, amongst the compounds formed being nitric oxide, which in combustion with an additional atom of oxygen forms the "nitrous fumes" given off by nitric acid when acting on certain substances. Clearly the higher the degree of nitration of the pyroxyline the larger the proportion of nitric oxide

formed, and if this possess any calorific action on the flame, we have a possible explanation of the yellow colour in this case.

I may mention a curious circumstance bearing upon the difference between combustion and explosion. Of course, it is well known that the same guncotton that burns harmlessly in the open air explodes with violence when ignited in a confined space or under pressure. I have already pointed out that whereas free oxygen is necessary for rapid combustion, its absence promotes explosion. But if the final products of combustion and explosion respectively be examined, it will be found that in the latter case the nitric oxide is altogether absent, its oxygen having been separated from it entirely, and the whole of the nitrogen left in the free state. According to the experiments of Lieutenant Karolyi, of the Austrian Artillery, it appears that whereas the products of combustion of tri-nitro-cellulose *in vacuo* contain about ten per cent. by weight of nitric oxide, the same when exploded under a pressure just sufficient to give way under the force of the explosion shows no trace of nitric oxide, but larger quantities of carbonic oxide and carbonic acid, as well as aqueous vapour. It may, therefore, be looked upon as more perfect combustion, brought about, no doubt, by the vastly higher temperature.

This circumstance also explains what was to me for long a mystery, namely, the fact that whereas in burning guncotton in the open you can *smell* the nitric oxide, yet in employing it for military or sporting purposes it is noted not only for its non-fouling, but also shows no tendency to corrode the gun, as might be expected. But under the circumstances, as will be seen, no corrosive fumes are formed.

I may say just one word with regard to the employment of gunpowder in conjunction with magnesium in contrast with pyroxyline. The products of combustion of the latter, as I have said, are practically all gaseous; but in the case of powder no less than *two-thirds* of the products are solid, and amongst the gaseous portions will be found such delectable combinations as sulphuretted hydrogen. Surely there is little inducement to adopt this plan!

In conclusion, I may mention a method that I have found both useful and easy, by which papyroxyline or guncotton can be evenly impregnated with finely-pulverised chlorate of potash. This salt, it is well known, is very slightly soluble in cold but freely in hot water. Make a boiling or, at any rate, hot saturated solution, and dip the cotton or paper in it, and press out the surplus liquid; on cooling, the excess of chlorate will be deposited in very fine powder. The same process answers admirably for powdering this awkward salt. Dissolve it in just sufficient water by boiling, and as it cools the salt will fall down in the finest powder.

On the whole, though papyroxyline may answer for slow exposures, I do not think it will prove of much use for "flash" work.

W. B. BOLTON.

COPYING PAINTINGS AND WORKS OF ART.

II.—AWAY FROM THE STUDIO.

POSSIBLY the most graphic way in which to put the difficulties and troubles of successfully copying old oil paintings will be to give illustrative cases and the methods adopted to overcome them. This may be better than a more didactic exposition, and thus enabling the details of careful work and manipulation to be stated, and rendered less dry and uninteresting than if a mere set of instructions and formulæ were duly set down, even when they are stated in the simplest way, as it is not given to every one to read through imperfectly-stated methods and baby fashions of imparting information, which does not always do, even although accompanied by common sense on both sides.

Some five-and-twenty years ago I was called upon to photograph the entire set of historical pictures, documents, and other interesting material connected with a now dormant peerage, the titles and greater portion of the estates connected therewith having been estreated in consequence of the share taken by them in the Stuart rising of 1715 and 1745. The then holders of the titles were Jacobites of the most extreme type, and after these two abortive rebellions sunk into comparative obscurity, some of the family losing their lives and liberty, as well as their goods, estates, and chattels. This necessitated prolonged visits to the family mansions of a number of the old Jacobite nobility and gentry, and some of the experiences may be related, bearing, as they do, on this subject, and elucidating it as well. The copies of the pictures, which were principally portraits, were to be executed to suit the pages of a privately-printed

history of the family. When it is considered that these pictures were of all dimensions—some of them being life size, full length, say eight feet by five, others half lengths, and so on down to enamels; miniatures on ivory, one of the latter being so small as to be used as the decoration of a finger ring; others were marble busts and figures, monumental memorials, and such-like works of art; views of the castles and mansions connected with the family, as well as MS. monuments and such-like—it will be seen that, while one camera of the proper description might suit the work, the same could not be said of the lenses, for experience proved that it required quite a battery of them, and those of the best kinds then available or obtainable. As this is practically a record of experience, and as we all learn by that Rhadamanthine monitor, at least all who are capable of learning, details will be useful, if not also interesting.

The camera determined on was a square one, capable of holding plates $8\frac{1}{2} \times 8\frac{1}{2}$, or, as then used in practice, and called full plates, $8\frac{1}{2} \times 6\frac{1}{2}$, either upright or oblong, as the subject required. This form of camera is decidedly more convenient than one needing to be altered in either direction, as the subject might demand, and it saves a lot of bother, time, and trouble. It was none of your gimcrack pieces of workmanship, but consisted of a good solid sliding box, not made even for portability, that being in this case the last requisite, but having, in addition, a bellows arrangement inside, and with a folding baseboard, making the camera capable of elongation up to nearly three feet; this, with separate fronts for the lenses, and with the necessary different movements, made one of the most perfect tools I have yet made and used for photographic purposes at home or abroad.

The lenses were the best rectilinears of the period—triplets—doublets for that purpose being not yet; there were also one or two of each of the ordinary landscape and portrait classes taken, which, if not capable of reproducing absolute rectilinearity, were still thoroughly fitted for some kinds of copying and for many other purposes.

The stand was a tripod one, made specially rigid, much like that of a theodolite, which, while being sufficiently portable, was not too heavy, and the tripod head was made exceptionally large, extending as it did to the outside edge of the camera's width, the extra strong legs ensuring great stability in use. In actual work it was used as seldom as possible, preference being given, where that could be got, to a firm, steady table from the hall or kitchen, the necessary adjustments for height being easily managed, either with the object to be copied or by assisting the height of the camera where that was needed. The other necessities included a store box to hold all the other things, such as chemicals—in fact, an entire workshop of all that was likely to be wanted; and be sure that a hammer, some nails, a bit of cord, and such-like, were not forgotten. The plate box, which it also held, was constructed for eighteen plates, each pair being placed back to back in one division, supplied with india-rubber tubing above and below to prevent shaking. With this precaution I have never had a broken plate. The water-tight bath was packed between this box and the inner end of the camera, and the lenses, covered up in cloths and chamois leather, packed inside the camera itself, made a neat package about twenty inches long, thirteen high, and a foot wide, or thereabouts, which when wrapped up in a large black baize cloth, the use of which has been explained, made a neat, tidy package, neither too bulky or too heavy. This outfit is as good now for use in dry-plate work as it was at first for the wet, the space got by the discarding of the bath being occupied by a couple of double dry slides and trays, and for dry-plate work away from the studio is as perfect and handy as it then proved itself.

One of the first places to be visited in this connexion was the home of an aged countess in her own right, the last of her race, the vicissitudes of war and other such incidents having wiped out every representative of the family save herself. She was then over ninety years of age, and it was a perfect treat to see the very little old lady in the costume of her youth, even to the natty high red heels of her tiny boots, being led down for exercise, which she took every decent day. She was not afraid of a bit of a shower, and the little carriage always used was an open one. She and it made a perfect picture, with the ivy-clad walls of the old border fortress, as they stood on the terrace in front of the main entrance to the castle; this terrace had evidently been added as an afterthought in less warlike times than that in which it had been first built, to get more easily up to the then only principal entrance, which had originally been on what we would call the first or living floor of the building. This was the almost universal method of construction of the Scottish border castles and keeps in the Middle Ages, necessitated by the continual raids and forays between the two countries—Scotland and England—whose people now dwell in peace and amity, and only strive as brethren do to see who can do the best for all.

A detective camera of the present day and rapid plates would have been invaluable for securing a representation of such a relic of the past

as was then before us. The good old lady was approached and requested to allow herself to be taken by the (to her) new method of portraiture, and as I was there it would be little trouble to either her ladyship or me to do this while I was copying the portraits of her progenitors and predecessors, but she refused consent in her own stately fashion to be handed down in "that new-fangled way" to posterity.

These old portraits had been hanging in a cold and, I believe, somewhat damp gallery, and they had evidently received very slight care or attention from the time they had been painted and hung up there, the canvasses of most of them being flabby and flapping, the paint cracked, and the varnishes oxidised, dull, and dirty, except in the case of two favourites of the elderly housekeeper. They were that of a lady and a gentleman, which she had carefully cleaned and rubbed up with furniture-oil or polish, of her own make, once or so a year. These could certainly be seen better than the others, but, between the rubbing and the polish, when those two come to be put in order, they will be worse to clean and be found to be more damaged than the others, and they were bad—but that is by the way. For the purpose of photographing they were much the most suitable, requiring not the slightest use of temporary or other varnish to bring out any detail they had. That pair of portraits were naturally taken first, and proved sufficiently successful for the purpose, but when the others came to be tried they, from the causes mentioned, proved failures or comparative failures. This was not only explained to her ladyship, but prints were shown her from the different negatives with the most lucid possible explanations, but no! "They must be taken as they are while I am here, after I am gone you may do what you will with them," was all the answer that could be got. The prints were forwarded to headquarters with the remarks of her ladyship, and the result was that impressions on plain paper were taken and the details sketched in so as to enable the copies to be made from them as being the only pictures known of the historical persons represented. Fortunately, these portraits were not fine as pictures, and were only similitudes more or less correct of the persons represented, and so their deterioration, or even destruction, as works of art, was of little consequence to the world at large. Coleridge puts it in one of his dreamy, poetical visions:—

"Their bodies are dust,
Their good swords are rust,
Their souls are with the saints, we trust."

So their delineations may be left to decay, or they may be revived if another of those once noble families decides upon their preservation when they change possessors.

The photographic lesson to be deduced from this may easily be deduced. Had full liberty been allowed in the circumstances, so that good or the best photographs from these pictures must be got, this would have been the mode of procedure:—After being taken from the walls, they would have been carefully and thoroughly dusted after being removed from the frames, then washed as has been described, and after being thoroughly dried, they would have been treated to a good rubbing with the hardest kind of oil before indicated, say colza or olive, both of which are always to be had in country houses, care being taken that little or none be left on the surface, after which they would be thoroughly rubbed with a coat of Robertson's medium, or a similar material, which was always carried in the store box, but leaving little or comparatively nothing on the picture. This treatment would have allowed all the detail to be copied, not only without injury to the pictures, but with positive benefit as to their preservation. It may be asked if I would recommend every photographer to do this, either while or previous to copying dilapidated old paintings. Most decidedly no. Let this be done by a competent person who understands the work, and on whom the responsibility (if any) would rest for doing it properly. This would allow the full attention of the photographer to be devoted to his work of copying, and so allow of the best results being achieved without the chance of him being blamed for any imaginary injury the works might receive, which he might be for maddling with work that he did not understand.

W. H. DAVIES.

PROPOSED PHOTOGRAPHIC TRADE SECTION OF THE LONDON CHAMBER OF COMMERCE.

THE London Chamber of Commerce is organizing a Photographic and allied Trades Section, to be added to the various other Trade Associations which are doing so much to increase the usefulness of the Chamber. There are many scientific societies and clubs in connexion with photography, but no commercial association of the trade exists, or has ever been attempted, and it is quite time that we had a combination similar to those possessed by most other trades. We are glad, therefore, to know that energetic steps are now being taken in this direction, and

that the movement has already received the support of several of our leading firms.

There are many questions which affect the interests of the trade calling for prompt attention, such as the working of the Merchandise Marks Act, the steps which are being taken to establish the use of the decimal system in weights and measures, the promoting or supporting any application to Parliament which may be beneficial or necessary to protect photographic interests, the organization of annual exhibitions, the amendment of the Copyright Act and Patent Laws, the railway rates question, &c., besides other similar matters which may arise from time to time in the future, and which could be more effectually dealt with by an association allied with so powerful and representative a body as the London Chamber of Commerce, consisting of about three thousand mercantile firms and others engaged or interested in trade and commerce, including some forty Members of Parliament.

The Photographic Section would form its own governing body, without interference from any other branches of the Chamber, the Chairman having a seat at the Council Board, where he would represent the interests of the trade, and in case any important question should arise, the influence of the Chamber would, with the consent of the Council, be exercised upon Government Departments, including the Foreign Office and Board of Trade, upon Colonial Governments, and upon Parliament.

The help of so influential a Chamber would be of enormous utility, as it is in touch with every Chamber of Commerce in the world, and a united trade, whose members would meet from time to time to debate trade questions in a business-like spirit, and to recommend certain lines of action to a strong body, such as the London Chamber of Commerce undoubtedly is, would be able to speak with an authority almost impossible under any other conditions.

Properly supported and conducted, it seems likely that the proposed Photographic Section can hardly fail to do a great, and useful, and, we may add, much needed work, we therefore heartily wish it every success.—*Contributed.*

PHOTO-MICROGRAPHY.*

To explain to you the importance and advantage of the immersion system over the system of dry fronts, I must refer to one of the simplest and most important laws in optics, namely, that of the total internal reflection of a ray of light in a transparent medium, such as crown glass, when the angle of incidence exceeds 41° . Hence no cone of light greater than twice 41° , or 82° , can pass from glass into air but by interpolating a medium of higher refractive power than air between the cover glass of an object mounted in balsam and the front lens of an objective. We not only enable rays of any degree of obliquity to pass through the object into the objective, but the obliquity of these rays in the denser media than air—that is, in the immersion fluids—becomes less than before. In consequence of this refraction or contraction of the illuminating cone in the immersion fluid, rays of the greatest obliquity are enabled to enter the front lens and help to form the microscopical image, which rays, without the intervention of the immersion fluid, would be completely lost. Now it is obvious that the angular aperture of an immersion lens (measured in balsam) is equivalent to a far larger angle of an air lens. Professor Abbé, of Jena, has formulated an exceedingly simple expression, which enables us to compare the apertures of dry and immersion lenses, and he has called this the *numerical aperture*, viz.:—

$$a = n, \sin u,$$

n standing for the refractive index of the immersion fluid, which is for air 1.00, for water 1.33, and for a homogeneous immersion fluid, such as cedarwood oil, 1.52, whilst $\sin u$ is the sine (a trigonometrical function) of the semi-angular aperture of the lens, $2u$ being the total angular aperture. The resolving power of an objective does not only depend upon its numerical aperture, but also upon the wave-length of the light used for illuminating the object. It is greater for monochromatic blue light, for the line F of the spectrum, than it is for white light, but it is greatest for the line H of the spectrum, or for that end of it where its actinic power dwells. A homogeneous immersion objective of 180° in oil is capable of resolving theoretically per inch—

	146,543 lines by white light,
	158,845 „ by blue light,
and	193,037 „ on the photographic plate.

Here we have in figures an expression of the far greater sensitiveness to light of the photographic plate than of the human eye. In other words, we may expect that a photo-micrographic negative may reveal to us one-fourth more than the human eye is capable of seeing in the microscope. The visibility of small isolated objects must not be confounded with the visibility of fine gratings, bands of lines, or other closely approximated structure, because only in these latter appear the phenomena of interference of the diffraction spectra produced by the passage of the light through narrow interstices. To render such structure visible in the microscope, or to resolve it, our objective must have sufficient aperture, so that at least one of the diffraction spectra of the first order is collected by it. This is not the place nor the time to enter

* Continued from page 353.

into the theory of micro-objectives, but I must not omit to mention that medium and high powers, with the exception of homogeneous immersion lenses of some makers, are provided with an arrangement called a screw collar, which enables us to approximate or separate the front lens from the posterior combinations in order to neutralise the influence of different thicknesses of cover glass. So sensitive are fine wide-angled objectives, that a difference in the thickness of $\frac{1}{1000}$ inch of the little glass which covers the object may prejudicially affect the performance of the lens unless this difference can be neutralised by the adjustment of said screw collar. By far the best lenses for photo-micrography, as well as for every other purpose, are the new apochromatic lenses of Carl Zeiss in Jena, and also those of Powell and Lealand in London, which they make of the new optical Jena glasses. Several English and foreign opticians call their lenses also apochromatics, because they employ these new glasses for their objectives. The apochromatic lenses differ from the ordinary achromatic lenses, which are not strictly achromatic, as they are only corrected for two colours of the spectrum, by their being corrected for three colours, which render them practically quite achromatic. The chemical and visual foci of these new apochromatic lenses coincide, their definition and resolving power exceeds that of the ordinary achromatic lenses in consequence of the perfection of their corrections, they give a far greater amount of light and stand a far larger amplification by eyepiece than the ordinary lenses, and are, therefore, in every respect the best objectives for photo-micrography and all other microscopical work. As no good music can be got out of inferior musical instruments which are out of tune, so likewise is it impossible to obtain correct and critical images from lenses whose aberrations are not perfectly corrected.

The compound microscope consists of objective and eyepiece. The eyepiece or ocular is of the utmost importance, and if inferior in quality may ruin the performance of the best objective. The usual form of eyepiece is the Huyghenian or negative one, besides which we have the Kellner eyepiece, the Ramsden or positive eyepiece (which is almost only used as a micrometer eyepiece), the achromatic ocular, and the new compensating eyepieces of Carl Zeiss, which are specially constructed for his apochromatic objectives. These compensating oculars give splendid definition and improve the performance of other objectives as well as of that of the apochromatics. They magnify the image projected into them by the objective up to twenty-seven times diametrically. Professor Abbé has devised special projection eyepieces for photographic purposes and for the lantern microscope, and they give, perhaps, the finest definition of any eyepiece made, but their field is much smaller than that of the Huyghenian and other oculars. Besides projection eyepieces, ordinary concave amplifiers, such as those I have here, which were made by Rosa and Co., will be found very useful, as they absorb but little light, give a large field, and do not impair the definition of the objective to any appreciable and noticeable extent. The question is often asked, and seldom satisfactorily answered, whether the eyepiece should be used or not when photographing with the microscope. Well, I think the answer depends entirely upon circumstances, such as the size of the image we wish to project, the length of the camera at our disposal, and the objective we intend to employ. Should this latter give us a flat, well-defined image on the screen, and should our camera be sufficiently long to obtain the requisite size of the image without an eyepiece, then it would obviously be superfluous to employ one, as it would only absorb a quantity of light, and, unless of the best construction, would impair the performance of the objective. If, on the other hand, the performance on the screen of an objective should be improved by an eyepiece—for example, by a compensation or Abbé's projection ocular, and if we should wish to obtain a higher amplification than we can obtain by the use of the bellows alone—then we must use an eyepiece or an amplifier, but it is always advisable to use one of long focus. It is a popular fallacy to suppose that the Huyghenian eyepiece improves the flatness of the field. When photographing with the objective alone we find a practical application of the law of conjugate foci of lenses. The further we draw out the bellows of our camera, i.e., the further we remove the posterior focus of our objective, the nearer we have to focus the objective on our object, or the more do we reduce the working distance which, with high powers, may ultimately result in the working distance being so far reduced that the objective does not work any more through the cover glass of the object, thus imposing a limit upon the amplification on the screen.

The question next to be considered is that of the light to be used in photo-micrography. By far the best light, at least for high powers, large amplifications, and for shutter exposures, is sunlight, owing to its great intensity, its great actinic power, and to the parallelism of its rays. By its aid we are enabled to see some of the finest structural detail which the microscope is able to reveal. Sunlight cannot easily be used direct, owing to the earth's rotation. To ensure the falling of the sun's rays on our microscope constantly from the same direction we must receive them first on the reflecting mirror of a heliostat, which is a clock-work arrangement moving a spindle set parallel to the earth's axis or at angle with the horizon equal to the latitude of the place. This spindle carries the reflecting mirror once round its axis in twenty-four hours. A second mirror is often interpolated, but these mirrors must be perfect planes, else the parallelism of the sun's rays will be destroyed. Unfortunately the sun is not often to be depended upon, and the photo-micrographer has to press humbler luminaries into his service. The light next to the sun, as far as its actinic power is concerned, is the magnesium

light; but the lamp for the successful employment of this excellent photographic, and now cheap, light has still to be constructed. The points to be attained are not only a steady combustion of the magnesium ribbon, but also that provision should be made for collecting every particle of calcined magnesia, so that none can settle on the object and on the front lens of the objective, as in this case the enlarged images of such particles will be photographed along with the object. A few inches of magnesium wire slowly pushed through a brass tube hammered flat will suffice to give a vigorous negative when the object is magnified several hundred diameters. The electric light is rich in actinic rays, but has, on the whole, not found much favour with microscopists, for the arc light is troublesome, expensive, unsteady, and gives off a great deal of heat. The incandescent light is far more suitable and handy, but as the first principle of microscopical illumination is to project a sharp image of the source of light in the plane of the object, the image of the thin glowing carbon film, if projected by a substage condenser of short focus, becomes often too small to cover the object. The power of the battery, if one is used, must be sufficient to render the film of the lamp glowing quite white, for if this is not the case we may get abundance of red light on the focussing screen, but not sufficiently rich in actinic power to get an image on our sensitive plate, as I found once to my great disappointment. As even the incandescent electric light is troublesome to generate, unless by a small dynamo driven by power, it has, from this reason and from the one mentioned before, not made much headway in photo-micrography.

The oxyhydrogen light has been made much use of of late in photo-micrographic work, notably by Professor Crookshanks. This light is exceedingly steady and intense, and since oxygen is being supplied commercially in a compressed state in steel cylinders, its advantages over some of the sources of light mentioned are obvious, although the lime-light, as it is commonly called, possesses relatively less actinic power than either the magnesium or the electric light. The limelight is especially useful for photographing *bacteria*, for which nothing but a central cone of light is required.

The last available source of photographic light is a good paraffin lamp, and in it we have an excellent, manageable, and cheap light, which is always at our disposal, and which suffices for photographing objects under magnifications of from 400 to 500 diameters, so that we can even photograph with high powers by lamplight. All, then, that is required is a good microscope lamp, having one flat wick, of which we can employ either the edge or the broad side, as circumstances require. The lamp must be adjustable in a vertical direction, and the flame should be enclosed in a metal chimney, having a window on one side, or the glass chimney should be surrounded by a porcelain shade having an opening on one side. I line my copper chimney with plaster of Paris, so that it reflects as much white light as possible through its window, which is filled out with a disc of light blue glass. Nearly all my photographs were taken by lamplight. Any ordinary paraffin lamp costing about one shilling can be made to do excellent service in photo-micrography. It is essential that the very best paraffin oil, such as crystal oil, be burned in microscope lamps, especially when used for photographic work. Inferior paraffin oils possess elements of danger, especially when burned in lamps having metal chimneys, as these latter get very hot. Gaslight is not suitable for our purpose, as it possesses too little actinic power, and is not steady enough.

Having briefly described the microscopical part of the apparatus, we will turn our attention to the camera. The number and variety of cameras used for photo-micrography is so great that I could not describe to you this evening even all the best-known forms. Almost every microscopist arranges his photographic apparatus to suit his work and as his circumstances permit it. The smallest cameras are generally carried at the ends of the microscope bodies, which arrangement has the advantage that the apparatus can be used both in a vertical and in a horizontal position; but, as a rule, such a combination is not very steady unless the camera is either very small, or is supported by a separate stand, such as Reichert's in Vienna, which consists of a heavy horseshoe foot provided with three levelling screws, carrying a stout iron pillar, on which a frame supporting the screen end of a small bellows camera can be adjusted in a vertical direction and fixed. There are a number of arrangements for dispensing with a microscope stand altogether; in these, a stage for the support of the object and the objective are attached to the front of the camera, but they are evidently only suitable for low-power work, and if provided with stage motions, fine adjustment for focussing, &c., will be as expensive as a separate good and cheap microscope and a camera. I have seen a picture of such an apparatus of American manufacture, which had a powerful large paraffin lamp with three wicks attached to it. This is both theoretically and practically wrong, for we would project three images of flames parallel to each other on the object were a substage condenser employed for the illumination of the latter. The smaller the flame, the more have we command over the passage of its rays. Besides, a large lamp, especially if provided with three wicks, produces so much heat that the objective and the object may be ruined by it. The exposures under low powers by lamplight are quite short enough even with a small flame.

Coming to some of the best arrangements, and those which are suitable for the highest powers, those of Dr. Maddox and of Dr. Colonel Woodward, whose work has not been surpassed, deserve mentioning. These

gentlemen dispensed with the bellows camera altogether by darkening the room they wrought in completely, and allowing the sun's rays to fall only through a small hole in the window shutter after it had been reflected from a heliostat placed on a shelf outside the window. The microscopical image was projected by the objective and a concave amplifier on a screen or on an easel similar to those used for enlarging on bromide paper, and this easel moved on rails. Seated by the side of the microscope and whilst controlling its adjustments, the image was viewed by means of a powerful short-focus telescope or field glass. The image having been focussed sharply on a piece of white card, the latter was exchanged for a sensitised plate and the necessary exposure given to it.

The arrangement, which seems to meet nearly all requirements for photographing with any kind of light and with any microscopical objective, is the recent one of Dr. Roderich Zeiss in Jena, a son of the famous optician, Dr. Carl Zeiss, recently deceased. Dr. Roderich Zeiss is probably the most favourably placed photo-micrographer living, and it must be admitted that he has made excellent use of his unique opportunities. He has all the vast resources of his establishment and of the optical glass works in Jena, and the great knowledge of microscopical optics of Professor Ernst Abbe at his service, besides being himself an excellent and enthusiastic microscopist and photographer. Dr. Zeiss works in an isolated and uninhabited dwelling house, in the ground floor of one of the rooms of which he has had sunk two large foundation stones. Upon one of these stones stands a firm iron tripod supporting an iron platform, which carries either the heliostat, the arc lamp, or the oil lamp, together with stands for various pieces of apparatus, such as iris-diaphragms, alum tank for filtering out the heat rays of the sun, condensing lenses, and a fine microscope specially constructed for photographic purposes. On the other larger foundation stone stands a long, square, iron table having four legs, which table supports a long bellows camera of two sections. The camera moves on rails, so that it can be either connected or disconnected with the microscope without delay. The motion of the fine focussing screw is imparted to it by means of a Hook's joint and a long rod, the end of which the observer holds in his hand whilst seated near the focussing screen. The focussing glass is attached to the screen itself by some moveable supports. Provision is also made for placing one section of the bellows in a vertical position when the microscope is placed vertically. Two iron stools, which are adjustable in a vertical direction, the one standing near the microscope and the other near the screen end of the camera, enable the operator to make all the adjustments with ease and the greatest comfort.

Before Mr. Carl Zeiss made the large apparatus just described, I devised the simpler, but almost quite as efficient, apparatus which you see before you. It has been evolved gradually as my experience in photo-micrography ripened, and whilst my stand is not in the least ornamental, it seems to me to fulfil all the requirements of the photo-micrographer, besides being portable and cheap. My photographic bench is eight feet long, sixteen inches broad, and eight and a half inches deep; one end carries a raised platform four feet long for the support of the camera, and to bring its centre in the optical axis of my large Ross' microscope stand when the body of the latter is placed horizontally. This platform, to the underside of which are glued strips of indiarubber to deaden vibrations, can be raised for the purpose of photographing with the stage of the microscope placed horizontally, in which case I employ a large rectangular prism above the cross arm of the stand in order to reflect the image in a horizontal direction in the camera. The other end of the bench supports a round table twenty-seven inches in diameter, which revolves upon its axis and serves to support the microscope, the lamp, and any other apparatus which I may require. The height of this revolving table from the ground is such that it enables me, whilst seated on a chair, to focus the object and arrange the illumination of it with the utmost comfort, previous to making the light-tight connexion of the microscope with the camera. Under the revolving table and attached to the bench are five brass screws carrying little brass discs topped with indiarubber, and by raising three of these screws the revolving motion is arrested, and the table is then firmly supported and can be levelled. Along the raised platform for the support of the camera runs a brass focussing rod supported by two short pillars on plates, which slide into dovetailed brass plates screwed to the bench. This focussing rod carries at the end, near the round table, a small grooved pulley adjustable in the direction of its axis. Over this pulley and round the wheel of the fine focussing adjustment is placed a thin elastic cord, and by these means the object can be accurately focussed whilst its image is being examined on the focussing screen. The bench itself is supported at its ends by two pairs of legs and two stretchers, which are attached to it by only two screws, which can be instantly removed either for the purpose of transport or when it is desired to place the bench on an ordinary strong table. When photographing objects in fluid, or when using immersion lenses having an inconveniently long working distance, the microscope has to be placed in a vertical position, and as my reflecting prism is not so perfect as not to impair somewhat the sharpness of the image under the highest powers, I have constructed a very simple addition to my bench, which consists of two hinged boards held perpendicularly to each other by means of a stout stretcher. The whole has to be fixed by means of two screws to the top of the platform. The camera is then fastened by means of two screws and brass stretchers to the vertical board, whilst the microscope and lamp are carried on the round turntable, which is now supported by a separate

square table only fourteen inches high. This arrangement necessitates, when the bellows are far drawn out, the use of a step ladder for viewing the image on the focussing screen, and it is in this position that the focussing rod proves itself a great convenience.

ADOLF SCHULZE, F.R.S.E., F.R.M.S.

(To be concluded.)

Foreign Notes and News.

THERE appears to subsist just at present what the Americans would call "a slight unpleasantness" between the Photographic Society of Berlin, of which Dr. Stolze is President, and the German Photographic Society, for which Dr. H. W. Vogel discharges analogous functions. The two Societies have similar objects and aspirations, and as will have been observed remarkably similar names—so similar, indeed, that many of us will probably be surprised to learn that they are really two separate institutions. Nevertheless, discord has recently cast her apple between them with deadly effect. It was recently proposed to hold a Jubilee Commemoration Exhibition in Berlin. Both societies appear to have indicated their willingness to support the proposal; but as the time for taking active measures for the realisation of the common object approached, it appeared that each had determined to have its own exhibition in its own suite of rooms, and to jubilate unsocially by itself. The *deus ex machina*, in the shape of Herr von Giesler, Minister of the Interior, has been wheeled in, and he has refused to let them have their exhibition at all unless they agree to hold it together. Will Tweedledum and Tweedledee after this patch up their quarrel? A better instance of the sturdy Teutonic independence, which Prince Bismarck the other day said made the German so much harder to govern than the Frenchman, it would probably be difficult to discover.

A VERY useful form of universal lamp was recently exhibited before the Society of Friends of Photography in Berlin. It may be employed both in the studio and on excursions. When furnished with a red cylinder it can be employed in the dark chamber, and an arrangement for blowing magnesium through the flame permits of its application as a flash lamp. The case in which it is packed is so made that it may be employed as a reflector. A very excellent negative was shown taken by this lamp by the combustion of from two to three centigrammes of magnesium powder.

THE President of the above society also exhibited a number of very interesting photographs, which Herr von Delden, in Breslau, had succeeded in taking during a *bal masqué*. The photographs in question were remarkably successful, and show that as far as portraiture is concerned photography has become completely independent of daylight.

THE Russian portrait photographers have a disagreeable *penchant* for over-retouching and for printing on rose-coloured albumen paper, which they press into relief and glaze (enamel?) excessively. Some also indulge in producing ultra-Rembrandt effects, which they heighten by the assistance of coloured backgrounds and other somewhat meretricious devices. A large picture of a lady in ball toilette, behind whose charms smiles a brilliant blue sky on the one side, while they are menaced by a threatening thunder cloud on the other, may serve as an example. In the case of all the larger exhibits a great degree of positive retouching seems to have been employed, with the result that they appear more like drawings than direct photographs.

RATHER tasteful exhibits by St. Petersburg artists and dealers help to fill up and complete the exhibition. The attendance of the public, particularly of the innumerable local amateurs, has been very large, and the jury is at present going through the performance of its somewhat laborious functions.

THE Photographic Jubilee Exhibition in St. Petersburg, the preparations for which were noticed in this JOURNAL some time ago, has been recently opened. The exhibition is specially intended to commemorate the services to photography of Daguerre, Talbot, and Niepce, a subject which formed the principal theme of the speech with which the President of the St. Petersburg Photographic Society, General Timaschitschek, opened the proceedings. The general excellence of the exhibition hardly appears to have satisfied the expectations which its pretentious title, and the resources of a city like St. Petersburg, were calculated to raise; and even the choice of the site, and decoration of the rooms allotted to it, were not especially happy. Among the principal exhibitors are Stein and Hoppe (St. Petersburg), Cronenberg, (Bavaria), and the Munich Autotype

Company, as also Warnerke, whose collection was especially extensive. The firm of Anschütz was represented by a number of instantaneous photographs, among which figured the well-known impressions of storks on the wing, manœuvres, and sporting scenes. Robinson, of Tunbridge Wells, was also represented by eight *genre* pictures, executed in his usual masterly style.

PROFESSOR SALCHER, who, in conjunction with Professor Mach, was the first to photograph projectiles during their flight, and who also succeeded in obtaining impressions of the air-waves preceding and following the ball, has lately extended his experiments to taking photographic impressions of air in motion from other causes. On permitting air under a pressure of from fourteen to nineteen atmospheres to escape from a circular opening of about five c.m. diameter, a lyre-shaped figure appeared immediately in front of the opening, whose open ends extended right into the aperture from which the air was issuing, while the curved portion of the figure was cut across by another figure somewhat resembling a pair of scissors. When the pressure was less, and the air escaped through a rectangular opening, there appeared a succession of figures of the accompanying form:—(). The figures diminished in size with increasing distance from the opening. The possibility of photographing these phenomena was doubtless due to the air issuing from the opening having a different refractive index from the air around it, and consequently producing an effect upon the light transmitted through it similar to that observable by the eye above heated surfaces, or over dry ground in hot weather.

Our Editorial Table.

STEREOSCOPIC TRANSPARENCIES.

By W. I. Chadwick, Manchester.

WHAT a beautiful thing, to be sure, is a stereoscopic transparency, more especially when, as in those now before us, the technical errors which are so prevalent are entirely eliminated! Mr. Chadwick has for a considerable period made the subject of the stereoscope so peculiarly his own that we naturally look for the highest development of the art in any pictures which emanate from him, and bear the impress of his own handiwork—nor do we look in vain.

The subjects which comprise the series are mainly *Reminiscences of the Royal Jubilee Exhibition, Manchester*, although some others not entitled to rank in this category accompany them. They are all mounted with mats, and have a backing plate of finely ground glass—so finely ground, indeed, as scarcely to show any granularity—a fault, by the way, which is much too common, and which seriously detracts from the merits of otherwise fine pictures. From a conversation with Mr. Chadwick we learn that he hopes soon to minimise the residuum of any lurking granularity by a preparation which, while forming a perfect backing, shall be entirely devoid of grain, even when examined through a powerful magnifier.

In these exhibition reminiscences the lighting and general manipulation must have been cleverly managed—as, for example, in 36, in which there are a large number of white marble statues on black marble pedestals, the statues being soft and fine, and devoid of chalkiness, while the pedestals are also depicted with the necessary detail. Or, again, as when in 112 the statuary in the foreground is so subdued, without any detail being lost, as not to have interfered with the perfect rendering of the paintings which cover the walls beyond. In one of these the leading painting is the now well-known *Village Wedding*, the popularity of which, when in the exhibition, was evinced by the tangible fact that no less than four times had the carpeting in front of it to be replaced. Well, this painting and the others which surround it are as perfectly rendered as if the most approved methods of orthochromatic photography had been employed in their reproduction. This, indeed, is somewhat of a noticeable feature in all of Mr. Chadwick's interiors: the paintings are admirable in themselves, while equally so is the white marble statuary in the same photographs.

The subjects not appertaining to the exhibition embrace several attractive scenes in the picture-teeming county of Derby. In their characteristics they are quite equal to those of the exhibition.

Mr. Chadwick has adopted, and, we are glad to perceive, is manufacturing for others, an outfit having special reference to the production of stereoscopic negatives and prints, more especially transparencies, which renders the production of these charming pictures a matter of extreme facility. Both camera and slides are unique, and partake largely of the best American ideas. The camera, as will be remembered from our description of his exhibit at the Photographic Society of Great Britain, is also readily convertible into a stereoscope in which to view its own productions. He informs us that since the beginning

of this year, and notwithstanding the inclement weather that has prevailed, he has supplied no fewer than seventy such outfits, which we are very glad to learn, as it indicates a rapid growth in the taste for stereoscopic photography.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8378.—"Improvements in or appertaining to Photographic Cameras." Complete specification. W. SANDERS.—*Dated May 20, 1889.*

No. 8475.—"A New or Improved Shutter for Photographic Lenses." H. HERBERT.—*Dated May 22, 1889.*

No. 8504.—"Printing Photographically and otherwise Labels, Show-bills, Posters, &c., from Thin Movable Metal Types." R. TISSINGTON.—*Dated May 22, 1889.*

No. 8603.—"An Improvement in the Production of Phototypes." J. A. FISCHER.—*Dated May 23, 1889.*

No. 8632.—"A Collapsible Pneumatic Focusing Chamber (a Substitute for Photographic Focusing Cloth)." A. D. CHAPMAN.—*Dated May 24, 1889.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 3	North Middlesex Club	The Iron Room, Stroud Green.
" 3	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle.
" 4	North London	Myddelton Hall, Upper-st., Islington.
" 4	Holmforth	
" 4	Sutton	Society's Rooms, Sutton, Surrey.
" 4	Sheffield	Masonic Hall.
" 4	Bolton Club	The Studio, Chancery-lane, Bolton.
" 5	Coventry and Midland	The Dispensary, Coventry.
" 5	Edinburgh Photo. Society	Professional Hall, 29, George-street.
" 5	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 6	Leeds	Philosophical Hall, Leeds.
" 6	Glasgow Photo. Association	Religious Institute, 177, Buchanan-st.
" 6	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MAY 28.—Mr. W. E. Debenham in the chair.

The CHAIRMAN laid before the meeting a specimen cloud negative and what was called an "opaline" print, which had been sent to the Society.

Mr. A. COWAN exhibited a negative stained yellow by quinol development, and said that he had traced the cause of the yellowness to the presence of even the smallest quantity of bromide of ammonium in the developer; bromide of potassium did not produce the yellowness. He had been unable to remove the stain by perchloride of iron or other agents.

The CHAIRMAN liked to see the causes of faults thus traced out.

Mr. LESLIE MONTEFIORE had never had yellowness with quinol, and had never tried ammonium bromide in the developer.

Mr. CHAPMAN JONES said that so far as he had seen in work brought to him by students, quinol stained worse than pyro.

Mr. LEON WARNERKE temporarily attached films to glass by means of a sticky material, which once applied to the glass seemed to last for ever; it was a compound of indiarubber and gum elemi.

Mr. A. COWAN thought that Carbutt's films were coated of such a size as to cut into four, for quarter-plates.

Mr. WARNERKE thought that there was no glycerine in the Carbutt film, and that the slight roughening of one surface was done by chemical and not by mechanical means; he supposed that the celluloid sheets were cut from a block and then submitted to heavy rolling or other pressure. About twenty years ago he (the speaker) had been in communication with the Xylonite Company about celluloid films for photographic purposes, but the sheets were too rough, and the Company had not then any fine-enough rolling machine to make them better.

Captain MANTELL (the Hon. Secretary) asked why a negative he produced had come out thin and fogged, unlike others on plates from the same batch; it had been developed by a man in his school.

The CHAIRMAN remarked that the whole film had been considerably fogged by light, and probably during long development.

Captain MANTELL stated that it took from half to three-quarters of an hour for development.

Mr. COWAN thought that great dilution of the developer and long exposure to the light of the developing room might have produced the result.

Mr. WARNERKE exhibited some photographs of the last meeting of the Council of the Photographic Society, which he had taken by the magnesium light. He also exhibited an instantaneous photograph he had taken by the magnesium light at the last meeting of the West London Photographic Society.

Captain Mantell exhibited a silver print which he had toned in the cold-bath platinum developer, and which was slightly yellow.

The CHAIRMAN remarked that it looked like a print on India tint paper. Captain MANTELL had tried to copy a blue and white line photograph by means of the camera, and could not get sufficient contrast in the results.

Mr. FRIESE GREENE recommended him to soak the blue print in bichromate of potash, which would turn it green, and render it easy to be copied.

Mr. WARNERKE preferred to use optical means for the purpose; he employed yellow glass in front of the magnesium lamp, and nothing but direct experiment would reveal the best kind of yellow glass for the purpose. He then burnt twenty-five inches of magnesium ribbon in illuminating the print from one side, and afterwards another twenty-five inches in illuminating it from the other; if the print were at all creased, the way this method of lighting would prevent the appearance of the creases in the negative was astonishing. His magnesium lamp was a good one for the purpose and bought in Berlin. The speaker added that M. Louis Duos du Haumont had recently made the curious discovery that if, instead of a pinhole, a fine slit be used as the lens, distortion of the image is the result; a vertical slit gives a different kind of distortion to that given by a horizontal slit.

Mr. CHAPMAN JONES stated that if an unexposed plate be put into the developer until the plate begins to stain, and then be washed but not fixed, dark particles will be found on the back of the film, near the glass, as if some unduly sensitive particles had settled there. Plates varied very much in the extent to which they became spotted under this treatment, and he had used the method to differentiate the plates of different makers.

Mr. J. D. ENGLAND supposed that with a coarse emulsion, which did not set rapidly, some of the coarser particles sank to the bottom and were not sufficiently protected by gelatine.

The CHAIRMAN thought that perhaps imperfect cleansing of the glass had something to do with the matter. If the other explanation were the true one, the method was an excellent one for testing the fineness of any particular emulsion and whether the film had been sufficiently quickly cooled.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 23.—Mr. A. Hadden in the chair.

The HON. SECRETARY read a letter from the Photographic Club, asking for co-operation in getting the metric system established among the photographic societies.

The CHAIRMAN said that it would be well if the members were to express their opinion respecting the desirability of introducing the metric system into their midst.

Mr. J. TRAILL TAYLOR said that sooner or later they were bound to adopt the system, and the sooner the better.

Mr. E. P. CEMBRANO explained that the metric system when once it became understood was infinitely better than that in use in this country. He was well acquainted with both methods, and invariably calculated formulae by the system of parts.

The HON. SECRETARY reminded those present that, at a meeting of the Photographic Club the previous week, Mr. Foxlee exhibited some measures graduated on one side with English and on the other with French measures. He thought the use of such measures would be at least a stopping-stone in the right direction.

Mr. W. COLES directed attention to the anomaly that in English weights and measures both eight drachms and sixteen drachms made one ounce.

It was decided by vote that all formulae laid before this Society should in future be according to the metric system or in parts.

Mr. W. H. Prestwich passed round a dark slide he had invented in which the plate was inserted from the front and held in position by a spring, necessitating only one opening in the dark slide.

Mr. ANDREW PRINGLE called attention to a stop action at certain openings in an iris diaphragm and also to a diaphragm containing a slit for holding a coloured film for use in colour-correct photography.

Mr. V. BLANCHARD was then called upon to demonstrate his new method of toning prints with platinum, a number of prints toned by this means having been exhibited at the meeting.

In the course of his introductory remarks, Mr. BLANCHARD said that fifty years ago pictures on matt-surface paper were considered the correct thing from an artistic point of view, and that after photographs with glazed surface had been in vogue for many years the public were again coming to the belief that a matt surface was more satisfactory. They were indebted in large measure to Mr. Willis for the invention of the platinum process. He called attention to the black tints of some pictures, and explained that the best black was not such a colour as would be obtained by mixing lampblack with a requisite fluid, but a black containing an admixture of colours, such as reds, in order to form a strong black purple. He considered that in producing a photograph it was quite as legitimate to print in clouds as for an artist to paint them in a landscape on canvas. His process was the result of close application and of hundreds of experiments, and, although he did not intend to inform the meeting about the composition of the solution he employed, he was quite willing to allow them all to see the *modus operandi* of his working. Exposed prints on plain paper having been submitted for examination, they were immersed for a few moments in hot water, after which they were placed in the toning solution, also made hot.

Mr. CEMBRANO asked how long the solutions would keep, and if they could be used over and over again.

Mr. BLANCHARD said they would keep indefinitely if they were strengthened as they became exhausted.

Mr. CEMBRANO: What is the result if a print is over toned?

Mr. BLANCHARD: It will become weaker.

Mr. S. G. B. WOLLASTON asked the relative cost of producing prints by this process compared with other processes of toning.

Mr. BLANCHARD: There being no waste, his process would be about twenty-five per cent. cheaper.

Mr. J. J. BRIGNSHAW inquired if heat was absolutely necessary when toning.

Mr. BLANCHARD: Not absolutely necessary, but in order to expedite the toning it is necessary.

About fourteen prints having been toned, Mr. BLANCHARD called attention

to the small quantity of toning bath that had been employed, there only being enough solution to cover the prints, which had all been immersed together.

In reply to a question by Mr. Cowan, Mr. BLANCHARD said when the prints were fixed in hypo the tone was altered imperceptibly, if at all.

The CHAIRMAN asked if the prints had been submitted to any test to try their permanence.

Mr. BLANCHARD said he had given them a prolonged soaking in hypo, and also in a weak solution of chloride of ammonia, without any change.

Mr. TAYLOR remarked that Mr. Lyonel Clark had recently written a letter on platinum toning; might he be allowed to ask if the method therein described and Mr. Blanchard's were analogous?

Mr. BLANCHARD said only in this respect, that platinum was used in both; all the other particulars were totally dissimilar to his method of procedure. He had tried the method spoken of and certainly got pleasing results.

Mr. F. A. BRIDGE: How long do you fix the prints?

Mr. BLANCHARD: For about ten minutes. He had recently been experimenting with rough, thick paper, and was, so far, delighted with his success.

Mr. WOLLASTON said he had had a good deal of experience in platino-type printing, and did not think the shadows in the samples by Mr. Blanchard's process before them were so good.

Mr. BLANCHARD observed that they were considered better when seen in a good light, his pictures having a soft, velvety appearance.

Mr. PRESTWICH asked if an albumenised print can be toned with this agency.

Mr. BLANCHARD: Yes.

The CHAIRMAN exhibited a piece of a platinum print which had been in chlorine water for six months, and also produced the part of the picture from which the sample had been taken. It would be observed that it had not undergone any change. Would Mr. Blanchard allow him to submit one of his prints to this treatment? He thought that when silver and gold were present together in a print an electrical action was set up which caused fading, and in his opinion it was the same if platinum were accompanied by another metal, but that if platinum alone were contained in the print it would last longer.

Mr. BLANCHARD thought the tests respecting permanence rather extreme. He claimed permanency for his pictures under everyday conditions rather than in soaking in chemicals which would destroy even the paper.

Mr. H. S. STARNES inquired about the yellowness with age of the whites of pictures.

Mr. TAYLOR: In one case in question on examination it was found that it was the paper, and not the picture, which had become yellow. There were certain organic salts of silver present in albumenised paper which were not amenable to hypo, requiring the addition of ammonia.

Mr. A. COWAN: When working a lens with a fixed focus for a detective camera, was it better to have it focussed for the near or the distant objects?

Mr. TAYLOR: For the distant object.

The subject for the next meeting is to be *Old Silver Prints*, the members being invited to bring such prints as they may have in their possession. Mr. Kerr in the chair.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MAY 21.—Mr. A. Mackie (Vice-President) in the chair.

The Hon. SECRETARY read a communication from the Photographic Club, recommending the adoption of the metric decimal system of weights and measures.

The CHAIRMAN opened the discussion, stating that the decimal system had every advantage over the present method; it is quite simple, and there would be no more confusion between troy and avoirdupois weights as at present, the grain being the only weight common to both.

It was unanimously decided that the excursions should be resumed for the season.

The CHAIRMAN showed a negative developed with hydroquinone, in which, after several trials, he had obtained all the good qualities of pyro without any stain. The following is the formula in the decimal system:—

Hydroquinone	20 grammes.
Sulphite of soda	15 "
Meta-bisulphate of potash	5 "
Methylated spirit	60 cubic centimetres.
Water to make 140 c.c.	
Caustic potash.....	20 grammes.
Bromide of potash.....	1 gramme.
Water to make 200 c.c.	

For use, take 1 c.c. of each to 25 c.c. of water.

On Saturday, June 1, there will be an excursion to Waltham Cross. First train after two p.m. from Liverpool-street.

The next meeting will be on June 4, when Mr. Valentine Blanchard will demonstrate his new printing process.

HOLBORN CAMERA CLUB.

MAY 24.—Lantern slides shown in Club Room by the limelight.

The following members were elected:—Messrs. Alfred E. Read, H. V. Clements, Humphreys, and G. Tomalin, jun.

June 1 will be a field day to Woodford, on the occasion of the cyclists' meet.

On June 7 Mr. E. Clifton will, at eight p.m., coat plates and show their chemical composition.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

MAY 17.—Mr. L. Warnerke in the chair.

Mr. NEWMAN attended and explained to the Society his shutter, and also a new hand camera which he is bringing out.

Mr. Warnerke showed a flash lamp adapted from a common spirit stove.

He also exhibited prints from the negative taken of the members of the Society by means of the flash light at the last meeting.

Mr. Dowling exhibited a "Dubroni" camera, which, though now out of date, was a novelty to many of the members.

Ten gentlemen were elected members.

The next meeting of the Society will be held on Friday, June 7, at eight p.m., when Mr. Edwards will give a demonstration on *Platino-type*.

HACKNEY PHOTOGRAPHIC SOCIETY.

MAY 23.—Mr. J. Hubert in the chair.

Mr. E. J. WALL read a paper, *Defects in Negatives*.

On June 13, Mr. Hubert will read a paper on *Platino-type*.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

MAY 23.—Mr. B. Karleese (Vice-President) in the chair.

A letter was read from the Hon. Secretary of the Photographic Club relating to the adoption of the metric system of weights and measures in photography. This was referred to the Council for discussion, &c.

Dr. W. W. Nichol was elected a member.

Excursions were announced for June 15 (half day), to Berkswell; June 20 (half day), to Warwick; June 10 (whole day), to Shakesperian villages.

Mr. C. T. COX then gave his paper on *Composition*. In the course of his remarks he dealt minutely with the nine laws of composition, viz., Principality, Repetition, Curvature, Radiation, Contrasts, Interchange, Continuity, Consistency, and Harmony, explaining and illustrating each law with large drawings, showing how the amateur photographer should remember and try to utilise these laws when taking landscapes; and afterwards detailed the different kinds of clouds, and cautioned the members when using separate sky negatives to be careful in choosing the sky most suitable to the time and weather when the picture was taken, especially in the case where shadows were seen. His illustrations of cloud pictures were effectively shown, and altogether the paper was very instructive and interesting, and was listened to with marked attention.

The CHAIRMAN said he regretted that a much larger number of the members were not present, and he was sure those who were absent had missed a great treat; he himself would certainly put into practice, when photographing in the field, &c., many of the useful hints Mr. Cox had given them.

Mr. J. EDMONDS proposed, and Mr. HAROLD BAKER seconded, a vote of thanks to the lecturer.

Mr. COX responded, and offered to write out the nine laws of composition, for the same to be printed for posting up in the Club Rooms.

Mr. S. SERSCHALL volunteered to help Mr. Cox by making a set of drawings to illustrate each law.

LEEDS PHOTOGRAPHIC SOCIETY.

APRIL 10.—Mr. Thomas Dawson (Vice-President) in the chair.

Mr. Frank Waddington was elected a member.

Mr. C. H. BOTHAMLEY, F.I.C., then gave a lecture on *The Chemical Effects of Light*. He said the ancients were well acquainted with the fact that many substances undergo change when exposed to air and light, but they failed to attribute these changes to their true cause, and it is only in comparatively recent times that accurate knowledge respecting the nature and cause of these phenomena has been obtained. The action of a prism shows that a beam of ordinary white light is composed of rays which produce very different colour sensations, and differ also in their refrangibility, or the extent to which they are bent out of their original course by the prism. When a beam of white light is passed through a prism and allowed to fall on a screen, we get what is known as a spectrum, in which, when examined, it is easily seen that the yellow seems brightest to the eye, green and orange less bright, and red, blue, and violet comparatively dark; if a thermometer with a blackened bulb is moved along the spectrum it is found that the heating effect is almost inappreciable in the violet, gradually increases towards the red, attains a maximum in the invisible rays beyond the red, and then rapidly decreases; if a piece of paper coated with silver chloride is exposed to the spectrum, it is found that the maximum effect is exerted by the violet and the invisible rays beyond the violet, whilst no appreciable effect is produced by the yellow, orange, and red. It is evident that the maximum effect on the eye, the blackened thermometer, and the silver chloride respectively, is produced in very different parts of the spectrum, and hence it was at first supposed that the luminous, heating, and chemical effects produced by a beam of light are due to entirely different kinds of rays, which were spoken of as light rays, heat rays, and actinic rays. It is now known that this supposition is erroneous. Any ray in the spectrum produces a heating effect when it falls upon lampblack or any similar substance, and chemical effects are not due solely by violet and ultra-violet rays, but may be produced by any rays if they fall upon suitable substances. The decomposition of carbonic acid in the leaves of plants takes place mainly under the influence of orange-red rays; the bleaching of cyanine is effected chiefly by orange rays; a gelatino-bromide plate prepared with ammoniacal erythrosine is more strongly affected by the greenish-yellow rays than by any other part of the spectrum, and many other examples might be mentioned. The effect which any given ray produces depends not so much on the ray as upon the nature of the substance on which the ray impinges, and one and the same ray may produce luminous, heating, and chemical effects. It is a well-established and fundamental principle that a substance can only be affected by those rays which it absorbs. For example, a mixture of gelatine and potassium bichromate is acted upon by the rays which the bichromate absorbs, and is therefore not affected by light which has previously passed through a solution of the bichromate; for the same reason a mixture of ferric chloride and alcohol is not affected by rays which have previously passed through a solution of ferric chloride. Several other instances were given.

Correspondence.

Correspondents should never write on both sides of the paper.

A NEW SHUTTER.

To the Editor.

SIR,—IN THE BRITISH JOURNAL OF PHOTOGRAPHY published on April 26 last, No. 1512, a desire was expressed by you in the "Correspondence" column to know something about a shutter which, with one exposure, would give a prolonged one to the foreground and an instantaneous or shortened one to the sky, as circumstances or the will of the operator might incline, and which, though seeming to be two, was only "one exposure" divided into two parts.

It had been a want long felt by the writer, in his extensive practice of landscape photography, how to overcome the above difficulty, and numerous dodges were tried, notably one by the late Mr. Walter Woodbury, by means of which an irregular-toothed disc of metal was fitted into the hood of the lens during one part of the exposure, and then suddenly withdrawn by a red-coloured handkerchief, and the flap shutter closed at the same time to complete the sky, thus giving a lengthened exposure to the one and a momentary one to the other, the toothed disc preventing any lines forming across the picture. But this at times was found to be very awkward, and it occurred to the writer that if, in conjunction with a pneumatic flap shutter, the same point could be arrived at, it would be as well. And here let me offer a few remarks on the "flap" over the drop, and blind-roller, and diaphragm-slot shutters of the present day. To take a photograph—we must not call them "pictures" (except the yachting scenes which are specially arranged for)—in the shortest possible period of time, seems amongst some gentlemen the height of their ambition. Of course, we all have a right to our own opinion in photography as well as in other matters, but those of us who are the old wet collodion workers, and who aim at making "pictures"—those representations of nature which embody thought and feeling, which speak to others, conveying to their minds happy memories of pleasant days passed, perchance, with loved companions—we (and there are a good body of us to the fore yet, thank God!) like to move upon the old lines, only making use of such appliances of modern times as will enable us to give force to our conceptions. Hence the desire for slow plates and flap shutters, which, by cutting off the top light, which is of no use, and which really, in a great measure, weakens the direct rays from the object, enables one by a moderate exposure of three or four seconds to secure that which is really perfection. Now to make this harmonious as to foreground and sky—to, in fact, equalise the exposure to both—the writer, in conjunction with his friend, Mr. Husbands, optician, Bristol, conceived the present idea, and after many trials worked it out both for single pictures and also for those of the stereoscope, calling the same the "Warner-Husbands Shutter." It embodies the shutters of Messrs. Guerry & Co., of Paris, and of Messrs. Reynolds & Bransom, of Leeds, leaving out certain weighty appendages, and affixing in their place a regulating wheel, giving the angle of the foreground to be exposed, with a positive certainty for such exposure, and the means of releasing the drop at any pace, securing either instantaneously or the exposure of one-sixtieth of a second, or a longer of one, two, or more seconds, entirely at the will of the operator.

It is light, there is no vibration or shake of any kind, and it may be used in any position, slanting to cut off light from windows in interior work, or upright for ordinary views. It has not been as yet brought prominently before the public in advertising its merits, as the inventors believe that, like as "good wine needs no bush," sooner or later its merits will be known, and that it will then lead to a better development, and a healthier state of all kinds of photography, especially of the portable and panoramic stereoscope and slides, for which the same gentlemen are the inventors and agents.

Photographs are enclosed of the two shutters, both of which are in daily and constant use by the writer of this explanation. No. 1 represents the large shutter (which by means of adapters fits eighteen lenses) as being half exposed for a foreground, the drop shutter being ready to fall, on the flap being raised gently or forcibly by the pneumatic bulb, ensuring rapid and slow exposure for the sky. No. 2 represents two shutters (which adapt themselves to six pairs of lenses of various foci) which move simultaneously, and by which even more rapid exposures can be obtained than by the larger size. There is a regulating pin in the smaller sizes, by which perfect unity of action is secured.

Messrs. Henry Husbands & Sons, opticians, Bristol, who are the agents for this shutter, &c., will answer every inquiry as to price.—I am, yours, &c.,

HARRING WARNER.

[Our esteemed and veteran correspondent has informed us very clearly what this shutter can do, but has not given such details as to its mechanical operation as we know our readers would like. Nor do we quite glean this from either the drawings or photographs received. So far as we can perceive, it consists of a flap raised, either quickly or slowly, by means of a pneumatic ball, which flap, when raised to the top, releases a drop shutter, which suddenly cuts off the exposure by dropping in front of the lens. But this was what we claimed when describing the shutter of Messrs. Reynolds & Bransom,

of Leeds, and we have failed to discover, from the description or drawings of Mr. Warner, wherein the one differs from the other.—Ed.]

CUSTOM HOUSE REGULATIONS.

To the Editor.

SIR,—Some time since there was a correspondence in your JOURNAL respecting the difficulty several amateurs had met with in attempting to pass their exposed plates through the Customs without some over-zealous official opening them. We thought it would be interesting to your readers to know that the matter had been brought up in the House of Lords by Lord Ribblesdale and replied to by the Marquis of Salisbury. The reply is in itself so exceedingly satisfactory that it will doubtless relieve the minds of all amateurs who are travelling abroad, or who intend to do so. We append an extract from one of the "dailies," which will, we think, interest all concerned.—We are, yours, &c.,

Pro The London Stereoscopic and Photographic Company,

BUTLER HUMPHREYS, Manager Amateur Department.

The following is the extract alluded to:—

Lord RIBBLESDALE, in calling attention to the Custom House regulations with regard to undeveloped photographic plates, justified his action by relating an incident which occurred at Plymouth lately on the arrival of a steamer with passengers from abroad. Among the passengers was a friend of his who had a fondness for photography, and among the friend's baggage was a box containing a number of undeveloped sensitive photographic plates. Explanations were useless; the Custom House officer refused to pass the box, on the plea that the plates might contain something of an indecent or immoral character. As no dark room was to be found the friend had to stay the night at Plymouth, and on the plates being developed the following day the most indecent or immoral thing discovered was a picture of a picnic party on the crater of a volcano. He supposed that all this bother was rendered possible by the regulations. The regulations certainly had a paternal smack about them which he did not much care for, and he should like to hear what explanation the Government had to offer on the subject.

The Marquis of SALISBURY supposed it was his duty to defend the Government, and he could only defend them by saying that this particular Custom House officer appeared to have acted with inconceivable stupidity. Formerly there was a pursuit of dynamite, but now it seemed there was a pursuit of decency. The pursuit of decency was highly praiseworthy, but it should be pursued with some discretion. Elaborate arrangements were not necessary to avoid such a misadventure in the future. A regulation had been issued at the Custom House, that if sensitive plates required to be examined, they should be examined in a dark room by the light of a red lamp. In that way he hoped all possible objection would be removed. He was only sorry the knowledge of science had spread so little in certain branches of Her Majesty's service that it should be necessary to issue such a regulation.

PHOTOGRAPHING IN NORWAY.

To the Editor.

SIR,—Your correspondent, Mr. F. Coop, will find the exposure in Norway to be about one and a half times that of England; usually it is considerably more, because of the prevailing black and dark-brown tone of the rocks. I have photographed along the entire coast, from Christiania to the North Cape, and shall be pleased to answer any questions that Mr. Coop may put to me, either through this JOURNAL or privately. If he takes Carbutt films, Paget "50 times," or Ilford red label, he will be able to take instantaneous views all along the coast, and fairly well exposed with f-11 and Kershaw shutter between 10 a.m. and 3 p.m. in June, July, and August, but the rocks will not develop out all detail with f-16, except under very favourable conditions, sun lighting them up, or forming distant background to seascape.

The neighbourhood of Christiania, Hønefoss, and along the coast, Christiansand and neighbourhood, Stavanger, and the lovely drive from Stavanger to Odde, will well repay a series of plates. So will the Geiranger and Nord Fjorda. The best scenery is all above Bodø and Toomsø, but the Loloden group is very grand and interesting. Baedeker's *Norway and Sweden* contains all the maps he can possibly want. I forgot to mention the Salten Fjord, which to my mind is much the grandest fjord in Norway. One disembarks at Bodø, and takes the little bi-weekly steamer that runs up and back every three days. If Mr. Coop stops at Bodø will he let me know, and I will give him a note of introduction which will be of some service to him there.—I am, yours, &c.,

G. LINDSAY JOHNSON.

11, Stratford-place, Regent-street, W., May 21, 1889.

A CORRECTION.

To the Editor.

SIR,—Will you kindly allow me to make a correction to your published report in last week's BRITISH JOURNAL OF PHOTOGRAPHY of the meeting of the University College Photographic Society on May 18th?

It is stated therein that I exhibited some examples of Pretsch's photogalvanographic process. I certainly showed one, the well-known print of Don Quixote in his study, but the numerous other specimens which were displayed by me were of Obernetter's simple photogravure. As these proofs excited more interest and admiration than anything that had gone

before on the occasion, it is only just to the representative who kindly furnished me with the series for exhibition that this should be mentioned.

While Pretsch's process is in question, how is it that this marvellously excellent system of reproduction is now so entirely neglected, if not quite unknown, to our present generation of photo process workers?—I am, yours, &c.,

28, L.inster-square, W., May 25, 1889.

HENRY E. DAVIS.

PRESERVATION OF SOLUTIONS OF PYROGALLOL.

To the EDITOR.

SIR,—The thanks of the fraternity are due to Mr. Burton for his elaborate paper on the solutions of pyrogallol which appeared on the 17th ult. Few of us have the time, means, and thought to carry out such a series of experiments, which appear to me to be the right way to arrive at the proper value the different substances possess. I should have liked to have seen sodium sulphite, as well as the sulphate, noted, also meta-bisulphite of potassium as well as the bisulphate. Can he give in a future number the effect of these upon the keeping of the pyrogallol?—I am, yours, &c.,

W. G.

Exchange Column.

*. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Newton's 7½×5 camera, six double slides, for whole-plate, three slides, or head-rest and cameo press.—Address, R. SIMMONS, Galway.

Ross' No. 2 C.D.V. lens in exchange for whole-plate or half-plate rectilinear or symmetrical.—Address, W. SAUNDERS, Dickleburgh, Norfolk.

I will exchange a Gem camera having nine lenses for a Rudge's or Rover Safety bicycle.—Address, J. POVEY, Photographer, 124, Wilbraham-street, Ribbleson-lane, Presloo, Lancashire.

Wanted, pair of good stereoscopic lenses, also detective lens by good English maker; exchange in musical instruments or lantern slides.—Address, W. A. BEZANT, 12, Victoria-terrace, Leamington Spa.

Hare's half-plate camera, new couch, and two Scholzig's graduated backgrounds (7×5), for exchange. Wanted, Seavey's interior and exterior backgrounds.—Address, W. COLES, 60, Queen's-road, Watford.

Will exchange Marion's print washer, cabinet barnisher, and Newbold's view finder, for half-plate Universal studio camera and slide or a 12×10 leather case for camera and accessories.—Address, A. WHETTON, Market-place, Deddington.

Cabinet lens by Vogel, Philadelphia, diameter three inches, focus nine inches; also Marion's C.D.V. embossing machine, new. Will exchange for posing chair with more than one back, backgrounds (exterior and interior), or studio curtain.—Address, HORTON, Photographer, Caroline-street, Cardiff.

Answers to Correspondents.

*. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

A. G. Petherick, Taunton.—Two photographs of H.R.H. the Duke of Cambridge on the review ground, Taunton.

A. Hamilton, Bristol.—Three photographs of the lion "Hannibal."

T. Bromwich, Bridgnorth.—Photograph of Palmer's Hospital.

S. J., LEONARD, and "TWO-YEAR-OLD."—See leading article in present issue.

MORS CONSILII.—The negatives are very bad, and the retoucher ought not to have wasted work upon them.

ALFRED.—Celluloid is practically a compound of a nitro-cellulose with camphor. Xylonite is a similar compound.

LOWESTOFT.—We have never compared the lenses against each other. All those on your list are good, and work with about the same aperture.

EAST ANGLIAN.—1. Fix the plates in hyposulphite of soda and then precipitate the silver with sulphide of potassium.—2. Consult formulae in later ALMANACS.

FERROTYPE.—So far as we are aware, such plates are not an article of commerce at the present time. They were once in the market, but we believe there was very little demand for them.

X. X.—Permission to take photographs in Kew Gardens may be obtained from Mr. Thistleton Dyer, at the Gardens. Write to him. You will not be admitted with your camera without a permit.

G. R.—By artificial ivory do you mean what is known as ivoryine? If so, that may be procured from most fancy stationers. Carbon prints transferred to it are very effective. We have frequently recommended its use in this direction.

S. NOKES.—Zinc dishes will not do for the hyposulphite of soda solution. You had better obtain an earthenware dish for the fixing bath. If large enough, common brown baking dishes will answer every purpose, and they are very cheap.

DOMINO.—As you ask for free criticism, we say that the lighting and posing are of good average quality. With regard to the retouching, we cannot say very much in its favour. Much of the modelling and drawing are lost in many of the faces.

REV. J. CARTER BROWNE, D.D., desires to thank the very numerous correspondents who so kindly sent him the meaning of the letters "O. H. P. C." What goodwill exists among photographic brethren, and what a useful medium is THE BRITISH JOURNAL OF PHOTOGRAPHY!

S. S.—If you use the Royal arms and style yourself photographer to the Queen you render yourself liable to a heavy penalty unless you hold the Royal warrant. The mere fact that you have taken a portrait of Her Majesty does not confer the right to use the Royal arms and title of photographer to the Queen.

J. W. COPLE.—Try the effects of slightly damping the paper before printing. You can scarcely expect to get a very perfect result at the first attempt with any new process, so don't be discouraged by a failure or two. Much depends upon the hygroscopic condition of the paper in the direct platinum printing process.

WM. MCK.—The sudden frilling of the plates with which, for months past, you have been working so satisfactorily may well be accounted for by the sudden and abnormal rise in the temperature we had last week. By this time, with the cooler weather, no doubt your trouble has disappeared. If not, immerse the plates in a solution of alum prior to putting them into the fixing bath.

SANDY GRANT.—So far as we are aware, "silhouette machines" are not articles of commerce, and we cannot say where you will find an illustration and full description of one. You might possibly find one at some country fair, but we imagine they are things of the past. All that is really necessary for the purpose is a rod pivoted, gymbal fashion, so that it can move freely in every direction, very much the same as shown in your sketch.

W. ANNOT.—1. There is always a certain amount of risk in purchasing second-hand apparatus without a trial, except from respectable dealers. The price named seems very low, but as no makers' names are mentioned, we cannot give any idea of its value.—2. For general purposes a lens of the rapid type is far preferable to one of the wide-angle series.—3. With a "rapid" you will experience no difficulty in obtaining instantaneous pictures at the seaside on a fine day.

Z.—As you cannot get a north light, and must have either east or west, which will be the best will depend very much upon what time in the day it will be most used. If the greater part of the work be done in the morning, then the west side had better be glazed. If in the afternoon, the east side. We should advise you to have a ridge roof, and perhaps it would be more convenient, if you want the studio for professional work, to glaze both sides and have tolerably dark blinds to stop out the sun as required. The proportions you suggest are very good, but, for full-length portraits, a little larger would be better, as that would enable you to work with lines of sufficient length of focus to obtain the best results.

RUSSELL STREET writes: "I am thinking of working the wet collodion process again; would you kindly advise me as to what sized nitrate of silver bath I should get for 8½×6½ plates so as to allow for the moving the plate up and down and from side to side during the process of sensitising the plate, and also what kind of dipper is the best?"—In working the wet collodion process it is always convenient to have the vessel containing the silver bath somewhat larger than is necessary to take the plate. For a whole-plate we advise what is termed a 10×8 bath to be used. Glass is as good as anything for a dipper. Ebonite is also good, and is not so liable to get broken. For ourselves we prefer dippers made of pure silver wire. These are somewhat costly, but they will last for ever.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, June 5, 1889, will be *Films*. Saturday outing at Pinner. Bank Holiday outing at Aylesford, Kent. Trains from London-bridge, Cannon-street, and Charing-cross.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1518. VOL. XXXVI.—JUNE 7, 1889.

RECOVERING BROMIDE FROM WASTE PLATES AND EMULSIONS.

At a meeting of one of our metropolitan photographic societies on Tuesday evening, a question was informally put, as to the best means of utilising or recovering the silver from a quantity of gelatine emulsion that had gone bad. The answer we gave was to spread it upon plates of glass, coat thickly with it the bottom and sides of a large flat dish, or adopt any similar means by which it could be brought into a somewhat pellicular form, and then submit it to the action of a solution of hyposulphite of soda, which might be renewed, if necessary, until the whole of the bromide was found to be dissolved.

Treatment of this nature applies equally to plates that have been found untrustworthy as to emulsion that from any cause has become deteriorated. Of these we have seen many dozens treated in the way indicated. They were stacked in a light basket, having been first separated from one another to a slight extent by a length of string interposed zigzag between them to ensure the liquid having free access to the surfaces, and were then lowered down into a vessel of solution of hyposulphite of soda. While in this the basket was moved up and down at occasional intervals to promote a free circulation of the solvent liquid, and when the whole of the bromide had been dissolved, and a spray of water directed against the plates to effect the removal and utilisation of such solution as adhered to them, the basket and its contents were in like manner transferred to a vessel of plain warm water, to effect the dissolution of the gelatine from the surfaces of the plates.

But it is with the hyposulphite of soda solution, now richly charged with silver, that we have to do at present. The story of its utilisation has been often told, and is well known to every veteran, but for the benefit of those whose experience is as yet limited we tell it again. If into a solution, such as that now on hand, a solution of potassium sulphide (the liver of sulphur, or sulphuret of potash of the druggist) in water be gently poured, accompanied by stirring, a dense black precipitate will immediately take place. The addition should be continued until, upon taking up a little of the waste solution into a test tube and adding one or two drops of the sulphide, it is seen that no further precipitation takes place. Avoid adding any more to the hypo solution than barely suffices to precipitate the silver.

The black substance thrown down as mud is silver sulphide, and it must be washed by several changes of water, each in turn being drawn off by decanting. With due care not one particle of this precious precipitate need escape. Preserve it carefully, for it can all be converted into nitrate of silver or into metallic silver, the former being the most easy for the

amateur, whose chemical appliances may not comprise a crucible or modes of melting metal.

Place the still moist sulphide into a glass or porcelain vessel, and pour into it, by very little at a time, nitric acid, allowing plenty of time for it to act after each addition. In due course it will be all dissolved, and it is now a solution of nitrate of silver, and must be poured out into an evaporating dish to crystallise.

But it will still be rather crude and somewhat acid; hence it should again be dissolved, this time in distilled water, and be once more crystallised, after which it may be utilised as the whim or requirement of the owner suggests. All the vessels employed should be washed with distilled water, so as to allow none to escape as waste.

The foregoing method presupposes the emulsion to have been spread on glass or otherwise. But it is also possible to obtain all the silver bromide, as bromide, from emulsion the gelatine of which has deteriorated. Ehrenmann's method is one which can be recommended for this purpose. The emulsion, after being diluted with sufficient quantity of water, is heated to about 150° Fahr., and to each gallon of mixture is added six ounces of nitro-sulphuric acid. Let the heat be continued for an hour, during which time the mixture is occasionally stirred up. When cool and settled it will be found that the acid has destroyed the viscosity of the gelatine, and that the bromide has settled at the bottom of the vessel.

The acid liquor is poured off and may be used again for a similar purpose. The bromide is repeatedly washed, and is ready for being again emulsified with fresh gelatine.

PRETSCH'S PHOTO-GALVANOGRAPHIC PROCESS.

In a letter in our correspondence columns last week, about the above process, Mr. Davis asks "How it is that this excellent system of reproduction is now so entirely neglected, if not quite unknown, to our present generation of photo-process workers?" Probably it is only our older readers who are familiar with this process; still, most of the younger ones have, however, heard of it, and the excellent results which were produced by its agency. It may, therefore, be desirable to enlighten the latter as to what the process really is, the principle upon which it is based, and to explain why, as our correspondent says, it is now so entirely neglected.

In an intaglio printing plate, it is scarcely necessary to explain, those parts which are to form the darker portions of the picture are depressed, while the others are not. In point of fact, an intaglio plate is precisely the reverse of a surface

or typographic block. In the latter, it is the raised portions that carry the ink, while, in the former, it is the depressed parts that contain the ink. This being the case, it might well be surmised by the uninitiated that intaglio plates were very easy to produce, inasmuch as it would only be necessary to make an electrotype *replica* of a gelatine relief to obtain what is required. This is correct up to a certain point, and there only. For, in practice, another condition is essential, namely, that the sunken parts must possess a certain degree of roughness, or grain, which will retain the ink when it is applied; otherwise it would be wiped out in the operation of inking in the plate. Furthermore, this grain must be deeper and more decided in the blacks than in the half tones. Obtaining a grain of a suitable character is one of the principal difficulties in the production of intaglio printing plates.

Briefly described, this is how the Pretsch process is, or rather was, worked, for we shall write in the past tense, inasmuch as the process is not now employed. A glass plate was coated with gelatine, containing bichromate of potash, a salt of silver, and sometimes other substances. When dry, the plate was exposed to light under a transparency. After printing, it was immersed in cold water. The action here was not only to dissolve out the unaltered chromium salt, but to cause those parts which had been protected from light to swell up, and that, too, in proportion to the protection which had been afforded by the transparency. But this was not all, for the raised portions were rough and reticulated, and, what is more, the reticulation was coarser or finer in proportion as the different portions had been protected, or otherwise, from the action of the light. The high lights of the picture, which had received the full force of the light, did not swell at all, and, consequently, had no grain—being perfectly smooth—that is, supposing the exposure was correctly timed.

It will now be seen that the plate, thus produced, was exactly the reverse of what is required in a printing plate. That is to say, what should be the darker portions were in relief, while what should be the lighter ones were, more or less, in intaglio, the former being granulated, while the latter were not. All that remained now was to take an electrotype cast from this relief to obtain the printing plate. But this had to be done while the gelatine film was still wet and swollen, in order to retain the necessary relief to produce sufficient depth and ink-holding grain in the finished plate.

All who have attempted to deposit copper on a wet gelatine film know quite well that it is not an easy thing to accomplish. The acid sulphate of copper solution has a strongly solvent action on the gelatine itself; consequently, unless the whole surface be covered very quickly with a rigid coating of metal, the crispness of the grain, so essential for holding the ink, would be lost. And it so happens that when the gelatine is most in relief and has most grain, it is then in a more soluble condition than when it has been hardened by the light's action, and, as a matter of course, is first to be acted upon by the copper solution. Hence the grain, which it was so necessary to retain, was the first to be attacked. The consequence was that many of the plates, when a sufficient deposit of copper had been obtained, were found to be nearly devoid of ink-holding properties in the shadows, and were, therefore, useless unless a considerable amount of hand work by skilled engravers was expended upon them. This, it goes without saying, rendered the plates very costly by the time they were finished.

Yet, more than thirty years ago, plates were made by the Pretsch method, some of which did not require an excessive

amount of hand work to make them good, as many of the specimens, still in existence, will show. However, the Pretsch process did not prove a commercial success in this country. Neither, at that time, did any other photo-engraving process, for that matter. The Fox-Talbot process, which was contemporary with Pretsch's, was not worked commercially, yet it was capable of yielding most excellent results. Possibly this was, in a measure, due to want of enterprise on the part of the inventors, coupled with the fact that the period was not then ripe for photo-mechanical processes. The processes were before the times.

Now as to the query of our correspondent, "Why is the galvanographic process of Pretsch so neglected?" The reply is simple. The process has been superseded by other methods by which the same end may be attained by easier and more satisfactory means.

All those who work any of the photo-engraving processes, commercially, keep the details of the methods they employ as profound trade secrets. But it is no secret that some, at least, of them are based upon the Pretsch and the Talbot principle.

A NOTE upon photographing colours in shades duly proportionate to their effect upon the eye was recently read before the Paris Academy of Sciences by M. G. Lippmann, in which the manner of use of coloured glasses was well worked out. The author commenced his remarks by pointing out the well-known difficulties presented by ordinary plates when colours were to be photographed. He gave forty, for example, as the number of times the exposure for green required over that for blue, and he went on to say that, although the orthochromatic plates of "Vogel, Obernetter, and Attout Tailfer" were far better for the purpose, they were a long way from being perfect. M. Lippmann's system is to make what he terms a "rational and systematic use of the plates," and, by so doing, obtain absolutely just values in the negative. His *modus operandi* is first to place in front of the lens a piece of blue glass and expose long enough for the blue rays only to impress themselves. Next, without touching the apparatus in any other way, and taking care not to shake or disturb the camera, the blue glass is replaced by a green, and the exposure is continued long enough for the green rays to become impressed. It is explained that the green glass has been chosen with great care, so as to select a sample that did not permit the least trace of blue to pass through, so as to have no fear of over exposing, owing to the presence of the quick-acting blue rays. Finally, the red rays have their turn: a piece of glass again well chosen, this time so as to keep out both blue and green rays, is placed before the lens in lieu of the green, and the plate exposed for the right length of time. The final result is stated to be a perfect photograph, *i.e.*, a negative quite clear, without brown patches, and in which green leaves and yellow and red draperies are represented as finely modelled, as in a well-executed engraving. We can only say that M. Lippmann has been fortunate in finding such perfect monochromatic pieces of glass.

An announcement is made from America that Professor Charles S. Hastings, of New Haven, Connecticut, has been so able to utilise the Jena glass as to produce objectives without secondary aberration. He has made a small telescope of two and three-quarter inch clear aperture, which gave images of most "astonishing beauty," in which the familiar purple was absent, or only visible upon the closest scrutiny, even when magnifying powers greater than forty to the inch aperture were used. He states that "by reference to the records I have made with many telescopes the power of the new telescope was estimated as equivalent to a three and a half-inch objective of the ordinary construction. The meangain, after a number of experiments, was about twenty-three per cent. over the best instruments yet constructed on the old lines," this being a rate of improvement that is, as the in-

ventor says, higher than would be generally admitted as possible by most opticians.

A new substance, which will attach to itself great interest from a photographic point of view, quite apart from its purely chemical interest, has lately been described by M. Péchard. It is a mixed acid derived from oxalic and molybdic acids, and hence is termed oxalomolybdic acid. It crystallises in regular forms, and is quickest and best made, perhaps, by dissolving the viscous mass formed on evaporating the saturated solution of the acid in dilute nitric acid, evaporating it in a dessicator. Now these crystals when dry are permanent either in the sun or when protected from light; but the moment they are allowed to become moist they begin to take a blue colouration in the light. Writing may be made with the solution in a weak light, and it will be quite invisible, but the moment the sheet of paper is placed in the sun's rays, the writing starts out in blue characters. In solution, however, the liquid is quite colourless.

It is stated that if a sheet of paper be sensitised with a saturated solution of this new chemical, the sheet may be placed under a negative, and a good picture in blue printed out. The image so produced, however, is destroyed when the sheet is moistened, but may be retained by exposing to a gentle heat for a few minutes, when the blue is turned to a grey which is permanent. It would seem as though something practical might be worked out from this newly invented substance.

We have on previous occasions pointed out how erroneous is the popular view that glass is a perfectly stable substance that is not acted upon, at any rate, by water; and in a foreign chemical journal this is emphasised by a description of a process for testing glass according to the colour reactions obtainable from the substance dissolved out by water. It is evident that such qualities as this may have a decided bearing upon the action of a gelatino-bromide film upon glass. An idea of the action of water on glass may be formed by sealing up a solution of iodine for a few weeks in a glass tube, the liquid becomes quite decolourised, and the colour can be brought back by adding dilute sulphuric. Again, when a trace of a very dilute solution of silver acetate or nitrate is added to an aqueous solution of starch and pure iodine, the blue colour is destroyed, owing to the combination of the free hydriodic acid; but if a little powdered glass is added, an alkaline iodide is formed with its aid and the blue colour is restored.

THE article goes into details useless to our readers, but in its concluding paragraphs we find some facts recorded, which, besides their practical bearing, throw light upon the causes of the retention of a photographic image upon a negative from which the film has been cleaned off. Herr F. Mylins states that the very worst sample of glass can be made capable of permanently resisting the action of water by a very simple plan. It is first left in cold water for several days, and then heated to a temperature of three to four hundred degrees centigrade. When so treated the tests for the extent of solution already described fail to give any result, the glass is insoluble. From these facts it would appear quite certain that an old negative would be more remarkable for not leaving an impression on the glass than for producing one, as the action of water would clearly be varied by the extent to which it could gain access to the surface of the glass below it, and this would be governed by the presence of a greater or less amount of matter in the film, this "matter" being in effect the image.

THE *Illustrated London News* has, in its last number, quite a number of views of scenes on a yachting regatta, which took place the previous week; many of these white wings having been successfully shot at and captured by Mr. Rouch, who was on board the press-boat, with his Eureka Detective Camera. No draughtsman could possibly have managed to secure such accurate transcripts of the details of this regatta as did Mr. Rouch with his neat little detective. The same journal, the week preceding, also contained several illustrations of

the animals in motion obtained by Mr. E. Muybridge, and which have been employed by him in elucidation of his lectures delivered at the Royal Academy, the Royal Institution, and other societies.

THE WHOLE ART OF PHOTOGRAPHY IN A SERIES OF EASY PROGRESSIVE LESSONS.

CHAPTER IV.—THE FERROUS OXALATE DEVELOPER.

COULD it be proved that one developer is in every respect better than another, then would there be no necessity for writing about or even tolerating any other than that one. But opinions are divided, a fair proportion of the public preferring to adhere to iron rather than to pyro or hydroquinone, and there is no doubt that numerous very fine negatives are produced by its agency.

The ferrous oxalate—so called on account of its consisting of iron and potassic oxalate—is a developer which is simply made, requiring neither scales nor weights in its preparation, works always well, costs very little, and does not stain the hands like pyrogallol. It is most easily made in the following manner:—

Having procured two large bottles of clear glass—common spirit bottles will serve if there is nothing better procurable—fill them nearly full of water, and into one place a quantity of neutral oxalate of potash (potassic oxalate), and into the other some protosulphate of iron (ferrous sulphate). As what we desire is a saturated solution of each, it is necessary that so much be added as to render the water incapable of dissolving it all, even after being well shaken up and allowed to stand for this purpose. There will thus be, or ought to be, a quantity of the crystals remaining undissolved in the bottom of each bottle. This must not be considered as lost, because when in course of time it becomes necessary to fill up either bottle with water to keep up the stock supply in lieu of what will have become extracted for use, the crystals dissolve and keep the solution up to the proper strength. Have these bottles labelled respectively "ferrous sulphate" and "potassic oxalate," and we are now ready to begin work.

The plate, having been exposed and brought into the dark room, is placed face up in a tray. The developer must have been previously mixed, and is composed of three parts by measure of the oxalate solution, and one part, also by measure, of the iron solution. The iron is poured into the oxalate, and immediately strikes a deep red colour. Suppose that two fluid ounces of developer will be considered requisite for covering well the plate about to be developed, then, according to the above, it will be composed of half an ounce of the iron, and one and a half ounce of the oxalate solution. Or, if cubic centimetres be the standard of measurement, a proportionate quantity would be fifteen of the one solution to forty-five of the other, which would give sixty c.c. of developer—not greatly in excess of two ounces.

When this developer is poured over the plate the image appears with considerable rapidity, and after it has acquired the requisite intensity, ascertained by raising it up and looking through it against the coloured light in the dark room, it is rinsed with water and transferred to the fixing bath.

But with some makes of plates the developer may not take so kindly to the surface of the plate but what minute air-bubbles may adhere, which will form white or transparent spots in the negative. There are two means by which this may be prevented: one is to thoroughly wet the surface of the plate with plain water previous to applying the developer, another being to ensure the contact of the developer with the surface by sweeping a hard tuft of cotton wool firmly across the surface immediately after the developer is applied. In either case no spots will possibly result. Some operators prefer to employ the ball of the finger for this purpose.

It may be that, especially during warm weather, the proportions we have given are so strong as to bring out all the details much quicker than is desired. When this is the case reduce the activity of the developer by increasing the proportion of the oxalate solution. This may be done, and frequently with very decided advantage, by even making the proportions as one part of iron to six or eight of oxalate.

We have hitherto assumed the potassic oxalate and the ferrous

sulphate to have been purchased of a quality properly adapted for the special work in hand. But we have known instances in which even fine samples of these salts did not give results so satisfactory as were desired. A few (very few) crystals of oxalic acid dissolved in the potassic oxalate solution will scarcely ever fail to render and keep it in good working order, while we, in our own practice, invariably add a few drops, per pint, of sulphuric acid to the protosulphate of iron solution. This ensures its remaining in a healthy condition and not suffering from per-oxidation.

But is there any reader so far removed from a photographic store as to be unable to obtain neutral potassic oxalate? Then, fortunately, he may be enabled to make it cheaply and plentifully for himself. No country village so ill-provided with the requirements of life but where there is to be obtained oxalic acid and carbonate of potash, known frequently as pearl ash, employed in the domestic wash-house.

Into a tall jar pour a quantity of water that will only partly fill it. Suppose this quantity to be a gallon, throw into it a pound of the carbonate of potash (which, by the way, is sometimes sold as salts of tartar), and stir with a wooden spatula until it is dissolved. Then throw in oxalic acid slowly, which, as it dissolves, will give rise to a brisk effervescence. When this effervescence ceases, by the alkali having been neutralised, it will be found that the weight of acid used has been considerably less than the potash salt. The resulting liquid is a saturated solution of neutral oxalate of potash, and when decanted off and filtered, forms a stock solution for the developer. It will not be found to differ in its action from the purest crystals dissolved in distilled water, a fact we have just verified by comparative trials made during the course of writing this article.

And here we may observe that this "home-made" neutral oxalate solution has just been found to have acted its part admirably in developing some bromide prints on paper, when mixed, of course, with the iron salt as described, and used much weaker than in the proportions recommended for negatives.

THE EMULSION PROCESSES OF PHOTOGRAPHY.

[A Communication to the Bath Photographic Society.]

THE abundance of material which has so far engrossed our attention must, I imagine, be singularly gratifying to the promoters and well-wishers of this energetic Society, as well as proving highly instructive to all of us who have been fortunate enough to attend the meetings. This state of things can only be achieved where selfish motives do not govern, and the mutual desire to help each other, as expressed in the first paragraph of our prospectus, "The general interchange of views and ideas as to the progress of the art," is honestly carried out. It would be absurd for any one to state that this condition is not generally observed, and I trust that as years roll on the solid advice given by that well-known representative of science, James Glaisher, F.R.S., when he presided over the deliberations of the founders in September last, will be kept steadfastly in view. To-night it is pleasant to note we have already got through more work than would suffice as an average at some other society meetings, and I am afraid that the time I am occupying would be more advantageously spent on another topic less comprehensive than the emulsion process of photography. And here let me state that, in introducing the subject placed on the notice paper, it was the intention to review some of the capabilities of emulsions for the information of inexperienced members of this Society rather than to deal with any one process in all its details. A general idea gathered, detailed papers relating to a specific subject may then be of increased interest, and we are fortunate enough to have experts amongst us who will doubtless lend their assistance when requested so to do.

What is an emulsion? An emulsion has been defined as oil divided and held in suspension in water by means of mucilage or some other colloid body, but we photographers use the term to signify the complete suspension of any powder which is insoluble in the vehicle chosen; the latter must, however, possess the quality of drying at moderate temperatures. The proposal to employ such an emulsion, as we understand it, composed of certain metallic sensitive salts supported in a convenient vehicle, is probably within the recollection of some present, although I think it dates back fully thirty-five years. According to Dr. Eder, in *Modern Dry Plates*, published in 1881, Gaudin, as far back as 1853, wrote the first papers on the subject of a collodion emulsion, in which he alluded to analogous experiments he had then made with albumen and gelatine.

Following up this gentleman's experiments, we find a few years later, 1861, he published a collodion emulsion process, in which silver iodide and silver chloride are described, and to which he gave the name of photogen. He also suggested the spreading of a chloride of silver collodion emulsion on paper, as a substitute for printing on albumen paper, but it does not appear that he achieved any marked advantages over the processes then in general use, even if the results were of equal utility. It, however, serves to indicate the starting point from which many later modifications and improvements originated. The practical advance may be said to have commenced four years later, when the collodio-chloride process of Simpson, and the collodio-bromide of Sayce and Bolton, were published. The first-named was designed for printing positives right out upon paper or glass, and the second was intended for the production of negatives. In neither case was the silver halogen employed in a pure state; organic compounds were associated with them. To-day both are in use for the making of positive images on glass, that containing chloride being employed on paper as well. It is a question which of the two important and well-defined processes have, or may eventually, most influence the progress of photography. If we follow either, it leads us up to the methods practised at the present time. The collodio-chloride emulsion process of Simpson as first published was incomplete, but with the improvements of Swan, Bovey, Tunny, and others, a high degree of efficiency was reached, and an adaptation we find in the so-called Aristotype paper, now commercially issued in Germany and America, and imported into this the country where it originated. The present success of this method of printing on a paper coated with a sensitive emulsion, which will retain its properties unimpaired for a considerable time, and then yield excellent results, is rather due to the nature of the paper basis which supports the emulsion, than the particular collodion or sensitising compounds emulsified. I have never been able in this connexion to trace any chemical influence exerted by collodion in combining with silver, as albumen and gelatine undoubtedly does. This is no drawback, as suitably prepared silver compounds darken in daylight with sufficient rapidity for the ordinary purposes of printing out, and yield rich positives, which can afterwards be modified in colour, if desired, by the action of the toning bath.

Differing as regards the vehicle and the method of preparation, we have an analogous process for printing-out positives by means of silver chloride in conjunction with organic substances, combined and emulsified in a practically colourless gelatine, the strength of which may vary between ten and forty grains of the colloid to each ounce of water. Prints of this nature were first made in 1866, and described by Palmer in the *Photographic News* at the time; but no practical use appears to have been made of the information then given. Captain Abney, in his Cantor Lectures, drew especial attention to the possibilities of this process and gave formulae. An extended series of experiments on many organic compounds, combined with silver chloride emulsified in gelatine, and spread on white surfaces, were jointly carried out a year or two ago by R. Offord and myself, and the results embodied in a series of articles specially written by us for the pages of the *Photographic News*; doubtless the conclusions we arrived at, and the manipulatory details given, are familiar to those who have opportunity to study these subjects, and need not be further referred to here. Like the collodio-chloride emulsion, the mixture compounded by an approved formula can be spread thinly upon any non-absorbent surface, such as opal or strong paper previously covered with a substratum. This may consist of arrowroot, or a ten per cent. plain gelatine solution, rendered partially insoluble with chrome alum. An emulsion of barium sulphate in gelatine makes a capital covering for the paper, and is non-absorbent if the correct amount of chrome alum has been added. Aqueous solutions of resins are likewise suitable in cases where a smooth polished surface is a desideratum. Upon any of these substrata the liquefied and sensitive emulsion is spread in an apartment shielded from the influence of daylight, and, as soon as dry, is ready for printing. If, however, matt surface prints are required, then there is no necessity to use any preliminary coating whatever, as the absorption of a liquid emulsion containing thirty or forty grains of gelatine per fluid ounce is not very considerable, even with porous paper.

The preparation of the sensitive emulsion is such an extremely easy matter that no one need hesitate to attempt a few experiments in this direction. I think there is much more to be discovered about this interesting process, for we have by no means exhausted the combinations which are reasonably likely to be beneficial in producing an effective and rapid printing surface. The chief obstacle is a liability for insolubility to occur some time after the emulsion has been prepared. Potassium salts are apt to bring this condition about very quickly, thus spoiling the emulsion entirely. Some other agents act in a similar manner—often before it is possible to coat the intended

surface. As regards rapidity of action, an emulsion can readily be prepared which will have twice the printing speed of sensitised carbon tissue or of platinotype, and consequently five or six times that of layers of ordinary silver chloride in coagulated albumen. Further, the process is absolutely unfettered by any restrictive conditions, which is rather remarkable in these days of patents.

I will now proceed to make an emulsion of the kind referred to, in order to illustrate how simple is the method of preparation. I will use, for convenience, a citrate salt as my organifier, although nearly all the vegetable acids, in some form or other, can be introduced. These mostly present special characteristics—some useful, others to be avoided.

We have here, then, the materials—gelatine, silver nitrate, and an alkaline chloride—and as the kind of organic salt we wish to form is of some importance, we will make ours a citrate for the occasion, with citric acid and ammonia. We must bear in mind that citric acid added to a solution of silver nitrate does not produce silver citrate, but only acidified silver nitrate. It is, however, another matter if we use a citrate salt such as ammonium, magnesium, or sodium citrate, for then the nitric acid in combination with the silver leaves the metal for the alkaline base, and the result is an interchange by which we get a compound of silver and citric acid—silver citrate and the corresponding alkaline nitrate.

We will take 20 grains of citric acid in 100 minims of water, and, to produce ammonium citrate—a deliquescent salt—add sufficient strong ammonia to nearly neutralise the acid, leaving litmus paper still decidedly red, which, for convenience, we call A. In another vessel, B, we take 45 grains of gelatine, dissolved in one ounce of water, and mix with A. We next take 45 grains of gelatine, 6½ grains of ammonium chloride, and dissolve in one ounce of water: solution C. Then 40 grains of silver nitrate dissolved in 180 minims of water to form solution D. C and D are next mixed (not in daylight), then altogether at a temperature very little above melting point.

The emulsion now formed contains a slight excess of silver nitrate, and more nitrate of ammonia than we desire, so in order to get rid of it, we let it set into a stiff jelly, then break it up into shreds by pressing the solid mass through the meshes of coarse canvas, or cut it up into small pellets with a silver spoon. In this condition washing out the soluble salts can be readily effected. Citrate of silver, which is formed in the foregoing reaction, is soluble in water, and as it is undesirable to remove this from the emulsion, only brief washes in two or three changes of water are admissible. This given, the excess of water is drained off, the shreddy pieces collected, rinsed in alcohol, and then melted, strained through fine cambric, spread on glass, paper, or any non-absorbent smooth white surface, levelled, set, dried, and printed. The remainder of the operations are washing, toning, fixing, and again washing the prints, as in the case of ordinary sensitised paper. Positives produced in this manner will tone well in a borax bath, and if paper prints are dried in contact with glass previously rubbed over with French chalk, will leave the surface when dry with a very high polish and considerable translucency.

Returning again to the collodio-bromide, we have here a process which yields some of the finest positives on glass obtainable by any method. Especially well does it answer for lantern transparencies, the inherent slowness being no drawback for such work.

A normal collodion, composed of a high temperature cotton dissolved in ether and alcohol, is bromised with a cadmium or ammonium salt, and another collodion containing silver nitrate is mixed therewith to form an emulsion of silver bromide. The solvents are then evaporated, and the soluble salt ammonium nitrate, the result of the reaction, is removed by washing, the pellicle is re-dissolved, and is then ready for coating glass surfaces. The emulsion is not suitable for printing right out, but is amenable to the influence of a developer. Alkaline pyrogallol is usually employed, but the ferrous-citro-oxalate developer recommended by Abney yields a perfectly black and vigorous transparent image, which can be toned by any of the recognised methods.

Following an analogous treatment here, and displacing collodion in this case, as we have already done in connexion with the chloride process of Simpson, we emulsify our silver bromide in gelatine instead of collodion by adding silver nitrate and soluble bromide thereto, and, as a result, get at least an equal speed. If by copious washing we remove the nitrate salt resulting from the reaction of silver nitrate upon a soluble bromide, some increase in the rapidity has taken place; but if we omit the washing, and alter the physical condition of the supporting colloid by setting up a decomposing influence in the gelatine—such as a high temperature, or the action of an alkali produces—a marked change at once sets in, but ceases upon the removal of the nitrate salt. The molecules of silver bromide as at first formed are pretty evenly distributed, and of equal size through-

out the mixture, and if a little of the newly formed emulsion were spread on glass, and examined by transmitted daylight, the film would be almost certain to appear red, especially if the precaution of slightly acidifying the gelatine has been adopted at starting.

It is impossible to preserve an emulsion in this state very long, neither is it desirable to do so. Decomposition sets in with liberation of free ammonia, and after the lapse of a few days, such an emulsion compounded without an antiseptic would have become perfectly putrid. In the meantime the silver bromide would also undergo a change in size and colour. An agglomeration of the molecules takes place, and the now coarse silver bromide, if examined by transmitted light, appears of a bluish grey.

Besides this slow method of altering the character of the silver haloid in the cold state, there is a plan by which the same effect can be brought about, namely, by the addition of free ammonia, either with or without the application of external heat, excepting that the emulsion under treatment must not be in a solidified state when the addition of ammonia is made.

There is also the most reliable plan of any for general practice, namely, heating or boiling the mixture until the desired change has taken place; but in either case it is beneficial to use only a minimum quantity of water, and the lowest proportion of gelatine capable of suspending the silver, the remainder being added when making up bulk before washing. In the process as given to the world by Bennett, the whole quantity of gelatine was subjected to a temperature not exceeding 90° Fahr.—for several hours to obtain a rather slow plate, and for days to acquire greater rapidity; but now the same result may be obtained in half an hour, provided the bulk of the gelatine which gives body to the film is added after sensitiveness has been gained.

When a thin film examined as referred to appears reddish, sensitiveness is seldom very great, but directly this has become changed, the maturing process need not further be prolonged. The point at which the ripening or gaining of rapidity is generally considered to have reached its climax for practical purposes is when a thin film of the emulsion spread on glass, and examined in the wet state by the plan already mentioned, appears of a bluish grey. Beyond this point there is considerable danger in continuing the action, as fog may intervene, and it is often really difficult to distinguish between exalted sensitiveness and foggy images in a delicately balanced dry plate. For this reason, perhaps, more than any other, the English makers of dry plates have a tendency to keep the speed of their ordinary plates down to fifteen or eighteen degrees by standard sensitometer test, rather than issue an emulsion of higher sensitiveness. Now, I presume most of us know that plates called *extra sensitive* are quoted by manufacturers at an increased price, but why this higher rate should be charged does not seem very apparent. Perhaps the truth is, that some rapid plates require more skill and judgment in order to attain a brilliant negative therefrom, whereas the slow plate possesses so much latitude that the liability of error is minimised to a large extent, and therefore the moderately slow plate is found to be the most successful upon the whole to popularise. It has over and over again been demonstrated that the actual cost involved in the preparation of rapid dry plates is but a fraction of the excess charged, and surely if it were a question of requiring two grains more or less of silver at 2s. 6d. per ounce to make it slow or quick acting, the difference now charged, I maintain, is excessive.

It is not necessary for me to quote particulars of plate making to-night, for it is a subject which would occupy your attention for a whole evening; and as the mere illustration of compounding a bromide emulsion now would not adequately demonstrate the process as it ought to be done before this Society, I will not attempt it, but any question which may arise concerning it in discussion I will do my best to answer.

In closing, I will just remark that the staining of silver bromide films, or the incorporation of certain dyes in an emulsion, to render the character of the sensitiveness more in harmony with some colours, is a subject which is of the greatest importance to photographers; but as we are told that to prepare such emulsions in England at present is not permitted by the proprietors of patent rights, except under special arrangement, I am afraid we shall not get a demonstration of making orthochromatic plates just yet.

W. M. ASHMAN.

PHOTOGRAPHIC USES OF URANIUM.

II.

THE salts of uranium were employed in the production of platinum images very many years since, but it does not appear that much beyond this stage of experiment was achieved. The learned authors of *Die*

Matinotypic say little on the subject further than quoting Nièpce de St. Victor's reputed "development" of the uranous image with solution of platinum, and Bollman's method of applying a mixture of uranium and platinum salts directly to paper and afterwards "intensifying." They observe that "the defect which qualifies every urano-platinum process is that the image obtained after exposure is almost invisible," and, further, "that the high price of the uranium salts will render the adoption of the process impossible in practice." I do not think the salts of platinum are readily reduced by uranous nitrate, which appears to have been the experience of Mr. Alleyne Reynolds; hence it may be inferred that the experiments of Nièpce de St. Victor were not successful and the reason understood. The difficulty attending the second process mentioned is one that Mr. Reynolds recently overcame in his platino-uranotype experiments by the use of an additional reducing agent, as in the iron-platinotype process, but there remains the question whether, as in the newest modification of this last process, the platinum, reinforced by a reducing agent, may not be applied to the uranous picture with success. Uranium chloride, oxalate, and nitrate, are not now higher in price than silver nitrate, and are amenable to being materially cheapened.

The action of light upon uranic nitrate has been found to correspond closely to the change undergone by ferric oxalate. The blue and violet rays deoxidise both salts; the red and yellow are inactive. It is further stated that the iron is affected by the green, and this degree, or rather range of sensitiveness is, I believe, also possessed by uranic oxalate. I am disposed to rank the uranic above the ferric salt in respect to the rapidity with which the positive impression on paper is received; in other words, the reducing action of the light takes place more quickly in the former compound. In comparing the uranous and ferrous images, if we set aside their basic characteristics, there is not, I think, a preponderance of photographic value in either. For rendering detail, for intensity and gradation of tone, they may be practically bracketed equal. There appears to me, however, greater risk of carrying the reducing action of light too far in the uranic than in the iron, in consequence, presumably, of what may be taken to be its relatively higher sensitiveness. An over-printed uranous picture can be well compared to a silver negative on glass, that has been seriously attacked by extraneous light before development. The over-printed uranous image is useless for further treatment. An iron image, if over-printed, tends to produce hard pictures, but is seldom prone to total loss of balance and vigour as in the analogous case.

The property possessed by uranous nitrate of depositing metallic gold and silver from their salts is, as of course every one knows, a characteristic of ferrous oxalate. Images in those metals, or in both united, are therefore feasible as a variation of the iron positive process. In actual application, however, this theory does not receive the most conclusive confirmation—I refer, of course, to my own experiences only. The protoxalate of iron easily reduces the gold and silver salts, even in the cold; but upon treating ferrous images with solutions of auric chloride and argentic nitrate respectively, acidified with oxalic acid, a reduction so quick and complete took place that the metallic deposits were insufficient to produce more than relatively weak images, although the amount of detail was considerable. I tried the effect of increasing the strength of the solutions with no compensatory increment of deposit. The ferrous oxalate, I take it, works in this instance with an excess of energy, and I am inclined to argue that by the employment of a restraining agent, the reaction would be less violent, and the deposition of metal would proceed with greater deliberation and evenness.

It may here, perhaps, be stated with advantage that those who at any time have the desire to undertake iron printing will find the preparation of the per-salt not difficult. Two methods of conducting it may be outlined. The ferrous salt is mixed with an alkaline carbonate, when a whitish precipitate of ferrous carbonate is obtained. This is boiled with oxalic acid until no more is dissolved, and the brown liquid decanted, filtered, and placed in the dark. Or ferric hydrate is prepared by adding to a boiling solution of ferric chloride caustic soda until it gives an alkaline reaction. The precipitate is washed until the alkalinity disappears, the water is removed and the iron hydrate mixed with oxalic acid and put in a dark place, when the formation of ferric oxalate will proceed and be completed in a few days. Ferric oxalate, however, is an article of commerce, and may be had of the purity requisite for experimental printing; while where it is sought to prepare the per-salt with the minimum of trouble the ferric hydrate is also obtainable. For very delicate operations, it will of course be necessary to determine the quantities of iron and oxalic acid contained in a solution of the per-salt.

The capabilities of ferric oxalate as an image-forming agent, and of the lower oxalate as a reducer, together with certain distinctive features of the salts of uranium, appear to indicate the possibility of

securing final pictures by the deposition of the latter metal. Metallic uranium, when isolated, is a dark coherent powder that is unaffected by the air at ordinary temperatures. In a test-tube reaction, cold ferrous oxalate dissolved in oxalic acid seemed not to reduce uranic nitrate very readily, and upon applying a solution of the latter and the acid to a ferrous image, this comparative failure was confirmed. However, by observing in the test tube the action of the ferrous solution upon uranic nitrate, with which a small proportion of gold chloride was associated, about 1:10, reduction took place. Upon applying the uranium-gold solution to a ferrous image the reaction was sustained, and a vigorous violet-black picture resulted. The half tones were deficient in delicacy, and the entire image had a coarseness inseparable from tentativeness, but of the practicability of producing positive impressions in deposited uranium and gold I was left in no doubt.

It is questionable whether the unchanged ferric salt exhibits an innocuous behaviour towards the uranium. A degradation of what should have been the white parts of the uranium-gold picture suggests that it is not inoperative, while on the other hand, from the failure to deposit plain uranium upon the ferrous image superadded to the apparent neutrality of the unaltered salt, it is open to assumption that the latter has no reducing power over the uranic compound. I am of opinion that the gold salt may be eliminated from the solution of uranium, and deposition of that metal alone effected on the ferrous image by, probably, the aid of heat and the substitution for the solvent of iron of a developing agent. But these and other points I reserve for the present.

As one is disinclined to publish formulæ that have not been tested by repeated experiments, I seek no justification for avoiding a semblance of practical details. Moreover, I have in mind a remark of the Editor that the field of iron printing is only partly explored, and it is in the humble persuasion that the same reservation is applicable to uranium printing that these notes are penned.

THOMAS BEDDING.

COMPARATIVE EXPERIMENTS WITH SODA, POTASH, AND HYDROQUINONE DEVELOPERS,

WITH EMPLOYMENT OF META-BISULPHITE OF POTASH AND VERY SMALL ADDITIONS OF CAUSTIC SODA AS A FORCER.

DURING the course of the month of November of last year, the accounts which were published in English, American, and German technical periodicals concerning the use of meta-bisulphite of potash caused me to make experiments with this preparation, for the purpose, on the one hand, of ascertaining how little hydroquinone one can employ, and, on the other hand, how much pyro or hydroquinone is necessary to preserve the "stock" solutions. As far as the hydroquinone is concerned, it was found that 0.4 gr. to 100 c.c.m. of developing solution was the smallest quantity which could be employed; if one uses less it exercises too restraining an effect upon the development. As many professional and amateur photographers employ hydroquinone, soda, or potash developers, and as these, as is well known, require always seven to eight minutes, I began to consider whether there was any preparation which could be employed as a forcer. I tried a small addition of caustic soda and caustic potash, i.e., 2 c.c.m. of a solution of 50 parts of caustic soda or caustic potash to 400 parts of water. The appearance of the first traces of the image was by this means considerably hastened, and the duration of the development very much shortened. The accompanying tables show the results obtained in the several cases. As regards quality, the negative appeared to be satisfactory and fit for use whichever of these various developers was employed; it became apparent, however, that the employment of caustic soda or caustic potash, in the case of soda and potash developers, produced more brilliancy and a greater clearness of detail, without considering that the duration of the development was shortened by several minutes.

Meta-bisulphite of potash restrains the development if employed in too large doses, but preserves the "stock" solutions much better than sulphite of soda alone. It is, however, advisable to dispense with the sulphite of soda, or to decrease its quantity in the formulæ, since the colour of the negative is thereby beneficially influenced. Meta-bisulphite of potash, in soda or potash-pyro developers, colours the negatives yellow, and sulphite of soda weakens this colouration considerably. The addition of bromide of potash, when this preparation is employed, is unnecessary.

These experiments induce me now to recommend the following developing solutions with hydroquinone, viz.:—

HYDROQUINONE-CAUSTIC SODA DEVELOPER.

Solution A.

Hydroquinone	10 parts.
Water	250 "
Meta-bisulphite of potash	4 "

Solution B.

Caustic soda	50 parts.
Water	400 "

Take for every 100 parts of water, 10 parts of solution A and 10 parts of solution B.

This developer acts very well for negatives, but not well for positives on bromide of silver emulsion paper, since the copies turn out very unequal in tone and mostly reddish in colour.

HYDROQUINONE-POTASH DEVELOPER.

Solution A.

Hydroquinone	10 parts.
Water	250 "
Meta-bisulphite of potash	4 "

Solution B.

Carbonate of potash	100 parts.
Sulphite of soda	50 "
Water	1000 "

Take for each development 10 parts of solution A, 50 to 75 parts of solution B, and 25 to 50 parts of water, according as a weak or strong developer is desired. To force the development add 2 c.cm. of caustic soda solution (50 : 400 of water); this addition has a beneficial influence upon the colour of the picture. For the development of positives, one may employ the same preparation.

HYDROQUINONE-SODA DEVELOPER.

Solution A.

Hydroquinone	10 parts.
Water	250 "
Meta-bisulphite of potash	5 "

Solution B.

Carbonate of soda	100 parts.
Sulphite of soda	50 "
Water	1000 "

For each development take 10 parts of solution A, and 50 to 75 parts of solution B, adding 25 to 50 parts of water. One is thus enabled to work with a weak or strong developer.

This developer, too, works much better when one adds 2 c.cm. of a solution of caustic soda (50 : 400 water). This preparation acts excellently for positives on bromide of silver emulsion paper, and is distinguished by the equality in tone which it produces.

It is advisable here to place the positives before washing in a weak solution of acetic acid, and to leave them a short time in it. Should the positives happen to be previously somewhat yellow, they regain by this means their whiteness.

The employment of bromide of potash as a restrainer is unnecessary, since meta-bisulphite of potash works sufficiently energetically. Since the addition of meta-bisulphite of potash, on the one hand, and of caustic soda solution on the other, worked so beneficially, I extended the experiments to the trial of soda-pyros and potash-pyros developers. Here, again, I found the meta-bisulphite of potash acted as a powerful restrainer; I attempted to prevent this by the addition of 2 c.cm. of weak caustic potash solution, and was agreeably surprised at the beneficial results I thus obtained. As no accounts of this procedure have hitherto appeared in the literature of the subject, the publication of it may perhaps prove of general interest. Even with these developers I would not advise the use of more meta-bisulphite of potash than I have indicated, since otherwise its influence is rather restraining.

It is further worthy of note that, as Professor Eder publicly declared, the preparation "Excelsior" which I introduced is highly effective in conjunction with the soda developer. The tables show this conclusively, while, on the other hand, it is true the preparation, when employed with the potash developer, does not act as a forcer or acceleratingly. Still, the other beneficial qualities that show themselves in the action of the "Excelsior" remain the same in both cases.

As is also shown by the tables, experiments were attempted with caustic potash, but as they gave less satisfactory results than caustic soda, and as the former is much more expensive, I recommend the use of caustic soda, more particularly as it is easier to obtain it pure. The caustic potash of commerce is said frequently to contain an amount of carbonate of potash.

At the conclusion of my paper, the series of experiments which were made public by Professor Eder in the December issue of the

Correspondenz have come under my notice. They agree remarkably with my observations.

As, however, I extended my researches so as to include experiments on additions of meta-bisulphite of potash and caustic soda, I venture to hope my readers will find them also of interest, for they are in reality merely a continuation of the same series, although carried out by a different hand.

FORMULA.	Parts Pyro Solution.	Parts Soda Solution.	Parts Water.	Parts Excelsior.	Parts Caustic Soda Solution.	Image appears after Seconds.	Duration of Development.
1.—PYRO-SODA DEVELOPER.							
<i>Pyro Solution.</i>							
Sulphite of soda							
Water							
Sulphuric acid							
Pyrogallol							
100 grms.	25	25	25	—	—	20	3½
500 "							
8 drops.							
14 grms.							
<i>Soda Solution.</i>							
Sodium carb.							
Sodium sulphite							
Water							
100 grms.							
50 "							
1000 "							
2.—PYRO-SODA DEVELOPER.							
<i>Pyro Solution.</i>							
Water							
Sodium sulphite							
Potassium meta-bisulphite ..							
Sulphuric acid							
Pyrogallol							
500 grms.	25	25	25	—	—	25	3½
100 "							
5 "							
8 drops.							
14 grms.							
<i>Soda Solution.</i>							
Sodium carb.							
Sodium sulphite							
Water							
100 grms.							
50 "							
1000 "							
As in Formula 1	25	25	25	2	—	14	2½
As in Formula 2	25	25	25	2	—	18	2½
As in Formula 1	25	25	25	—	2	14	2
As in Formula 2	25	25	25	—	2	18	2½
As in Formula 1	25	25	25	2	2	12	—
As in Formula 2	25	25	25	2	2	17	—

FORMULA.	Parts Pyro Solution.	Parts Potash Solution.	Parts Water.	Parts Excelsior.	Parts Caustic Potash, 50 : 100 Water.	Parts Caustic Soda, 50 : 100 Water.	Image appears after Seconds.
3.—POTASH DEVELOPER.							
Water							
Sodium sulphite							
Sulphuric acid							
Pyrogallol							
500 grms.	25	25	25	—	—	—	12
100 "							Duration of Development, 3 mins.
8 drops.							
14 grms.							
Potass. carb.							
Water							
100 grms.							
1000 "							
50 "							
4.—POTASH DEVELOPER.							
Water							
Sodium sulphite							
Potass. meta-bisulphite ..							
Sulphuric acid							
Pyrogallol							
500 grms.	25	25	25	—	—	—	25
150 "							Duration of Development, 3 mins.
5 "							
8 drops.							
14 grms.							
Potass. carb.							
Water							
100 grms.							
1000 "							
50 "							
As in Formula 3	25	25	25	2	—	—	48
As in Formula 4	25	25	25	2	—	—	30
As in Formula 3	25	25	25	—	2	—	19
As in Formula 4	25	25	25	—	2	—	19
As in Formula 3	25	25	25	—	—	2	17
As in Formula 4	25	25	25	—	—	2	17

FORMULA.	Pta. Hydroquinone Solution.	Pta. Caustic Soda Sol. 50:400 Water.	Parts Water.	Soda Solution. Sod. Carb. 10 grms. Sod. sulphite 50 " Water 1000 "	Potash Solution. Pot. Carb. 100 grms. Water 100 " Sod. Sulphite 50 "	Pta. Caustic Pot. Sol. 50:400 Water.	Image appears after seconds.	Duration of Development.
5.—HYDROQUINONE DEVELOPER.								Mins.
Hydroquinone 10 grms.								
Sod. sulphite 25 "								
Water 250 "	10	10	100	—	—	—	39	5
Caustic soda... 50 grms.								
Sod. sulphite 50 "								
Water 400 "								
6.—HYDROQUINONE DEVELOPER.								
Hydroquinone 5 grms.								
Water 125 "								
Potass. meta-bisulphite... 2 "	10	10	100	—	—	—	46	7½
Caustic soda... 50 grms.								
Sulphite of sod. 50 "								
Water 400 "								
7.—HYDROQUINONE DEVELOPER.								
Hydroquinone 5 grms.								
Water 200 "								
Potass. meta-bisulphite... 4 "	10	10	100	—	—	—	55	10
Caustic soda... 50 grms.								
Sod. sulphite 50 "								
Water 400 "								
<i>Hydroquinone Solutions consist of</i>								
Hydroquinone 10 grms.	10	—	25	75	—	—	55	7
Water 250 "								
Sod. sulphite 25 "								
Hydroquinone 5 grms.								
Water 125 "	10	—	25	75	—	—	56	8
Meta-bisulphite " "								
Potass. 2 "								
Hydroquinone 5 grms.								
Water 200 "	10	—	25	75	—	—	75	12
Potass. meta-bisulphite . 4 "								
Hydroquinone 10 grms.								
Water 250 "	10	2	25	75	—	—	25	4½
Sod. sulphite. 25 "								
Hydroquinone 5 grms.								
Water 125 "	10	2	25	75	—	—	40	5
Potass. meta-bisulphite . 2 "								
Hydroquinone 5 grms.								
Water 200 "	10	2	25	75	—	—	50	8
Potass. meta-bisulphite . 4 "								
Hydroquinone 10 grms.								
Water 250 "	10	—	25	—	75	—	27	5½
Sod. sulphite. 26 "								
Hydroquinone 5 grms.								
Water 125 "	10	—	25	—	75	—	36	6½
Potass. meta-bisulphite . 2 "								
Hydroquinone 5 grms.								
Water 200 "	10	—	25	—	75	—	72	10
Potass. meta-bisulphite . 4 "								

FORMULA.	Pta. Hydroquinone Solution.	Pta. Caustic Soda Sol. 50:400 Water.	Parts Water.	Soda Solution. Sod. Carb. 100 grms. Sod. Sulphite 50 " Water 1000 "	Potash Solution. Pot. Carb. 100 grms. Water 100 " Sod. Sulphite 50 "	Pta. Caustic Pot. Sol. 50:400 Water.	Image appears after seconds.	Duration of Development.
Hydroquinone 10 grms.								Mins.
Water 250 "	10	2	25	—	75	—	15	3½
Sod. sulphite. 25 "								
Hydroquinone 5 grms.								
Water 125 "	10	2	25	—	75	—	16	3
Potass. meta-bisulphite . 2 "								
Hydroquinone 5 grms.								
Water 200 "	10	2	25	—	75	—	47	6
Potass. meta-bisulphite . 4 "								
Hydroquinone 10 grms.								
Water 250 "	10	—	25	—	75	2	30	4½
Sod. sulphite. 25 "								
Hydroquinone 5 grms.								
Water 125 "	10	—	25	—	75	2	40	5
Potass. meta-bisulphite . 2 "								
Hydroquinone 5 grms.								
Water 200 "	10	—	25	—	75	2	64	9
Potass. meta-bisulphite . 4 "								

EUGEN HIMLY, *Captain (retired).*

THE ACTINOGRAPH.

At a recent meeting of the Liverpool Amateur Photographic Association, Mr. V. C. Driffeld read a paper upon the actinograph, an instrument invented by Dr. Hurter and himself for calculating photographic exposures.

He said that one of the greatest difficulties the photographer has to encounter lies in correctly estimating his exposure. The fluctuations of the light throughout the year, and again throughout the day, are so great that they cannot be adequately allowed for unless some reliable data are at hand. Again, the great variety in the speeds of plates presents a very serious complication.

The actinograph is the outcome of an effort to reduce exposure to system, and to put the speed of plates on a satisfactory basis.

After many attempts Dr. Hurter succeeded in constructing an actinometer, which they believe to be the only existing means of rapidly and accurately measuring diffused daylight. One form of this instrument is self-recording, and for upwards of a year they took, by means of it, daily diagrams of the light, three of which were shown on the screen. From these diagrams they learnt that though the light fluctuates considerably, these fluctuations are limited deviations from a certain mean value.

In order to facilitate the calculation of exposures from the actinometer readings, they made use of a specially constructed logarithmic slide rule, and the actinograph is simply this slide rule with this difference, that the light value, instead of being ascertained from the actinometer, is ascertained from a specially constructed light diagram which records the mean value of the light.

A photograph of the instrument was here shown. It consists of a small box which can be easily carried in the pocket, and which contains, suitably mounted, four logarithmic scales, which correspond with the light, the lens, the speed of the plate, and the exposure.

The light scale is wrapped round a cylinder, and in contact with this is a slide bearing the lens and exposure scales, and fixed in a particular position is the speed scale. Sliding between the exposure and speed scales is an index pointing on the upper edge to five different exposures, and on the lower edge to the speed of the plate.

The light scale records the value of the light from hour to hour throughout the year by means of a system of curves, each curve giving the value of the light for a particular hour. The unit of light is so chosen that in places where the sun culminates in the zenith the bright test light is 100 units. One actinograph degree of light is, therefore, the 1/100 part of the brightest diffused light on the surface of the earth.

The lens scale allows for the differences in the construction of lenses, and for the various ratios of aperture to focal length.

The exposure scale indicates directly exposures ranging from 1/20 of a second to one minute.

The speed scale.—In speaking of this scale the author called attention to the pressing need of some scientific and satisfactory method of comparing the rapidities of different plates, and said that Dr. Hurter and he had endeavoured to meet this need by adopting as a unit of speed the length of time required to produce upon the plate a definite result. They call that plate speed one, which in one second, with one degree of light, produces under certain other conditions a satisfactory landscape negative possessing a certain definite ratio of density between foreground and sky; and a plate which yields the same result under the same circumstances in the $\frac{1}{10}$ part of a second would be said to be speed 100. The speeds indicated on the actinograph range from 0.5 up to 300. 0.5 is about the speed of a wet plate, and 30 is about the speed of the most rapid plate so far made.

The short scale sliding between the exposure and speed scales, and pointing on one edge to five different exposures, serves to allow for variations in the light due simply to atmospheric conditions. The single mark on the lower edge, termed the "speed index," is placed opposite the speed of the particular plate about to be exposed.

The author here made some remarks upon development. He said that it is popularly supposed that a great deal can be done in development to modify the effect of faulty exposure. Careful experiments made to decide the question, however, show that this control during development is, to say the least of it, greatly exaggerated. A technically perfect negative can only be produced by a correct exposure. The effect of abnormal additions of alkali is merely to hasten development, and eventually to fog the plate, and the effect of abnormal additions of a bromide is simply to retard development, and eventually to prevent it altogether.

The author proceeded to show, with the aid of the lantern, how correct exposures are calculated by means of the actinograph, and how the speed of plates is ascertained by the photographer himself. He also drew attention to the variations necessary in the light diagrams for different parts of the globe, several of which he exhibited. Actinographs are constructed for any latitude north or south of the equator at intervals of two and a half degrees.

BEAUMANOR AND CHARNWOOD FOREST.

THE outdoor meetings of our numerous photographic societies are, perhaps, the most enjoyable part of their proceedings, especially when the weather is favourable; but it was most aggravating during the latter part of May, preventing many members of the Derby Photographic Society from sending in their names to join the expedition of the 1st of June. Our destination was Beaumanor. The day turned out all that could be desired, save a little too much wind. We travelled by rail to Loughborough, where we found waiting for us a contingent of the Leicester and Loughborough Societies. We drove in brakes through the narrow streets, past the fine old church and comparatively new Grammar School and pretty cemetery, and were soon bowling along the old London coach-road.

Before reaching Quorn, of hunting renown, we turned sharply to the right, and trotted merrily up a lovely lane with overhanging trees and flower-besprinkled banks and hedges, and many a peep of the pastoral country on either side. The fresh wind from Charnwood Forest, laden with the scent of hawthorn, met us, and was very enjoyable, for the afternoon was hot and sunny, the sky a lovely blue dappled over with light cumulus clouds. Presently we came to a lodge embowered in trees and flecked with sunshine. We turn down the trim carriage drive soon to find ourselves landed at the south-east front of Beaumanor.

A host of cameras were soon rigged up, but only a few of our party tackled this view, for the sun was shining nearly in front of us and behind the building. The members soon dispersed in different ways, each one choosing his own pet subject. The horses were sent round to the stables to rest while we got hard at work. Many of us went to inspect and photograph an old coach, one of the lions of the place, and this was a great disappointment, for we found the lumbering, picturesque old thing of 1740 had had a special building placed over it, open at one side and one end, with huge brick pillars cutting into the view so that it could not be taken entire excepting a very much foreshortened view from the front. Three or four cameras were at work on this object, but we fear the results will not be very satisfactory. Wheeling it out into the light and free from the obstructions was out of the question—it was like a tortoise in its shell, and it is doubtful if its worm-eaten condition would have stood it either. Never mind, there were plenty of sweet pictures all around—a handsome, though modern house, a charming garden with grassy terraces and all the adjuncts that wealth and taste can supply, a pretty park with noble avenues of ancient trees, and freedom to ramble where we would and take away anything we pleased—on our plates.

Beaumanor is about four miles from Loughborough Station. The park is ancient, the fine Jacobean house modern (1847), and stands on the site of earlier structures. The last building was in the Italian style and of no great beauty. The first house here, dating from a remote period, was "moated round with a fair and clear moat"—it had a double moat in fact. Here came to reside Sir William Herriek, Elizabeth's ambassador to Turkey, to whom it was transferred by the celebrated Earl of Essex, who held it by lease from the queen. Since that time it has passed through the hands of seven or eight plain William Herrieks, for the

family has ever lived without ostentation, their motto "*Virtus omnia nobilitat*." The knight mentioned above was uncle and guardian to the celebrated Robert Herriek, author of the "*Hesperides*." We were shown some of the rooms, the noble entrance hall with its grand carved staircase and great stained window of glowing glass. Here we saw what must surely be the champion of chairs cut from the solid trunk of an oak which measured thirty-seven feet in circumference!

Now all had done and seen all we could, the party shouldered their cameras and wended their way through the park and the pretty little village of Woodhouse adjoining, where the same order and neatness prevail. The cottages are of the local stone of the forest, irregular pieces of slaty-looking rock of all colours, with pretty porches and gables. Climbing plants add to their beauty, and well-kept gardens, with many a lilac and laburnum, the background filled in with great trees, complete such scenes as we love to see reproduced on our magic plates. Only a few shots were made here, for was not tea ordered a mile further on at Woodhouse Eaves? Arrived there, however, we found so large a number was not expected, so we had to wait awhile; and the time was well spent in taking views of this picturesque part of the forest, the principal object being the church perched on a high rock with a yawning cavern at its foot. Many interesting rambles might be made from this village to Swithland, to Beacon Hill, Ulverscroft Priory, Bardon Hill, the Monastery, and other places of note in Charnwood Forest.

Tea ready, we filled two great tables and emptied them as well by next filling ourselves with the delicious ham and eggs—nothing like carrying a camera about to develop an appetite. Our brakes now came up from Beaumanor for us, and a return ride in the cool evening, with an enjoyable smoke on the way, soon brought us to Loughborough Station again, where each society had to part with promises of future meetings—the next one at dear old Haddon Hall. As we neared Derby the sunset sky was a revelation of beauty such as would have driven Ruskin into raptures. We cannot put that glorious scene into words, so we give it up. Here is Derby Station where we—stop!

RICHARD KEENE.

PHOTO-MICROGRAPHY.*

I use an excellent long-focus bellows camera made by Messrs. George Mason & Co., of Glasgow, the focussing screen end of which racks out, and not the front of it, which latter plan condemns a camera for the purpose of photo-micrography. This camera I always fasten with two screws to the platform of my bench, as one screw alone would not suffice to prevent lateral displacement, especially when the front of the dark slide is being drawn out. To prevent any vibrations of the dark slide containing the sensitive plate during exposure, I screw four stays of brass to the front and to the back of the camera, which stays are firmly screwed against two iron rails running alongside of the platform. In the place of the rising front I place a front having a wide square box attached to it, which contains a shutter for timing the exposure. The eyepiece end of the microscope body or the projection eyepiece is inserted through a round opening into the front of this box, and the light-tight connexion between camera and microscope is effected by means of a flanged tube, which is lined, and whose flange is faced with black velvet, and which slides over the body of the microscope. Now there is one very important, nay indispensable, adjunct to a photo-micrographic outfit, and one of which almost every camera should be possessed, especially those for copying or for photographing dimly-lit interiors, and that is, besides the ordinary focussing screen containing ground glass, one other such screen containing clear glass. It is needless to say that the inner surfaces of these focussing screens must register exactly with the film side of the sensitised plate. The light on the screen, when images under high powers are projected on it, becomes so feeble that these images are no longer visible through the ground surface, nor are they visible on the clear glass screen unless we place an eyepiece or an ordinary photographers' focussing glass upon it, which has its focus in the plane of that side of the screen which is turned towards the microscope. With this arrangement the image on the clear screen appears as distinct and luminous as it would if simply viewed in the microscope, and all difficulty about focussing under high powers vanishes. The clear glass screen serves simply as a support in the proper place for the focussing glass. A wooden screen with a number of holes for placing an eyepiece in it is sometimes employed for viewing the image, but this plan is not so good as the clear glass screen. Without such a clear glass screen all focussing with microscopical precision becomes mere chance work. There is another reason which often renders the use of a clear glass screen imperative, and that is when we photograph by monochromatic blue light in order to eliminate, as far as possible, any residue of chromatic aberration of the objective, and to increase its resolving power. The image in this case becomes far fainter than when projected by white light on the focussing screen. Monochromatic blue light is obtained by placing suitable blue glasses between the source of light and the object to be photographed, or a small glass tank filled with an ammoniacal solution of sulphate of copper, which solution must have been filtered; such a tank is often called the cupro-ammonia cell. The employment of monochromatic blue light is especially to be recommended for low powers which are not corrected

* Concluded from page 328.

for photography, because in these the differences of visual and chemical foci are greater than in the higher powers. These differences have to be ascertained by a number of trials for the different objectives, and have to be noted, so that the photo-micrographer knows in future how many turns of his fine adjustment the objective has to be withdrawn from the object after the sharpest possible visible image has been obtained on the screen in order to secure a sharp chemical image on the sensitive plate. Most modern objectives are corrected for photography, and in the apochromatics the visible and the chemical foci coincide, so that they give as sharp chemical images by white light as by monochromatic blue light.

I have now arrived at the last part of my notes, which deals with the *modus operandi* of taking photo-micrographic negatives, and which I purpose to illustrate by photographing a microscopical object. As I am addressing the members of the Glasgow Photographic Association, among whom are many of the foremost professional and amateur photographers of the West of Scotland, and as in the development of the latent image the same rules obtain as in copying or in any other branch of photography, it would obviously be out of place and presumptuous on my part to enlarge on this part of my subject. Should, however, any of my hearers not be acquainted with photography, and desire to give photo-micrography a trial, he will do well to get the late Mr. J. H. Jennings's little handbook on photo-micrography.

The illumination of the object having been carefully arranged, the table carrying the microscope is turned so that the axis of the latter coincides with the centre of the camera. I then raise three screws to support and fix the turntable, and make the light-tight connexion by means of the flanged tube. I focus next the image as sharply as possible on the ground-glass screen, and after that on the clear-glass screen, and shut off the light by means of the shutter in the camera front. This done, I insert the dark slide containing the sensitive plate, draw out the front, and after all vibrations have subsided, and the whole apparatus has come to rest, I make the exposure, observing during this time all possible precautions against the slightest vibrations. The exposure completed I close the camera by means of the shutter, push in the front of the plate carrier, and proceed to development in the dark room.

The length of exposure in photo-micrography is of quite the same importance as in any other branch of photography, and upon it depends chiefly the vigour of the resulting negative; but the latitude in the time of exposure by artificial light is relatively considerable. It is impossible to give any definite rule for calculating the requisite time of exposure, as this is influenced by many factors—such as the quantity and quality of the light; by its distance from the object; by the condenser, its focus, aperture, and position; by the thickness, nature, and colour of the object; by the objective, the eyepiece, and its distance from the screen; by the degree of sensitiveness of the plate used; by the nature and power of the developer, &c., so that there is here any amount of scope for exercising our speculative faculties, and any amount of chances of going wrong. Experience teaches one sooner or later to estimate the required time of exposure from the quantity and quality of the luminosity of the image on the focussing screen. Dr. E. C. Bousfield has published a brochure entitled *A Guide to the Science of Photo-micrography*, and in it is given a scale or table to find the time of exposure under different circumstances, and which table is based on the visibility of the figures on Warnerke's sensitometer under the same illumination and at the same distance from the screen as the gelatino-bromide plate, and used in conjunction with the known scale of the sensitiveness of the plates, either as stated by the maker or tested by the same sensitometer.

Regarding the choice of the plates, the wet collodion plate must be ranked as the first, judging from the results it is capable of yielding under proper treatment, but unless we can photograph by sunlight, the exposures, especially under high powers, become very much prolonged and often impossible. I have had to give, by lamplight, as much as half an hour's exposure when using so low a power as a one-inch objective.

use now only dry gelatino-bromide plates, preferring, of course, thickly coated ones, rich in silver, and of great, but not of the greatest, rapidity. I only use the slow plates when photographing with the lowest powers of the microscope, and when I aim at great density. Among the plates I have used most I can recommend the North British plates, owing to their great sensitiveness and the great density and contrasts they are capable of giving. I also use Paget's and Thomas's, but of late I have used many Ilford plates, which I have found remarkably uniform and good. Nor must I forget the isochromatic plates, which are especially serviceable when photographing objects with great actinic colour contrasts, such as blue and red, or brown. Dr. Roderick Zeiss recommends those of Perutz. I have also photographed on Eastman's stripping films with good results.

The developer to be used for photo-micrography ought to possess considerable latitude and power, such as those containing pyro and ammonia, but I prefer a developer containing pyro and a large proportion of sulphite of sodium, which is powerful and suits many brands of plates. In developing a negative one must not lose sight of the purpose for which it is intended, whether for printing positives on paper, or for lantern transparencies; for the latter the negative must be vigorous, leaving, if possible, the ground black. Negatives of photo-micrographs ought not to be retouched, as otherwise they might lose their scientific value and their character of truth. Intensification or reduction of the negative are, as stated already, the only changes permissible under certain circumstances;

the former enables us often to dispense with that difficult and wearisome process, the blocking-out of the ground by means of Chinese ink and black varnish, generally resorted to in negatives for lantern transparencies in order to obtain in the latter a ground of clear glass. As pictures, such transparencies may be very satisfactory, as the object photographed may be printed to any depth desired, but at the same time the clue to the thickness of the object is thereby lost, for the most pellucid object can be made to appear as possessed of great thickness and substance.

Regarding the size of the plates which are most suitable for photo-micrographic negatives, it is held that it is on the whole wiser to take sharp small negatives and quarter and half-plate sizes, and to enlarge these afterwards, instead of taking large direct photographs, if large prints are required.

As a photo-micrograph should possess all the detail which we can secure on one plate, it is obvious that for printing positives a smooth paper ought to be chosen instead of one with a rough surface. The making of transparent positives for the lantern is now a pleasant and easy task if we possess good and suitable negatives and such excellent lantern plates as Thomas's, Mawson & Swan's, Fry's, &c. No positive can, microscopically speaking, render all the finest detail of the negative, and in some cases it would therefore be advisable to show the latter on the screen instead of the former.

I have said nothing yet regarding the objects which may be photographed by the aid of the microscope, suffice it to say that comparatively few specimens or mounted objects will give good photographs, either in consequence of too great colour contrasts, or of unevenness of sections, or of uneven imbedding in the mounting medium, or of too great opacity, &c. Microscopical objects possess often very transparent, and, at the same time, more or less opaque parts apart from their colour contrasts, and so it is in such cases unavoidable that the transparent parts appear greatly overexposed, and the opaque parts greatly underexposed in the negative, and unless this defect can be corrected to some extent by the use of isochromatic plates, there seems no other way out of this difficulty. Live objects have to be photographed by the use of the so-called instantaneous shutters and a powerful light. In this case a finder will be found extremely useful, which is a separate microscope body carrying an eyepiece, into which the image is reflected by means of a small prism, so that the operator can seize the favourable moment when the moving object is in the field of view.

With these remarks I bring my notes to a conclusion, trusting that they may induce some of you to begin and pursue photo-micrography, and that they may assist others practising this most useful and fascinating branch of photography already in overcoming some of the difficulties besetting their path.

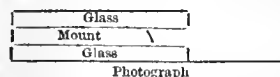
ADOLF SCHULZE, F.R.S.E., F.R.M.S.

After Mr. Schulze had read his paper, he photographed the proboscis of a blow-fly on an Ilford half plate, and subsequently showed some sixty lantern transparencies of microscopic objects by means of the limelight on the screen. These transparencies Mr. Schulze had printed from his negatives, and the subjects embraced botanical, entomological, and physiological specimens, crystals, minerals, and starches photographed by polarised light, and a number of beautiful diatoms photographed under high powers.

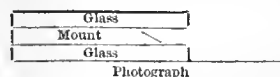
CURRENT COMMENTS.

SHADOWLESS MOUNTS.

In a recent answer to a correspondent, in which F. R. Fisher wishes to know how to avoid shadows with cut-out mounts under glass on photographs mounted in optical contact on glass, your answer is, "It cannot be done." I think it can. Try it in this way:—Do not use a purchased cut-out mount, but, rather, take a good mounting board of the shade you wish, and of any thickness up to "twelve-sheet" (the thicknesses are given always in sheets, although they may be pulp boards), and cut it to size and shape, but instead of cutting the bevil at the angle of from 45° to 75°, as is usually the case,—



make the bevil at a much more acute angle, say from 20° to 25° from the horizontal line,—



This, if skilfully done, will, it will be seen, thoroughly obviate the cast shadow given by the steeper bevils most usually adopted in the "manufactured shop mounts."

ORTHOCHROMATISM versus COLOUR SCREENS.

Like our old friend, "Free Lance," I have tried the interposition of coloured screens in almost all kinds of ways, but as I do not remember having seen some of the methods adopted put on record, they may be explained as being useful and easily accomplished, and probably they will

be new to many. There are now to be got in the market brown paper tubes of all sizes, but if they can not be easily got they are very simply made by pasting the paper round a mandril of the proper size and leaving it till dry. Make or get one just the size of the cap of the lens which is being used both in diameter and length, then take a piece of stout mounting board of rather larger size than the external diameter, and on this draw a circle slightly smaller, say one-fourth of an inch all round, which cut out and smooth on the inside edge of the opening, then square and glue the brown paper cap on this, keeping an equal margin all round. When dry, cut off and smooth the spare mounting board and smooth it off neatly, then give it a coat of dead size black, or stain it with ink, or blacken it in any other convenient way, and, when dry, having your sheet of coloured gelatine (this can be had in almost every colour) ready, slightly damp the annular ring which will be in front of the cap and press it on the gelatine, straining it so that it is left quite tight and flat. This will give a transparent cap for the lens of any desired colour to be used as a colour screen.

Another way, and a very handy one for experimental purposes, is to make a similar cap, but keeping the outside size of the mounting board considerably larger, in the shape of an oblong square, and on the top and bottom edges of this form with strips of mounting board, of the proper thickness, a rabbet and cheek kept sufficiently loose to allow pieces of coloured glass to slip along easily, just as lantern slides do. It will be easily seen that by this method any kind of transparent screen of coloured glass, or of plain plate glass, with collodion tinted to any shade by such of the coal tar dyes as are soluble in spirits of wine, can be used and experimented with.

The latter form of cap was found to be by far the handiest, as any and every shade can be tested with the ordinary plates as against orthochromatic ones for the same class of work. They have been so tested, and some day a careful note and analysis may be ventured upon for the benefit of your readers.

BICHROMATE POISONING AND DISEASE.

As an aid to the further knowledge of this, perhaps the record of a severe case, the particulars of which I personally was acquainted with, may be of some use. The late Mr. D— was a keen experimenter with the carbon printing process when first introduced, and as he was nothing if not thorough, he did every portion of the work with his own hands until he was master of the work. Unfortunately for him he was either a good subject for attack, or the insidious particles passed more easily through his skin than that of others similarly engaged, but so it was. He began to be troubled with what he thought to be psoriasis, but by consultation with his medical adviser he was induced to think it one of the forms of eczema, and underwent the usual course of treatment for this painful and annoying disease, but it was all of no effect. The drying of the skin, the bran-like scales, but not the red rash, were all there, but in many cases the scales were red and painful. It extended even to and over the eyes, and this continued for many months, till it, in addition to being unbearable, was thought to be incurable. Utterly incapacitated for business, he was early induced to try some of the German spas and baths, and while doing so consulted several of the most eminent physicians of that country, but with little effect, till one of them made a bold guess at the bichromate as the cause of the malady, and by judicious treatment for this he was ultimately cured. The bichromates were not then used so largely, or their qualities so well known. The case lasted over eighteen months.

W. H. DAVIES.

CAMERA CLUB CONFERENCE PAPERS. THE LIMITS OF PHOTOGRAVURE.

By A. DAWSON.

HAVING been desired to prepare a paper on photogravure—i.e., the production of intaglio plates in half tone (although line subjects and maps are equally photogravured)—I desire to respond to the best ability that other demands will permit.

I propose in this paper to keep to the artistic aspect of the question, and so doing rather to point out the limits of the science as I have so often encountered them. Others, I am aware, frequently take a sort of pride in the capabilities of the method; but when the demands of taste have to be met, it does not allow one much time to think of anything but how to enlarge our field of work, and how to increase our production without losing quality. Remembering that well-cut copper plates never gave the number of impressions that were desired by engravers, and that steel plates were introduced to remedy this defect—then remembering that photogravure plates are far weaker and shallower than even copper engraved plates—it will be seen that there was much to be done, and there still is much to be done, to make it perfect. I would suggest that the making of a fine photogravure in steel be kept in mind as the desideratum of the future.

Of course, we steel-face all plates nowadays, however engraved, so only that they are made of copper. But any one who has had to work a plate hard knows the grief of wearing the precious film of iron (or, as it is called, steel) away. This protecting coat is the only thing that makes photogravure a possibility for book work; and the wearing of it away is

the one great hindrance to the long endurance of the plates. Partly by reason of the action of solvents in removing it, partly by incipient wear when it gives way, the second coat of steel is found always a greater load for the plate to put up with than the first—lights are smoother and darks are more levelled down to one uniform shade. This power or endurance of the first coat of steel then becomes the real limit of the number of fine first-class prints obtainable. The art of making a really good and yet thin steel face carries a deal along with it. We generally reckon 500, but often 1000 are printed off one facing before it gives way.

It is rather hard to have to start in this tone, but it is really necessary to remove the common impression that once a copper plate is manufactured an infinite number of the finest impressions can be produced as a matter of course. It is a great mistake in the present condition of the art.

Let me now imagine a plate from Turner's *Liber Studiorum* before you, and I would say that, putting aside the enormous power of the bitten outlines, the mellow transparent tones are what we have to get. Remember that these plates are deeply cut into the copper by the mezzotint tool, which cuts sharper and deeper than holes made by chemical means. The result is that a transparent ink made with soft colour, such as bitumen or Vandyke brown, may be used instead of black and burnt umber. The result is that the deep plate gives a much softer and more glowing print than we do with our shallow chemical grains.

I do not think I can by all my power convey to an ordinary onlooker an idea of the great width and depth of the gulf that once separated the struggling processist from the technically perfect engraver in steel or copper. I feel sure that if the processist knew the length of the journey before him he would scarcely have desired to start on it.

But, instead of this, we found the first photogravure or the first relief photo block, swaggered about and shown all over the plate as a wonder and a thing to supersede the hand entirely. Now, although the automatic methods are at present very much to the fore, yet it is chiefly as rivals. Etching has made giant strides beyond all our early anticipations; scientific skill and cultured taste have placed wood engraving quite on the platform of a fine art. The result is that, although processing is a truculent and ever-watchful rival, it is kept in a limited field; and whether in relief or intaglio, I am quite sure that human mind and skill, having brought one branch out of nothing, will bring the other out of past shortcomings to future excellence undreamed of now.

The same spirit of swagger followed the first good results of photography, and what do we find now?—simply that it is a serviceable assistant to art; but no artist building up the feeling of a composition bit by bit, line by line, tone by tone, with centuries of work and the labour of great genius piled together on his mind, can ever get more than a suggestion from it. It is certain that the photograph is a useful help, but it is no substitute for art. So it is certain that photogravure is a useful means of producing prints—probably the best means devisable for making a high class facsimile; yet the artist is as careful as ever, and the man of science will wait upon the artist, and the artist will help the man of science. Thus the earlier idea of superseding and abolishing an old art must be given up, and a new idea of co-operation to a single end take its place.

I go through these points at some length because they are the result of my own laborious and energetic efforts to produce art by processing. Year after year the attack has been renewed, but though processing has advanced, it has been apparent that the goal advanced also; and that, though I could do things easily that the hand could never do so truly, yet that same hand guided by skill and taste did things that I could never catch up by my processing.

Perhaps the prettiest point in photogravure has been its power to render the texture of the surface of the picture or original. It is peculiar that in proportion as a copy without texture is employed, such as a silver print, so in proportion does it become difficult to make a plate that pleases the eye. If, however, instead of the silver print we use the negative from which it was printed, we get a much better result—chiefly in this case, I believe, because the print on paper is a defective original compared with the negative, its tones being less accurate, and its outlines being a little furred up by the fibres of the paper.

But if we make a plate from a rough wash drawing, it is quite pleasing to see the rough paper texture. Now take a silver print of this rough paper sketch, and it immediately looks poor in comparison. We now see that the photogravure is capable in things where the photograph is weak, but the photograph is strong in the brilliant, yet tender, reproduction of natural forms, portraits, &c., though its very smoothness and perfectness unfit it for many purposes of art reproduction. This being so, it will be well to push each art along the line that it has shown a power over, and not to strain too much after things that it cannot do.

(To be continued.)

SHAFTESBURY PHOTOGRAPHIC SOCIAL.—On Friday (this evening), at half-past eight, Mr. Baker will give a paper on *Lantern Slide Making*. Visitors invited.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The last ordinary meeting for the season will be held on Tuesday next, June 11, at eight p.m., at the Gallery, 5A, Pall Mall East, when matters of interest will be brought forward.

Foreign Notes and News.

THE Society for the Promotion of Photography in Berlin has recently been having a good deal of discussion about the origin of black rims in dry plates. According to Herr Stoll, the employment of soda as a finer was to some extent to blame, but he was more inclined to lay the trouble at the door of the paper in which the plates were packed. Herr Vogel attributed the cause to the action of sulphurous acid liberated by acids contained in the paper.

THE same speaker then proceeded to give an account of his experiments with paraphenyl diamine, which he did not find give as good results as its patentee claimed. Herr Stoll made the experience that the addition of small quantities of caustic alkalies improved the action, although clouding was easily produced thereby.

THE Berlin Society of Friends of Photography admits ladies as members, and at its recent general meeting elected by ballot four young ladies, all of whom are Berlin artists.

HERR SCHIRM, of Breslau, made some observations concerning the employment of the magnesium light. He says that it is inadvisable to have the tubes, through which the magnesium powder is blown, too long, as the powder is liable to remain hanging in them, and so to arrive too late in the flame. The best thing is to blow it in quite close to the flame. The flame itself ought to be as open as possible, as otherwise some of the powder passes off unburnt. An oxidising flame, particularly that of a Bunsen burner, works remarkably well. A very small amount of magnesium is required, 1½-2 centigrammes usually sufficing for each lamp.

HERR VOGEL exhibited some plates made by Dr. Baekeland, which on being immersed in water developed themselves, the substances required for the development (soda and hydroquinone) being spread on the back of the plate. As the front side of the plate often gets soiled with some of the preparation from the back, causing local reduction and injury of the photograph, Herr Vogel recommended that the developing substances should be employed in the form of bulbs or small cartridges.

THE same gentleman pointed out later that grey hydroquinone acts just as well as white, as the colouration is only superficial. He further drew attention to the fact that the new "permanent hydroquinone" of Dr. Byk occurred in commerce in yellow crystals, often containing traces of sulphurous acid, and that it may be employed with just as good results as the other.

THE teachers in the Photographic School of Hanover give at present an excellent example of devotion to the science, inasmuch as they fulfil the office of imparting instruction to a number of pupils and apprentices without any kind of remuneration.

THE recent meeting of the Silesian Society of Friends of Photography, which took place in Breslau, appears to have been illustrated by some rather interesting exhibits. Amongst other objects were displayed a very artistic and interesting collection of a large number of photographs of Italian antiquities—ruins, grottoes, &c.—taken in the open air with picturesque backgrounds; further, a collection of landscapes on platinum development paper, showing the great advantages of development paper over ordinary copying paper, especially as regards clearness and definition of the shadows; a very good series of flash-light impressions of subterranean buildings completed the exhibits.

A GERMAN tribunal has decided that in a case where an action was brought to restrain certain persons from reproducing a photograph by lithophany, such reproductions came under the category of graphic reproductions, and that consequently it was not permissible to reproduce pictures or photographs without the permission of the holder of the copyright. The defenders maintained that lithophany belonged to the plastic arts, and was, therefore, beyond the scope of the law respecting the issue of unauthorised counterfeits.

THE only photographic periodical in the Hungarian language, the *Fényképeseti Lapok*, published by Franz Veress, of Klansburg, finishes its seventh year with the present number, which contains an intimation that for lack of support it will hereafter cease to appear.

AN interesting communication has been made to the Société Française de Photographie by M. Grassin, of Boulogne-sur-Mer. He succeeded in developing an instantaneous plate which had been exposed more than two years previously, and found that during this long period it had not lost any of its quality.

RECENT PATENTS.

PATENTS COMPLETED.

IMPROVEMENTS IN AND RELATING TO PHOTOGRAPHIC SHUTTERS.

No. 6583. HARRY WILLIAMSON TEEB, 188, Camberwell-grove, Camberwell, Surrey.—May 3, 1888.

My invention relates to shutters for photographic cameras and the like, and to mechanism for actuating the same.

According to one part of my said invention, I provide a shutter for a photographic camera by means of which the amount of exposure given to the sensitive plate or film, or any part of it, can be easily and expeditiously regulated.

My said invention comprises moreover various other improvements hereinafter set forth.

In carrying my said invention into practice, I prefer to provide a shutter formed in two parts or portions, that is to say divided vertically in the centre of the same. The said shutter may be of a circular or other suitable form when closed, and is provided with any suitable joint where the two parts of the said shutter meet, so as to exclude the passage of light through the same. I provide moreover the said shutter with extensions or prolongations pivoted to any suitable part of the apparatus. The said extensions or prolongations of the shutter are fitted with pins or projections adapted to work in slots in a suitable plate arranged to slide in V grooves or in any suitable manner in guides also attached to any convenient part of the apparatus. The said slots are formed curved, so that the extremities of the same are in proximity to each other in the above-mentioned plate, and when the said pins are at either extremity of the said slots the shutter will be in a closed position. The said plate is also provided with a pin or projection adapted to engage in a slot in the extremity of a lever attached to a suitable spindle pivoted to any convenient part of the apparatus. This lever is provided with a spring, which acts upon the said lever so as to tend to keep the latter constantly depressed, that is to say in its closed position, and thus to maintain the hereinbefore-mentioned slotted plate normally at one end of its stroke, the pins or projections being at the upper extremities of the slots. The spindle of the said lever projects through the case of the apparatus, and is provided with a handle, by means of which the mechanism of the apparatus can be set or cocked, as hereinafter described. The said handle is moreover provided with a pointer adapted to indicate upon a suitable dial when the said mechanism is set or cocked. To set or cock the said mechanism, I provide a lever pivoted to a bracket attached to the guides carrying the hereinbefore-mentioned slotted plate. The said lever is provided with a suitable spring, and has a shoulder or projection adapted to engage with the hereinbefore-described pin or projection upon the slotted plate, and thus maintain the latter at the top of its stroke, and the pins or projections at the lower extremities of the said slots. The said lever is moreover provided with an extension arranged to act in connexion with any well-known pneumatic device, by means of which the said lever can be actuated so as to release the hereinbefore-mentioned pin or projection upon the slotted plate from the shoulder or projection upon the said lever, and allow the said slotted plate to descend to the bottom of its stroke. During the descent of the said slotted plate the parts of the shutter are opened by the pins upon the extensions of the said shutter passing round the hereinbefore-described curved slots, the shutter being completely open when the pins are at the greatest distance apart in the said slots. Instead of employing a pneumatic device to actuate the hereinbefore-described lever, I sometimes cause the extremity of the said lever, or an attachment to any part of the said lever, to extend through the case of the apparatus so that the slotted plate can be released by operating the same.

In some instances moreover I provide a time limit, so that the duration of the exposure can be regulated to last for any predetermined length of time. To accomplish this object, I provide a suitable train of clockwork mechanism, which can be wound from the outside of the apparatus by means of a convenient handle, a pointer being also provided to indicate upon a suitable dial the duration of the exposure.

I moreover provide means for starting the said time limit, comprising a lever arranged to be actuated by the slotted side when the latter is at the beginning of its stroke. The said lever is thus caused to bear against a spring or pawl and cause the latter to engage with a toothed ratchet or other wheel and thus allow the time limit to be employed. Underneath the hereinbefore-described lever engaging with the pin or projection upon the slotted plate, and pivoted to the same bracket attached to the guides of the latter is another lever, or inside lever, provided with a pin or projection bearing against the first-mentioned upper or outside lever, and with a suitable spring adapted to cause the said lever to follow the movement of the said upper or outside lever. The said lower or inside lever has at its lower extremity a projection or hook adapted to engage with the hereinbefore-mentioned pin or projection upon the slotted plate, and retain the same in such a position that the pins or projections upon the extensions of the shutter are at the greatest distance apart in the said slots, and therefore the said shutter is in its open position. The said shutter is retained in this position until the time limit (which has been released by the partial descent of the slotted plate, releasing the lever and pawl hereinbefore mentioned) unlocks the said inner lever by a projection upon the said toothed or ratchet wheel, or any suitable toothed or other wheel of the clockwork mechanism impinging against an extension of the said inner lever and tilting the same, when the shutter instantly closes. Or the said shutter can be closed at any time during the operation of the said time limit by releasing the upper or outer lever.

I prefer to employ moreover a suitable catch adapted to engage with the hereinbefore-described pointer, and thus lock the said time limit and prevent it from operating when not required. I can, however, employ any other convenient means for this purpose.

When the said time limit is locked, by setting or cocking the hereinbefore-described mechanism, the shutter can be opened and retained in that position at will by actuating the pneumatic device, or by operating the mechanism by hand.

I sometimes moreover provide a cam capable of being moved from the outside of the case of the apparatus and adapted to bear against the hereinbefore-mentioned pin or projection upon the inner lever, and thus actuate both the

inner and outer levers. The shutter is thus opened and will remain in that position until the said cam is again moved out of gear with the said pin or projection.

The above-described shutter can be placed either before or behind the lens or lenses, or it may in cases where a combination of lenses are employed be placed between the said lenses.

Moreover, in some instances I provide a hood or screen, composed of any suitable substance, so as to give a greater proportion of light to one part of the sensitive plate or tissue than to another; as, for example, to give the full amount of exposure to the foreground, but a less proportion to the sky. To effect the above object, I prefer to place a hood or screen, of such a form or shape in the passage of the light as to abstract the required proportion of the rays travelling to any part of the said sensitive plate or tissue. The sky may be thus deprived of any required proportion of light in a uniform or varying degree. The above-described hood or screen is placed either in front or behind the lens, and is so arranged as to be capable of adjustment to any extent required. Either one or more of the said hoods or screens can be employed.

Although I have hereinbefore described a convenient and advantageous method of carrying my said invention into practice, it is obvious that I can modify the construction of my apparatus without, however, in any way departing from the nature of my said invention; and, moreover, that a portion of my said invention, that is to say, the hereinbefore-described mechanism for instantaneously opening and closing a photographic shutter, the time limit, the means for retaining the said shutter open at will, and the hereinbefore-described hood, are applicable to drop shutters, revolving shutters, hinge shutters, or photographic shutters of any other description.

IMPROVEMENTS IN PORTABLE PHOTOGRAPHIC CAMERAS.

No. 9327. PETER CHARLES, 26 and 27, Milk-street, Cheapside.—
June 26, 1888.

THIS invention relates to improvements in portable cameras intended for use in instantaneous photography, but also applicable for employment where a long exposure is allowed. A camera constructed according to this invention is specially adapted to fulfil the requirements of detectives.

The body of the improved camera consists of a rectangular box, having in front a screened aperture for the reception of the lens, and provided at the top and bottom with sliding lids for the admission of unexposed plates and the withdrawal of plates that may have already been exposed. The said rectangular box is formed with a central horizontal partition, over which slides a receptacle containing two compartments arranged one above the other, the said horizontal partition forming the division between these two compartments. The upper compartment is adapted to contain a series of unexposed plates arranged parallel with and in close proximity to and behind one another. Each plate is backed by a darkened sheet, or may, if preferred, be mounted in a frame provided with a darkened back; these sheets or frames being by preference of metal, and serving as screens to prevent the passage of light. Each plate, after exposure, is permitted to fall, through a slot in the said horizontal partition, into the lower of the two compartments, the plate receptacle; the said slot being normally covered by a spring-actuated slide operated when it is desired to permit an exposed plate to fall by means of an external hand lever. The sides of the plate receptacle are formed with a series of grooves for the reception of the several plates; the lid of the same is likewise grooved, the top of each of the plates lying within one of the grooves, the passage of luminous rays to any unexposed plate or plates being hereby further prevented. The plate receptacle is fitted at the bottom with a rack engaging with a pinion mounted in the body of the camera. The pinion is turned by means of an external button or finger-piece, the plate receptacle being thus caused to slide within the body of the camera in either direction, according to whether it is desired to charge or empty the same, or to bring the unexposed plates successively into the proper position for exposure. The latter end is easily accomplished by forcing in turn each unexposed plate against a suitable stop or stops provided for the purpose. An indicator is fitted at the side of the camera for denoting the number of unexposed plates remaining within the plate receptacle.

The lens, if moveable, may be actuated by means of rack and pinion mechanism. In its normal position it is arranged so that all objects beyond a given distance, say twenty feet, may be in proper focus. When the lens is adjustable an indicator is preferably provided outside the body of the camera in order to show the proper positions for different distances.

A revolving shutter is employed, rotating, by preference, behind the lens and mounted upon a horizontal spindle formed or provided with a pinion adapted to engage with a toothed driving wheel driven by a coiled spring. The latter is wound, as occasion may require, from outside the case by means of a key or handle. The shutter is held and prevented from moving until the proper time by a pivoted catch operated by means of an external finger-piece. The said pivoted catch is preferably furnished with a tail-piece adapted to engage with the shutter after the latter has rotated the requisite distance; the said tail-piece being disengaged and the catch again thrown into action when the finger-piece is returned into the normal position. Brake mechanism is employed for the purpose of regulating the speed at which the revolving shutter is permitted to rotate. Such mechanism may comprise a leather disc mounted on a shaft carrying a pinion engaging with the toothed driving wheel, a spring bearing against the said disc. The pressure exerted by the said spring may be regulated by means of a cam or a screw, an indicator being provided on the cam shaft or on the screw, in order that the brake mechanism may be adjusted to permit the shutter to revolve at the proper speed. For a slow exposure a special and independent catch is provided, which, when in operation, holds the shutter in such a position that the aperture, or one of the apertures therein, is immediately behind the lens.

The camera is furnished with suitable view-finders, and means are provided for enabling legs or supports to be attached when desired.

The claims are:—1. The improved construction of a portable photographic camera arranged and operating substantially as set forth.—2. In a photographic camera, the employment of a revolving shutter actuated by a coiled spring adapted for the storage of sufficient power to operate the shutter repeatedly, according to the number of plates to be exposed.—3. In a photographic camera,

a shutter arranged to revolve in one direction only, and driven by a coiled spring, the rotary movement of the shutter being controlled by a catch, substantially as set forth.—4. In a photographic camera, a revolving shutter provided with brake mechanism for enabling the speed of rotation to be regulated, substantially as described.—5. In a photographic camera, the combination, with a spring-driven shutter arranged to give a series of successive exposures, of a plate receptacle containing a series of plates for successive use, substantially as set forth.

IMPROVEMENTS IN MAGIC LANTERN SLIDES.

No. 3340. WILLIAM CHARLES HUGHES, Brewster-house, 82, Mortimer-road, De Beauvoir-town, N.—March 5, 1889.

MY invention has for its object the covering of the edges of magic lantern slides and the like with thin sheet copper, brass, or other ductile or malleable metal, in such a manner as to more perfectly protect the edges of said magic lantern slides than if covered in gummed paper or braid, as heretofore, which is liable to get roughed up and broken away after a little use.

In carrying out my invention I may either use a narrow strip of suitable metal of troughed or channelled shape, with pieces cut out at intervals corresponding with the width of the slide to be covered, thus allowing it to be bent round the edge of the said slide without creasing, or I may take a square piece of sheet metal and cut therein a central hole of the size required, and at a pre-determined distance from said aperture turn up the edge of the metal all round, previously cutting the four corners in such a manner that the edges of the sheet metal can be pressed over the edges of the slide without creasing.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 11.....	Great Britain	54, Pall Mall East.
" 11.....	Bradford.....	55, North Parade.
" 11.....	Derby	Society's Rooms, 3, Derwent-street.
" 11.....	Manchester Amateur	Manchester Athenæum.
" 11.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 12.....	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 13.....	Birkenhead	Free Public Library, Hamilton-st.
" 13.....	Manchester Photo. Society	36, George-street.
" 13.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 30.—Mr. T. Kerr in the chair.

The Hon. SECRETARY announced that he had been trying Dr. Liesegang's Pizzighelli platinum paper, and he exhibited results which he had obtained by half an hour's exposure to sunlight under a negative; he had found the printing to be quicker than with some other papers of the class which he had tried; the pictures were flatter than ordinary albumenised prints from the same negatives.

Mr. F. P. CEMBRANO had worked platinum processes extensively, and, by direct comparison of results, had found the old processes by development to be superior to the new ones in which the photographs are printed out.

Mr. A. COWAN stated, as already published, that he had found bromide of ammonium in the quinol developer to produce a yellow stain in the negatives.

Mr. CEMBRANO said that under-exposed plates gave a yellow stain with quinol.

The Hon. Secretary exhibited a silver print on tissue paper; it was five or six years old, and presented no signs of fading.

Mr. W. E. DEBENHAM always washed his silver prints in several alternate changes of hot and cold water; the hot water was as warm as the hand could comfortably bear.

Mr. H. D. ATKINSON asked how in photographing from the top of the Eiffel Tower the lines of buildings could be kept vertical.

Mr. DEBENHAM replied that if the plate were kept vertical the lines were bound to be vertical.

Mr. CEMBRANO wished to know whether cloud negatives taken at the seaside required less exposure than cloud negatives taken far inland, all other conditions being equal; he had reason to suspect that such was the fact.

Mr. COWAN suggested that the sea might reflect light upwards.

Mr. W. H. HARRISON remarked that inland there might be more floating dust in the air, and that would tend to cut off the violet more than the less refrangible rays of the spectrum.

Mr. CEMBRANO had found that immediately after sunset the exposures must be increased enormously to get cloud negatives; with extra rapid plates he had given exposures of eight seconds with an *f*/64 stop.

UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

MAY 28.

A paper was read by Mr. J. T. LEON, B.Sc., F.C.S., on *Direct Printing Processes*. The author began by giving a short description of the Daguerreo-type process, and showed some exceedingly beautiful examples. The Calotype process of Fox Talbot was then described, consisting of taking a picture on paper coated with iodide of silver and washed over with gallic acid, and finally developing in a similar solution of gallic acid. This process has much to recommend it even in the present day, on account of the few solutions and apparatus required, and especially in hot climates. The next method described was the preparation and printing of ordinary albumenised papers. The necessity of having free silver nitrate in the paper was shown, and also the use of the organic compound. Prints were shown on a matt gelatine paper, and the

author recommended matt-surface papers from an artistic point of view. The operation of toning was then discussed. The author considered that the object of a toning bath is first of all to bring the gold as near to reduction to the metallic state as possible. This causes the attraction of the silver, or subchloride of silver, as the case may be, to chlorine to be greater than the attraction of the gold; therefore gold is deposited instead of silver, and silver chloride is formed. This chloride is finally all removed in the fixing bath. In his *Treatise on Photography*, Captain Abney gives various complicated reactions for toning with various baths, and those in the case of the acetate bath were given as an example. The author considered these to be quite unnecessary according to the simple theory given above, and also thought it most probable that the salts mixed with the gold chloride only tended to prevent the bath getting acid, though he considered this the only point upon which one could not speak with certainty. Toning with platinum was then mentioned, and prints shown toned with platinum, according to the method described by Mr. Lyonel Clark in *THE BRITISH JOURNAL OF PHOTOGRAPHY* for April 12 last. This method was much recommended. Printing with salts of iron was then discussed. The action of light on ferric salts is to reduce them to the ferrous state. Cyanotype—the method of printing a positive from a positive—was then described. If printed from a line drawing, the first of these would give blue lines on a white ground, and the second white lines on a blue ground. The difference is easily understood if it be remembered that ferrous salts give a blue precipitate with ferricyanide, whereas ferric salts only give a blue precipitate with ferrocyanide of potassium. The only other substance mentioned was uranium, the uranic salts being reduced to uranous by light, which may be developed by ferricyanide of potassium, and also gold, silver, and platinum. Examples of each were shown. Paper coated with salts of iron and exposed to light can also be developed by any of these means, as in the platinotype process.

On Saturday, June 1, the Society made an excursion to Epping Forest.

At the next meeting, Tuesday, June 11, Mr. E. S. Warrall will open a discussion on *Exposures*.

MANCHESTER PHOTOGRAPHIC SOCIETY.

ABOUT twenty members and friends of the above Society spent a very enjoyable afternoon at Gawsworth on Saturday afternoon last. Leaving Manchester by the one o'clock train, Macclesfield was reached at fourteen minutes to two, where a large brake awaited the party. A pleasant drive of over three miles brought them to that photographic gem, the old Perpendicular Church of St. James's, Gawsworth. Cameras were soon at work, both on the interior and the exterior, and the fine old Rectory and the old Hall each had their full share of attention. After tea, at the Harrington Arms, the return to Macclesfield by a fresh route was accomplished, and the party landed in Manchester, completing one of the pleasantest trips of the season.

BATH PHOTOGRAPHIC SOCIETY.

MAY 29.—Mr. Philip Braham, F.C.S., presided.

Mr. F. W. Simpson was elected a member of the Society.

The pictures taken at the outdoor meetings of April 25 and May 23 were then shown. The first outing was at Farleigh Castle, a pleasant ride of nine miles from Bath. The old chapel, ruined gateway, and various other spots were photographed from different points of vantage. The second outing was to St. Catherine's Court, a beautiful house and grounds, part of an old monastery in the picturesque valley of St. Catherine's. The results were highly satisfactory. That the Society is making rapid progress may be judged from the fact that about two dozen members attended the outdoor meeting, and the Bath society paper, *Blatant*, in noticing the work done, remarked on the great success of the undertaking in Bath.

The Hon. Secretary showed his negatives of Farleigh Castle treated with different developers—hydroquinone, pyro and ammonia, potash, soda. The general feeling was in favour of potash.

Mr. W. M. Ashman also exhibited, on behalf of Captain Molesworth, a series of 10 x 8 negatives depicting scenery and life in India.

A framed portrait on opal of Mr. C. H. Talbot was next presented to the members by Mr. Friese Greene. The original negative was said to have been taken unawares by the electric light.

A vote of thanks having been passed, Mr. GREENE showed a sample of his new process for producing prints rapidly on an impermeable surface, and, in reply to a question, stated that the novelty consisted in preparing a suitable surface upon which chemicals would not act; all other details were the same as for bromide printing. He recommended, in printing without retouching, the interposition of talc.

Mr. ASHMAN (Hon. Secretary) then read his paper, entitled *The Emulsion Processes of Photography* [see page 376]. The delivery was accompanied by a series of experiments showing the method of compounding emulsions. Mr. Ashman also showed examples of various emulsion work on opal and paper, describing the qualities to be sought after. He also drew attention to the perfect manner in which small opals could be printed from any sized negative by means of Mr. Offord's frame.

A discussion followed, in which the Chairman, Messrs. Harbutt, Pitman, Friese Greene, and Walter Pitt took part.

The CHAIRMAN, in conveying the thanks of the meeting to Mr. Ashman, impressed upon experimenters the importance of noting all results at the time, and not by any chance to trust to memory alone, for years after making an experiment something might crop up by which the notes would be of great interest.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

MAY 30.—The President (Mr. W. A. Beer) in the chair.

Messrs. H. W. Guthrie and H. S. Nicklin were elected members.

The HON. SECRETARY read a letter from the Hon. Secretary of the Photographic Club (Mr. Edward Dunmore), recommending the adoption of the metric system. He also exhibited Talbot and Eamer's dark slide, and distributed

samples of Schözig's sensitised paper. He also acknowledged a gift to the library of six volumes from Mr. Beer, the President.

The PRESIDENT read a letter from the Secretary to the Royal Infirmary, acknowledging in grateful terms the gift by the Association of a large number of spare prints. He then referred to the resignation of the present Hon. Secretary (Mr. W. A. Watts), owing to business engagements, at which he expressed great regret.

Mr. HUGHES reported on the excursion to Rossett, which was fortunate both in numbers and weather; Mr. J. EARR reported on the one to New Brighton; and Mr. BEER reported on Bakewell and Haddon Hall, as to which he remarked, "That it was moist when we started, the noontide was moist, and it was moist at night."

Mr. Wilkinsons exhibited some prints by Blanchard's process, and Mr. ARCHER showed and explained a new American detective camera, the most important feature about which is its very moderate price.

Dr. G. A. KENYON then gave his paper and demonstration on *Film Photography*, in the course of which he remarked that there were three types of film—Eastman, Vergara, and celluloid. As regards the Eastman, the result left nothing to be desired, but the necessary work was somewhat laborious. The source of most failures in stripping he attributed to want of perfectly clean glass; he advised the use of Chance's patent plate, simply giving a thorough rinsing under the tap and leaving to dry spontaneously; he also advised the use of French chalk and the Eastman rubber solution. He exhibited stripping films in various stages and successfully stripped one which had been on the glass for two years. The ferrous oxalate developed films strip more easily than those developed with pyro, which tends to render the gelatine insoluble. The Vergara film he described as rather slow and requiring a special slide, otherwise no difficulty in working it. The Carbutt celluloid film was simply perfect; worked in all respects like a glass plate. The Fry celluloid he thought slower, but there was more difficulty with it than with Kingston plates.

All communications for the Hon. Secretary should be addressed in future to Mr. W. Hughes, 7, Crescent-chambers, N., 3, Lord-street, Liverpool.

BURNLEY PHOTOGRAPHIC SOCIETY.

MAY 29.—Dr. Brumwell (Vice-President) in the chair.

Mr. W. SUTCLIFFE gave a description of his visit to Scarborough last autumn. His first care was to be provided with a sufficiently strong camera to bear the strain of the equinoctial gales which occasionally endanger the stability of photographic apparatus. He gave a very humorous account of a mishap to his camera caused by a sudden gust of wind. Referring to the leading features of the scenery at Scarborough and the neighbourhood, Mr. Sutcliffe pointed out the various places where good photographic pictures may be taken. The paper was illustrated by a number of choice pictures taken under great difficulties. Some of the marine subjects were remarkably good. Several practical hints were also given in regard to the exposure and development of plates.

DERBY PHOTOGRAPHIC SOCIETY.

THE members of the above Society held their fortnightly outdoor meeting on Saturday last, when, by the kind permission of Mrs. Herriek, they visited Beaumanor. At Loughborough Station they were joined by the members of the Loughborough and Leicester Societies. The day was beautifully fine, and about one hundred and twenty-five plates were exposed on the Manor, old coach, and other objects of interest in the neighbourhood.

CINCINNATI CAMERA CLUB.

MAY 6.—Mr. George Bullock (President) in the chair.

One new member was elected.

A motion prevailed as to the sense of the Club that its interests would be best subserved by a declination of prizes of money value to members for work done on the annual excursion. A suggestion was adopted that the Excursion Committee offer diplomas for two or more grades of work done on the annual excursion, and that prints of the same be framed and hung in the Club rooms, with proper mention.

Mr. BULLOCK, after addressing the Committee on the work expected of them, read a paper on composition generally, and the duties of the Exhibition Committee specifically, especially with reference to lantern slides.

The reports of Treasurer and Librarian showed the Club to be in general good condition, forty-five new members received during the year, making a total to date of one hundred and thirteen.

MAY 20.—The President in the chair.

Two members were elected.

Mr. KELLEY read a paper following the papers of Messrs. Johnson and Bullock at previous meetings. Mr. Bullock had maintained that general interest in the picture should determine whether it should be publicly exhibited. Mr. Kelley, not ignoring the interesting, thought that selections should be governed by the technical and general excellence of the photograph as well. These papers provoked a good-natured and desirable discussion.

Dr. LE BOUTILLIER followed, advancing the merit of pictures with life in them, because they were apt to meet applause.

Mr. FISHER advanced novelty as a very desirable feature.

Mr. PECK beretically advanced the view that, as we cannot all be great artists, if the photograph is good and the maker and his friends are satisfied with it, it ought to be accepted.

Mr. JOHNSON, not disputing any one, thought that the exhibition each year should show study and improvement as to general excellence.

The CHAIRMAN of the Exhibition Committee gave assurance that each and all the ideas advanced would be considered in their selections.

The Chicago slides were shown at the close of the discussion, following which Mr. Prince gave practical demonstrations with positive films. Mr. Bullock also showed samples of his work with same.

PACIFIC COAST AMATEUR PHOTOGRAPHIC ASSOCIATION.

MAY 9.—President E. M. Runyon occupied the chair.

The Committee on the exhibition of *Illustrated Boston* made an interesting report. Over seven hundred people had filled the hall of the Association of Californian Pioneers, and as there were many Bostonians present, scenes familiar to them were greeted with applause.

The Committee on the preparation of the slides and the paper to illustrate and describe *Glimpses of California* reported some progress. The work had been completely mapped out, and so soon as gentlemen having certain negatives would send in slides and prints of them the collection would be completed, and the lecture ready for delivery. Negatives of those subjects not possessed by the Society were being made. In one instance a gentleman had volunteered to secure a negative of the San Diego Mission, the first settlement of the Spanish missionaries in California. This offer will be appreciated when it is understood that to do this means a trip of five hundred miles.

At the conclusion of the business of the evening, Dr. MAX BOELTE prefaced the exhibition of Dr. Piffard's new dark-room lamp by remarks upon the various experiments of Barton, Vogel, and others, towards securing a safe light for the dark room. Various negatives were exhibited which had been developed after long exposure to the flame of the lamp. They were without trace of fog, while other negatives exposed under similar circumstances to other dark-room lights were quite badly fogged. The construction of the lamp is very simple, consisting of a Bunsen burner, around the tube of which and projecting at the top is placed a cylinder of asbestos and sodium. The supply of air is regulated by a simple valve underneath, until the flame is seen to be entirely non-actinic or free from blue rays. To improve the lamp, and for further protection, an amber-coloured chimney is used. To those amateurs fortunate enough to have gas in their dark rooms this lamp will be a blessing. The Doctor also exhibited the Piffard flash lamp. It somewhat resembles an Argand burner in appearance. The principle is so simple that one wonders it has not suggested itself to every one making flash-light pictures. An air-pressure bulb is attached by a rubber tube to a cylinder. In this cylinder is placed a piston containing a lighted punk. Over it is a stand holding the magnesium powder spread on gun-cotton. A pressure on the bulb forces the lighted punk into contact with the cotton, and complete ignition of the powder results.

To conclude the evening, a number of interesting foreign slides, belonging to a private collection, were thrown on the screen.

Correspondence.

SUBSTITUTE FOR SOFT WATER.

To the Editor.

SIR,—In re "Foreign Notes," *et seq.*, 21th May issue. As a result of an experiment, I have been using water I prepared by dissolving one grain of commercial carbonate of potash to each ounce of pipe (hard) water from Kent Waterworks, letting it settle for three or four hours, and filtering it, after decanting it, through a plug of cotton wool pushed into the neck of a glass filter. If wanted in a hurry it can be filtered directly after a good shake up, but then first through a piece of sponge in place of the cotton wool, and after through the cotton wool. I take it the result of the adding the potassic carbonate to the hard water is partly mechanical (similar to Dr. Clark's process of softening water) and partly a chemical reaction, leaving an excess of K_2CO_3 . The water thus prepared takes the developer well. Testing it with soap, it lathers well. The nitrate of silver test for hard water when applied gives a thick deposit after standing twelve hours, and the water in the test tube, when a piece of plain paper is put in, gives no result by colouration. This test, however, is of no value, I take it, under these circumstances.

Now, as to the remark on p. 243, that "with hydroquinone ammonia appears unsuitable." Although I have not used ammonia for years, still I know the two first hydroquinone negatives I took in 1883 was with five grains hydroquinone, five minims ammonia 840, and five ounces water. The printing quality was all one could wish, the detail perfect, and the one of the two I have kept remains unaltered to this day. Of course this is not a keeping formula, for which I subsequently experimented, and which I have now obtained.—I am, yours, &c., W. T. F. M. LNOALL.

A NEW SHUTTER.

To the Editor.

SIR,—In offering your readers details of the mechanism of this shutter, I regret that without sectional drawings I cannot do so as fully as I could wish. It comprises all that Messrs. Reynolds & Co. claim for theirs, and embodies in it also the obturator of M. Guerry & Co., of Paris, with the addition of a disc on one side, to set the shutter to the proper inclination seen on the smaller shutters, with lines and pointer, thus giving the angle to the hook with clamping wheel attached, at which it is to be set on the notched trigger, so as to allow extra exposure to the foreground and a shorter one to the sky. The trigger holding the shutter captive, when the bulb is pressed sharply the flap is raised to a horizontal position and the shutter falls.

The novelty consists in being able to regulate the exposure, and so equalise and harmonise it (the exposure) to the foreground and sky. When the drop shutter is not in use it is still possible to use the trigger for regulating the exposure, or, by fixing the trigger down with the hook, to simply use the flap as such, with the obturator or stop-cock.

Thus there are three shutters in one, each with a perfect movement under the will of the operator.—I am, yours, &c., HARDING WARNER.

SHUTTER SUBJECTS.

To the Editor.

SIR,—I read the Benchers have kindly thrown open the Inner Temple Gardens to children, and that of the hundreds who pour in are many little ones from the narrow courts and alleys of the neighbourhood, who are minus coat, hat, shoes, or stockings.

Oh, London amateurs with quick plates and quick shutters, what an opportunity of subject is given you here! I envy you! Surely the opportunity will be greatly used, and surely the Benchers will have copies given to them.—I am, yours, &c., WILLIAM ADCOCK, Melton Mowbray.

THE EFFECT OF ELECTRICITY ON DRY PLATES.

To the Editor.

SIR,—In reference to the remarks in Mr. F. C. Beach's article (in your issue of May 24) respecting my experiments on electric action on dry plates, I may say that although daylight was almost perfectly excluded from the laboratory, a ruby lamp was alight during the experiments, but was usually turned with its dark side towards the plates while the electric discharges were taking place on them, and was sometimes placed behind a screen. I have been careful to avoid saying positively that I believed part of the effect was due to some cause other than the visible light of the spark, but I am inclined to think so. Consider the experiments where a discharge on the uncoated side of the plate produces by induction through the glass and the film peculiar and well-defined markings on the outside surface of the film opposite it; also those where the electrified foil was separated from the film by four thicknesses of gutta serena tissue, and yet left its mark on development. There may have been luminous action. But what is luminous action?

It was my difficulty in imagining what might be the immediate cause of the production of a latent image here that led to the remark, "Possibly further investigation may show that we have here a new kind of experimental evidence on the relation of electricity to light."—I am, yours, &c., Edenderry House, Belfast, June 3, 1889. J. BROWN.

THE TWO PHOTOGRAPHIC JUBILEE EXHIBITIONS IN BERLIN.

To the Editor.

SIR,—In the issue of May 31, p. 363, of your valuable JOURNAL, I read under "Foreign Notes" a communication respecting Berlin photographic societies and the intended Jubilee exhibitions here, which contains some errors you will allow me to rectify.

At first I may mention that I am not President of the German Photographic Society, whose centre is Weimar. In Berlin there are now three photographic societies—the Photographischer Verein (Photographic Union), the Society for the Advancement of Photography, and the German Society of Photographic Amateurs. I am President of both the last-mentioned societies. Exhibitions for this season are intended by the Photographic Union (President, Dr. Stolze), and the German Society of Photographic Amateurs. You will observe from that, that your contributor is wrong, if he says that the two societies have "similar objects and aspirations, and similar names."

Each of the societies has resolved, independently of the other, to make an exhibition this season, and whereas there does not exist an intimate connexion between the Society of Amateurs and the other Society (containing professional photographers, manufacturers, and stock dealers in general), and whereas the programme of the Photographic Union and the programme of the Society of Amateurs were quite different, the two societies have worked separately. Perhaps this appears still less surprising if I mention that in the past year, in Vienna, have been placed also two photographic exhibitions in the meantime—one of a more technical character, and another by the Society of Amateurs.

Even there is no *deus ex machina* here, who intends to unite the two societies or their exhibitions by high order. Minister Gossler had granted to the Society of Amateurs a room for the exhibition, but he was obliged to rescind this, because the annual art exhibition wanted the rooms. Minister Gossler made at first the condition to unite both exhibitions, if he would be requested to grant other rooms in his authority; but afterwards he declared to me personally that he had not known the very marked difference between both societies and their programmes.

In the meantime the minister of war has granted to the Amateur Society (which has a great many officers amongst its members), for its exhibition, the magnificent rooms of the Royal Académie of War, pretty near up the Linden, and the exhibition will be opened on the 19th of August—the birthday of photography.—I am, yours, &c., Berlin, May 2, 1889. DR. H. W. VOOGL.

A VERY convenient mode of mounting stereoscopic prints has been adopted by Mr. J. A. Forrest, of Liverpool. A neat morocco folding mount has inside, and at either side of the central fold, the two halves of the binocular picture. When opened out, it is ready for the stereoscope; when folded, it is an elegant case. This, if manufactured for the public, ought to take well.

Exchange Column.

- A couch-end posing chair for one of different pattern.—Address, H. HAWKINS, 60, Evelyn-street, Deptford, S.E.
 Will exchange 10x8 bellows camera and studio stand for whole-plate portable camera. Address, HANSEN, Gibson-street, Oakes, Huddersfield.
 Will exchange a half-plate burnisher and half-plate camera for a whole-plate burnisher.—Address, J. MEADOWCROFT, Photographer, Hilson-road, Nelson.
 Will exchange a five-inch double condenser in pe feet order for a half-plate portable camera and three double slides.—Address, CHARLES MANTELL, Thurning Rectory, Oundle.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED:—

- J. Thomson, Liverpool.—One photograph of Cunard Royal Mail ss. "Unabria."
 F. M. Ratcliffe, Whitby.—One photograph entitled "Black and White."
 J. Paton, Greenock.—Photograph of Inman Line steamer "City of Paris."

- PRETSCHE.—See leading article in the present number.
 PHOTOFEL.—Wyleys & Co. Received. We are giving it a trial.
 FLORENCE.—We shall gladly welcome the views of which you speak.
 HAROLD R. HARTK.—On application to Mr. Harold Baker, Birmingham, you will doubtless obtain the necessary permission.
 INQUIRER.—Collotype is not a patented process, therefore you are free to work it to your heart's content, your friend's dictum notwithstanding.
 P. S.—You had better write to the City and Guilds of London Institute, London, S.W. You will then receive full particulars of how to proceed.
 R. H. ELDER.—You will not experience any trouble in photographing in Brittany. Special care must, however, be taken to abstain from photographing fortifications.
 JOHN COX.—Soak the negative in a solution of two grains of iodine to the ounce of alcohol until the stains become of a pale tint, then put the plate in the fixing bath for a few minutes.
 S. A. J.—We cannot tell you how Mr. Blanchard's paper "is prepared in the first instance," as that gentleman has not published the formula. He supplies the paper ready for use.
 MERICIA.—Large slabs of vulcanite can be obtained from the India-rubber, Gutta-percha, and Telegraph Works Company, Cannon-street, E.C. We believe they also supply a cement for the material.
 ASSISTANT.—Your late employer is not bound to give you a reference. If the facts are as you state, his withholding one is a great hardship to you, and certainly does not redound to his credit. Such petty spite is contemptible.
 W. W. W.—By all means employ a bi-lens camera for stereoscopic portraits. A shifting front will enable you to get the same stereoscopic effect, but the convenience of securing the two pictures simultaneously cannot well be over-estimated.
 AJAX.—1. It is quite a matter of taste; most professional photographers, however, prefer wood.—2. Secure the cards tightly in a vice or screw press and take off the corners with a plane, then finish with a scraper. Some little practice will be necessary to do the work neatly.
 CRANUS writes: "Will you kindly give the formula for paint used for working up carbon and other prints in black and white that will not change colour?"—Ordinary water colours blended to match the tint of the picture, whatever that may be, avoiding the use of lakes, which are all more or less fugitive.
 S. CRAIG.—You would have no difficulty in obtaining a patent for the apparatus, but you would have great difficulty in maintaining it in a court of law. The same or very similar contrivances have been in use for the last thirty years, and, if we are not mistaken, have formed the subject of more than one patent.
 M. DAVIES.—If you wish to make good lantern slides you should avoid the use of extra rapid plates, as they are not at all adapted to the purpose. Very slow plates, as a rule, are much better. Why do you not employ the plates that are specially prepared for lantern transparencies? They yield the best result of all.
 W. J.—If the ink comes off the mounts when the prints are rolled or burnished it is clear that it is faulty, and you have a good cause of complaint against the one who supplied the cards. However, the ink will probably dry with time. Spread the mounts out and leave them exposed to the air in a warm room for a few days.
 BORE.—It is impossible to say the cause of the spots on the print sent from a casual examination. They may proceed from something in the manipulation, say, particles of floating matter settling on the picture while it is wet, and so inducing an incipient fading, or from something in the mountant used, or possibly from the mount itself.
 R. BILLINGWOOD.—The old-fashioned single landscape lens was, as you say, an unwieldy instrument and gave distorted lines, and you may "wonder they ever used such a thing." But you will perhaps be surprised to learn that no better lens is yet in existence for pure landscape photography. Many of our best artists take all their landscapes with single lenses. Your sneers at single lenses are a little out of place, as you will find when you have gained more experience.
 CANTAR.—The cold is produced by the act of dissolving the nitrate of ammonia. If the vessel in which solution takes place be kept carefully covered by a jacket of non-conducting material, such as a few thicknesses of felt, then will the liquid be kept in a cold condition for a considerable period. When its temperature rises to that of the atmosphere its virtue is gone, only to be reascited by recrystallising the salt and redissolving it. The proportions suitable for producing the best effect are stated to be equal parts of water and nitrate of ammonia. The water should be the coldest that can be easily procured.

B. A. ROME asks who are the proper parties to apply to for permission to take photographs at the Crystal Palace.—Messrs. Negretti & Zambra have the sole right to photograph in the Palace and grounds, and they, we believe, will not grant permission to any one. However, you might write to them, they are the only ones who can grant you permission.

J. B. KEEN complains that all the negatives he takes with one of his lenses are thin and without detail at the corners, although it was sold for the size plate for which it is used. It is, he says, a portrait lens without a name.—The fault is, no doubt, with the lens. Many portrait lenses will not cover the size plate they are said to do. Better get a lens of longer focus.

COLESWORTH.—If you have been making your own varnish successfully for six or eight years you ought to meet with no difficulty in continuing to do so. Possibly you have obtained some indifferent resins. We should advise you to get some fresh from a different source. Unbleached shellac simply dissolved in spirit, without further treatment, makes a very good varnish for negatives. Possibly it is your clarifying treatment that has caused the brittleness.

W. A. MEIGH writes: "In your JOURNAL, a week or two back, it was recommended to try plates 'backed' for landscape work. The other day I made the experiment with half a dozen plates, and got far better results in each case than I should have done had I not had the plates backed; I get a denser and sharper negative without it taking any longer to print. I should very much like to hear what others have to say with regard to 'backing' plates for landscape work."

LOCOMOTIVE says he has been taking photographs of some engines for an engineer, who has returned the proofs, saying they were of no use, as they were not like the pictures shown by several other firms who use photography in their business. He admits that his work is certainly not so good, and sends us a print of his own and one which his customer has sent him, and asks how he can produce work like it.—Our correspondent has taken his photograph from the bare metal work, whereas the other has been taken after the engine was prepared specially for being photographed. Engineers who employ photography regularly paint the metal over with a flat colour of a slate tint to dull the bright metal. This fully accounts for the difference in the two results.

W. MCLEAN writes: "I shall feel obliged if you can give me a remedy for the following:—For the last three weeks I have been troubled with tears on the albumenised paper in sensitising; either the paper is repellent or the bath has by some means got into such a state that it will only adhere in beads, and not distribute itself equally and drain as usual. I have tried kaolin and permanganate of potash; I have also weakened and strengthened by adding more water, then more silver, to no purpose. If you can assist me out of the difficulty I shall feel obliged."—Sometimes the addition of a little alcohol to the sensitising bath will overcome the difficulty, but the best remedy is to keep the paper for some time in a damp place before floating it. Should both these remedies fail the paper must be blotted off before the tears form. This may possibly necessitate a longer floating or the use of a stronger silver bath, but there is no help for it unless the paper be discarded.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, June 12, 1889, will be *Rapid and Slow Gelatine Plates*. Bank Holiday outing at Aylesford, Kent. Trains from Cannon-street, leaving by train nearest ten o'clock. It is suggested members should inquire on Saturday as to Bank Holiday arrangements.

DEODORISED ALBUMEN PAPER.—Few are unacquainted with the offensive smell which characterises much otherwise excellent albumenised paper of foreign preparation. We are pleased to learn that Messrs. Thos. Thorns & Co. have discovered that this smell may be quite eliminated without interfering in any way with the good quality of the albumen surface. This Mr. Thorns effects by a special method of treatment with animal charcoal, which, however, is not brought into such contact with the surface as to damage it. He has made application for a patent "For Extracting from Albumenised and Sensitised Bright Surface Paper all Unpleasant and Obnoxious Smells." A sample of the paper which has been submitted to us attests the accomplishment of this desideratum.

HOLBORN CAMERA CLUB.—The following are the arrangements for June, at all of which visitors will be welcome:—Friday, June 7, Mr. E. Clifton will give a demonstration in the Club Room at eight p.m., when he will make some dry plates, and explain their chemical composition and the action of light and developer upon them. Friday, June 14th, Mr. G. A. Freeman, B.Sc., F.G.S., will lecture on the *Chemistry of Photography*, at eight p.m. Saturday, June 15, Field-day to Windsor. Friday, June 21, Mr. F. Brocas's demonstration on *Toning*, at eight p.m. Saturday, June 29, Field-day to Burnham Beeches. The full arrangements for the field-days will be posted up in the Club Room a week in advance, and in the event of rain or totally unsuitable weather for photography, the outing will be carried out on the Saturdays following the above dates. Mr. Fred. Brocas, Hon. Secretary, 100, High Holborn, W.C.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1519. VOL. XXXVI.—JUNE 14, 1889.

DEFECTS IN SIDEREAL PHOTOGRAPHS.

IN a letter from the Astronomer of the Imperial Observatory, Rio Janeiro, published on another page, that gentleman directs attention to an hypothesis we gave at the Camera Club (on the occasion of a lecture by Mr. A. A. Common, F.R.S.) relative to the seeming anomaly of stars, which when seen by the most powerful telescopes are only points, yet in a photograph become expanded into discs of greater or less dimensions, according to their luminousness.

This hypothesis was also dwelt upon with somewhat more minuteness in an editorial article in this JOURNAL for December 21, 1888. We there mentioned what we believe is the true cause, primarily, of the photographs of some stars being larger than others, although the images in themselves are but points, and explained it to be due to a lateral radiation of light from one particle of silver bromide to another, which extends all round, and to a distance, from the luminous point, in strict relation to the brilliance of that point. This was the species of halation to which we attributed the conversion of the star points into discs, although we recognised the existence of that other halation, caused by reflection from the back of the sensitive glass plate on which the telescopic images are received.

It is this latter to which our correspondent, Professor Morize, is inclined to attribute the phenomenon in question, and there is no doubt that it may exert an influence in addition to the radiation spoken of. One reason for our thinking so arises from the following:—When Sir Howard Grubb at the Society of Arts projected some star images on the screen by means of the lantern, we noticed that many of the larger stars towards the margin of the screen were very slightly oval in form, those at the centre being circular. We observed the same thing in some others, including some lately shown at the Photographic Society of Great Britain.

The obliquity of the incidence of the star images towards the margin of a quarter-plate would be too slight, when formed by an object glass of long focus, to give countenance to the possibility of this proving the cause, even if the images were projected with a visible disc, which we know is not the case. Then, whence arises this oval form?

It can only arise from halation or reflection from the back of the plate, as pointed out by Professor Morize, and illustrated in the diagram which accompanies his letter. The determination of this cause suggested by him, viz., to silver the back of the plate and thus intensify the action, seems excellent, and if tried would throw such light upon the matter as would place its possibility beyond the realm of conjecture or hypothesis. On the other hand, the backing of the plate with a dark-

coloured, light-absorbing material in optical contact with it, such as photographers employ when taking a dark interior in which there is a bright window, would provide the means by which such halation would be overcome.

As hinted by our correspondent, this elongation of the star discs, by displacing the position of their true centres, introduces an element of disturbance, although a slight one only, in determining accurately the relation of one star to another, and it is well to have every source of error eliminated.

HYPO SOLUTIONS.

IN continuing our remarks upon the stability or otherwise of solutions of "hypo," it will be thought by some that they may merely be of academic interest, seeing that it is the custom to use fresh hypo for each day's work. Such is, however, not really the case; many professionals use their fixing solution—for negatives, at any rate—for many days without changing, while amongst amateurs we are afraid to say too common we believe the custom to be of saving their print-fixing solutions for use on subsequent occasions. Then, again, in establishments where it is the custom to make "saturated solutions" of various chemicals, the hypo solution stands a chance of being kept a considerable time. The salt we are at present considering is a conspicuous example of the varieties that these so-called saturated solutions may exist under. If a glass flask be half filled with hypo crystals without any addition of water, and heat be applied, the whole mass will become perfectly liquid. If next a plug of cotton wool be put in the neck, and the flask be allowed to cool, the solution will remain liquid for an indefinite time, even when repeatedly shaken, if the plug be not wetted. We should like to know in what light this solution would be regarded by the "saturated-solution" advocates. Finally, with regard to this liquid, if the plug be removed and a minute crystal of hypo be dropped into the liquid, the whole will almost instantly become a solid mass, and at the same time become so hot that the flask can scarcely be held with comfort. Then, again, if a solution of hypo be made with water in the ordinary manner, so as to contain as much of the salt as possible, it will be found that if a single, well-formed crystal be placed in it, and allowed to stand without stirring the liquid, it will daily grow in size, evidently from abstraction of the salt from the solution, thus showing that the presence of crystals of a certain salt in a solution of that salt will tend to lower its strength, and that a saturated solution will not be obtained. Indeed, we may say that to obtain a really saturated solution is a matter of no mean

difficulty. We cannot therefore do better than advise, at any rate with regard to "hypo," that saturated solutions be displaced by solutions of known and definite strength. But, as we have said, thiosulphate of soda is useful, not only for photographic purposes under its well-known name "hypo," but also for the purposes of the professional chemist, and several methods have been devised for preserving it with its qualities unimpaired.

The tendency to decompose is shown most decidedly in the light; hence it is desirable always to keep the solution in a dark place, this, again, being contrary to the practice of some photographers, who leave a bottle of fixing solution in strong daylight, or, on a large scale, their vat or other vessel of saturated solution unprotected from the light. Any one may easily prove this want of stability himself. Let some solution of hypo be placed in a clear glass and settle in daylight, and it will be seen that after a while, even in the dark, but more especially in the light, a decided deposit will take place on the sides of the bottle, and examination shows it to be sulphur. Here at once is a suggestion for one cause of fading; if hypo solution is changed in composition so as to deposit sulphur, we may be quite certain that if prints are put in that solution to fix there is a probability of sulphur being deposited upon or within them, an effect the evil of which is too well known to be looked on with equanimity.

Years ago Mr. Spiller showed the advisability of using carbonate of ammonia in the print-fixing solution, with the intention of removing the whole of the unused silver salt, so as to insure against future change or fading; the whites themselves he found to contain a silver compound not wholly soluble in hypo, but which was removeable by the carbonate of ammonia. It is singular that this should be so, for one of the leading continental authorities on the system of analytical testing by solutions of definite strength says that the change in hypo solutions just described can be entirely arrested by adding this same sesquicarbonate of ammonia, in quantity about eight per cent. of the weight of the hypo employed.

In the *Philosophical Transactions* the same subject has been referred to, Messrs. Harcourt and Esson both recommending caustic soda for the same purpose.

Quite lately the subject has been again referred to, and a short abstract appeared in the *Chemical Society's Journal* of a paper by H. Bornträger, which writer recommends salicylic acid. He states that a small pinch to a pint of "hypo" solution will greatly retard the tendency to decomposition.

We should be inclined to deprecate the employment of any acid in solution of hypo intended for photographic purposes, lest the very evil intended to be averted should be brought about; that is to say, the upsetting the equilibrium of the solution in such a manner that unstable silver compounds might be in danger of being produced within the texture of the film or paper, and so lead to future alteration.

We think it very desirable to bring before our readers a point that is now so rarely heard of—the value of ammonia carbonate in fixing solutions; and it was this fact that suggested to us that some remarks upon the stability of solutions of hypo would be both useful and appreciated, and once again draw attention to a valuable recommendation.

In conclusion, we may say that we have used large quantities of carbonate of ammonia (the ordinary "rock ammonia," purchasable at the chemists' shops) for fixing prints, and, provided that it was not used in a larger quantity than we indicate, we have not found the slightest harm to occur from

its use, while there is the added great satisfaction of feeling that the prints made by its aid are protected from fading possibilities to the utmost extent possible.

A GRACEFUL acknowledgment of what is owing by the public to Dr. R. L. Maddox comes from the Franklin Institute, Philadelphia, as will be seen from the following announcement in its *Journal*:—"Notice is hereby given that the Committee on Science and the Arts of the Franklin Institute has recommended the award of the John Scott legacy medal and premium to Dr. Richard Leach Maddox, of Southampton, England, for the 'Substitution of Gelatine for Collodion in Photography.'" We congratulate the Franklin Institute upon having taken this step to recognise so publicly the services of a most worthy gentleman, and we also tender Dr. Maddox our congratulations upon his merits having received such acknowledgment.

THE rumoured combination amongst dry-plate makers, to which we referred a short time back, to raise the price of plates to a considerable extent, has, we learn, fallen through. Some of the larger makers, we are given to understand, refused to join the ring, their reason being that any material rise in the price would at once open the market to foreign competition. They were doubtless right in their surmise. At the present prices there is very little to induce foreign makers to send their plates to England. But, with even a much smaller increase in the price than was mooted, the case would be widely different. The fact should be borne in mind that a considerable quantity of the material used by English plate makers is imported from abroad. Labour also, as a rule, is cheaper on the Continent than it is in this country.

WE have an example of foreign competition in the albumenised paper trade. A very large proportion of the albumenised paper—both "ready sensitised" and insensitive—used in this country is prepared on the Continent. This is scarcely to be wondered at when we consider that the English maker has to draw his supplies of the raw material from abroad. The paper itself is made on the Continent, as British paper makers cannot, or at least do not, make a suitable article. Foreign eggs have to be used, as English ones, for the greater part of the year, are far too expensive for the purpose. Now freight is little, if any, more on the prepared paper than it is on the unprepared; whereas the carriage on the eggs is an important item in their cost. Hence it will be seen that, with the higher cost of labour here, the home manufacturer is placed at an immense disadvantage. Those dry-plate makers who held aloof from the proposed combination were, we think, wise in their generation. While the prices remain as they are, there is little to fear from foreign competition in this direction.

THE project of the Photographic Club to introduce the metric system and make it universal in photography appears to be meeting with every success. Measures graduated with cubic centimetres on one side, and ounces, drachms, or minims, as the case may be, on the other, are now to be had commercially. These will greatly facilitate the introduction of the system, as any one can, without calculation, see at a glance what in one system is the equivalent in the other. This idea might also be carried out with the weights. The gramme weights might be stamped with their equivalent in English grains. To be strictly accurate, this, it is true, would involve going into fractions; but for all weights, say over the gramme, the nearest whole number would, practically, be correct enough for all photographic requirements. For less than the gramme, the half or the quarter of a grain will be near enough for all purposes.

NEVER, perhaps, has photography figured so largely on a race course as it did last week at Epsom. Possibly there were fewer large cameras present than on some former occasions; but they were more than compensated for by those of the detective class. However well a detective camera may be disguised, it seldom fails of recognition by

those familiar with the art. These cameras, from the miniature "Kodak" to the more pretentious half-plate size, were to be seen by the score.

MANY attempts have for several years past been made to obtain an instantaneous photograph, on a moderately large scale, of the "Derby," but up to the present we have not seen even a moderately good result. Successful and very characteristic groups and scenes on the course, secured by "instantaneous shots" of the detective size, have been common enough; but a large instantaneous photograph, taken direct, of really good quality, has not yet come under our notice, notwithstanding all the attempts that have been made. Why this should be the case it is difficult to say, seeing that excellent instantaneous views of London, even in the heart of the city, are to be seen almost everywhere, and the light in London is certainly not better than that at Epsom, particularly during the race season. However, it may be that London street scenes are with us all the year round, and a failure one day may be followed by a success a few days afterwards. But the Derby is but an annual event, and a failure, from whatever cause, means waiting a year for the next opportunity.

ON more than one previous occasion we have advocated the employment of photography in deciding races, though, so far, it has not been adopted in this country. However, according to a recent number of our French contemporary, *La Nature*, it has been carried out on some of the race courses in Germany, and as follows. At a few metres of the winning point several cameras are arranged at short distances apart, and as the horses pass the exposures are made by electricity. By this means an incontestable record of the result is secured.

BACKING plates, notwithstanding the advantages accruing therefrom, is usually voted a bore by most people. The usual method of applying the colour is by means of a brush or a piece of sponge, but, with either method, the operation, it must be confessed, is a somewhat messing one. At a recent meeting of the Photographic Club Mr. Carter showed a very neat and simple method of applying the colour with a roller. The roller is a composition one, like a printer's ink roller, which in fact it is in miniature—such as are supplied with some forms of letter-copying apparatus. This roller is charged with the colour and then simply passed over the back of the plate.

INDIARUBBER rollers, which will answer for the above purpose, are now to be had at most photographic stores, where they are sold for mounting purposes. A suitable material for the backing is a non-actinic pigment, such, for example, as burnt sienna mixed with water and a little dextrine to a thickish cream-like consistence. A small quantity of this mixture is distributed, fairly evenly, with the roller on a glass plate, after the manner that a printer works up his ink roller, then the roller is passed once or twice over the back of the plate, when a perfectly even coating is obtained. By this simple method two or three dozen plates may, without soiling the fingers, be backed in a few minutes. If methylated spirit be made to take the place of a large proportion of the water in the mixture, the coating will dry in a much shorter time than if water alone were used.

A few years ago some very fine large portraits, by Bergamasco, of Russia, were exhibited in this country, and they attracted a good deal of attention at the time. The pictures were vignettied, head and bust, of large size—about five-inch heads. The special feature about these pictures was that instead of being vignettied into a white background, as usual, they were vignettied into a black or very dark one, which rendered the face remarkably brilliant. Some few photographers essayed the same style, though on a far smaller scale—mostly of the carte and cabinet size—but these met with little commercial success. Now that the demand has arisen for large direct pictures, those who are in search of novelties in portraiture might give this particular style consideration.

THE FORTHCOMING EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

It has now been decided that the Annual Exhibition of this Society will open by a *conversazione* on Saturday, September 28, and will close on Wednesday, November 13.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence, and for transparencies and apparatus.

The judges elected by the Society are Messrs. W. Bedford, V. Blanchard, Geo. Davison, W. England, J. Gale, Henry P. Robinson, and J. Traill Taylor.

Further particulars will be duly announced.

THE WHOLE ART OF PHOTOGRAPHY IN A SERIES OF EASY PROGRESSIVE LESSONS.

CHAP. V.—FERROUS OXALATE AND HYDROQUINONE DEVELOPERS.

A FEW words more concerning the ferrous oxalate developer ere it is dismissed for the present.

After its components are mixed, this developer will not keep for any length of time if exposed to the atmosphere. And yet, by adopting the following expedient, it is not only enabled to keep for a considerable time, but also to be used with a great degree of comfort. Provide a bottle of any desired capacity, from a pint to a gallon, having an aperture near the bottom—say an inch from it—by which any required portion can be drawn off as it is wanted; and after it has been nearly filled with the developer, pour into it as much paraffin oil or kerosine as will form a stratum from a quarter to half an inch in thickness on the top of the developer. A small funnel is inserted in the mouth instead of the cork.

Some dealers keep bottles of this class in which a little spout is melted on to the bottle. On this spout is sprung a piece of rubber tube, at the other end of which is a spring clip, by which it is pinched. The bottle, thus prepared, is placed on a shelf a little above the table or sink on which stands the developing tray; and by releasing the pressure upon the clip, any desired portion of the liquid may be drawn off and, when done with, returned to the bottle through the funnel at the top. When the developer loses its energy by age and use it may be usefully employed in conjunction with some that has been freshly made. It is no secret that an old ferrous oxalate developer imparts a much more pleasing tone, especially to a bromide print, than one which is quite new.

A modification of the method described for preventing the oxidation of this developer, due to Mr. Cosmo I. Burton, consists in keeping it in a flexible indiarubber bottle or ball of any suitable size and form, having attached to it, as in the previous case, a piece of tubing closed by a spring clip. This, when filled, is laid upon a shelf a little above the level of the sink where the development is to be carried on. The used solution cannot be returned to the reservoir, but that which remains will keep good.

In either of the two systems described the services of the spring clip mentioned may be dispensed with by raising up the lower end of the rubber tube to a higher level than that of the reservoir.

The hydroquinone developer has acquired a deserved degree of popularity, and many who had bestowed their affections upon iron and pyro have deflected them towards the new favourite. For a long time has it struggled for recognition through good and evil report, but that recognition is now attained.

So many formulæ for compounding this developer have been published that we are slightly at a loss which to select for the beginner. But one cannot go far wrong in giving that recommended by Mr. J. W. Swan in a communication to the Photographic Society of Great Britain, the result of many experiments carefully conducted.

A.	
Hydroquinone	80 grains.
Citric acid	10 "
Sulphite of soda (recrystallised)	80 "
Distilled water	20 ounces.

B.	
Caustic potash (fused)	160 grains.
Sulphite of soda	160 "
Distilled water	20 ounces.

C.	
Bromide of potassium	24 grains.
Distilled water	1 ounce.

D.	
Caustic potash	160 grains.
Distilled water	20 ounces.

For normal exposures use equal parts of A and B, adding five minims of C for every ounce of solution.

For over-exposed plates, use D instead of B, with an extra quantity of C.

For under-exposed plates, omit C, and in extreme cases add six or eight grains more of sulphite of soda to each ounce of the developer. The object of increasing or decreasing the quantity of sulphite is to give greater or less density.

As we have said, the formulæ which have been recommended by various successful workers for mixing the hydroquinous developer are very numerous, and various alkalies other than the caustic potash in the foregoing have been employed, among these being meta-bisulphite of potash, carbonate of potash, carbonate of soda, carbonate of ammonia, &c. But we advise the reader to adhere to the one given until all its peculiarities have been mastered and familiarity with its working acquired, after which he may make trial of others, ultimately adhering to that which he finds the best for use with any particular brand of plates he prefers.

This developer answers equally well for negatives, for lantern and stereoscopic transparencies, and for bromide paper prints.

THE THEORY OF THE STEREOSCOPE.

IN the series of articles on *Stereoscopic Photography*, which I recently published in the pages of this JOURNAL, and which series commenced in January, 1888, and terminated in August last, I confined myself almost entirely to those practical details with which twenty years of industrious experience have made me perfectly familiar. The whole of my theoretical observations put together would, I fancy, scarcely fill a column—certainly not a page; it is, however, very desirable that something should be said by somebody on the theory of the stereoscope, not only for the advantage of the rising generation of photographers, amateur and professional, who know nothing of it, but for the advantage of those older hands who know a deal of what is wrong.

I have already pointed out with emphasis, and repeatedly, that one of the great causes for the decline of stereography was to be found in the incorrect manner of making the negatives, another in the incorrect mode of printing from them, and a third in the incorrect manner of mounting the prints when got. There is, however, still another cause for the decline of stereography, and that is the total ignorance which did prevail, and the partial ignorance which does prevail (and prevails extensively), of the true theory of binocular vision and of the stereoscope.

It is a bold and an astonishing thing to say, but nevertheless a true one, that for this ignorance we are chiefly indebted to the two men by whom the two forms of stereoscopes were invented—to Sir Charles Wheatstone, the inventor of the reflecting stereoscope, and to Sir David Brewster, the inventor of the refracting or lenticular instrument. Both these gentlemen were thoroughly imbued with the idea—of which they were seemingly incapable of getting rid—that stereograms, when properly seen, were viewed with a *convergence* of the axes of the eyes.

In the pages of this JOURNAL in 1873 the late Mr. Thomas Sutton vigorously and gallantly combated this idea, but so far as the two eminent opticians, who were his opponents of the time, were concerned, he seemed to have combated it in vain. Nevertheless, that Sutton was right and his opponents wrong is as demonstrable as any proposition in geometry, as was evident to Sir George Biddle Airy (the Astronomer Royal of the period), and to Professor Piazzini

Smyth (The Astronomer Royal for Scotland), and to other eminent mathematicians of the time.

I am no mathematician myself, and don't pretend to be, but I am able to demonstrate by experiment that Wheatstone and Brewster were both wrong in the matter of converging axes, and that Sutton was quite right. I am able to offer some common sense argument against the idea that everything to be seen right must be "squinted" at; and I think I am able to produce the one argument which Sutton did not use, by showing how probably Wheatstone and Brewster became afflicted with the mania for converging axes.

If we look at a card with markings on it at a distance of twelve or eight inches from the eyes (as the case may be), in order that we may see it as *one* and not as *two*, it is necessary that the optical axes of the eyes shall be converged, so say the supporters of the converging axes theory, and they say so truly *if we are to look at it with the unaided eyes*.

But when we look at a binary picture in the stereoscope, whether the instrument be a reflector or a refractor, whether it be Wheatstonian or Brewsterian, we look at it through an apparatus which is lenticular; in fact, in both appliances "magnifying glasses" are employed and the conditions are entirely changed.

Besides, it should always be remembered that what we *seek* to look at is not a piece of card with markings on it so many inches off, but an illusion in the air, at the solid phantoms of solid things, subtending the same angular magnitude as the originals, producing the same or very similar effects upon the retina, and colour, and knowledge of what the "slides" in reality are apart, capable of being mistaken for the originals themselves.

The rays which reach us from distant objects, such, for instance, as the point of a church spire on the horizon's verge, strike the eyes in what would be called "parallel" rays by anybody who was not over anxious to be pedantically correct. The convergence of lines drawn from a base of about two inches and a half (the distance between the eyes) to a point some miles away is certainly too trivial altogether to be taken into account in the practical affairs of life, and in order to get the illusion of reality which we seek by stereoscopic aid, objects so distant as to present practically parallel beams in nature must be seen in their representations by practically parallel beams in the stereoscope. If they are not, they won't seem as far off as they should, and everything will be (optically) reduced, so that a "slide" representing, say, a town, as seen from a position of eminence, will present—not the aspect of the town—but the aspect of a little model of it; and this is the kind of aspect which everything presents as seen in the Wheatstonian and Brewsterian stereoscopes with their converging axes of the eye.

"Every one" who is in the habit of practising stereographic photography is able easily enough to "squint" a "slide" into the negative solidity of the pseudoscope. It is quite as easy, however (after a little experimenting in a proper way), to combine it so as to produce the positive solidity of the stereoscope, and it is more desirable to do this; but whichever method is adopted, the process is tiring to the eyes—and why? Because the process is "unnatural," and requires an effort, of which we are conscious, to perform it. And why an effort? Because, in the ordinary practice of binocular vision for the purposes or pleasure of our daily lives, when we "focus" the image of an object at a given distance on the retina, we also converge the optic axes through a certain arc. But when we "squint" or converge the dual pictures of the stereogram into the appearance of relief, we converge the optic axes in the one case more, and in the other case less, than they are converged for the same focal distance of the retina in ordinary vision.

When lenses are looked through, however, the case is altogether different. Our power of focussing on the retina is practically at an end. It is no longer by a movement of the mechanism of the eye that the images are made sharp; it is either by the movement of the things or a bodily movement of ourselves that we bring them into "focus" now. (It is, of course, in relation to convex lenses only that I speak.)

The optic axes now are parallel or converged by the nature of the pictures we inspect. If these contain "objects" substantially alike, and separated from each other by the distance between the eyes, we see them by parallel vision without the consciousness of effort. If

they are separated (in reason, of course) by an interval which is less than the optic axes converge "of their own account," the focussing operation of the eye (now of no avail, for good or ill) is, as usual, automatically performed from habit, and the object advances into optical relief.

The components of a stereogram should always be mounted with the distant objects separated to the distance of the centre of the eyes, as used for parallel vision. They should always be viewed through lenses which are entire, and not through magnifying prisms. Those lenses should be of the same focal length as the lenses with which the negatives were made, and these lenses themselves are the best which can be had. Their centres should be separated by an interval equal to the distance between the eyes, and (as would be the case in these circumstances) their centres, and not their edges, should be used. Now comes the question, How came Wheatstone and Brewster by the converging craze?

There is no absolute evidence on the point, but the probability, seemingly, is this: they tried their inventions without the magnifying lenses before they tried them with. What more likely thing than this? If so, the images had to be focussed for their actual distance, to make them sharp, by the mechanism of the eyes, mechanism habituated to the working with given degrees of axial convergence for each varying focal length. These degrees of convergence, doubtless, both Wheatstone and Brewster ascertained for the distances employed, and did so before the magnifying lenses were applied, and hence, having definitely ascertained that, in the circumstances of their experiments, combination was most easily effected by the optic axes which converged, they overlooked the fact that the lenses remove the function of focussing from the eye, and so continued the employment of the converging axes when their use was gone, and in consequence of which evil alone ensued.

I have a Brewsterian stereoscope by me as I write. It is a genuine "old stager," having been purchased by my father at the time of the London Exhibition of '51. Examining the "slide" either of that period or of this with it becomes a painful occupation for the eyes.

When, however, a "slide" is divided, and its dual pictures separated by a space of an inch and a quarter in length—an operation which makes parallel the emerging rays—the relief is perceived with ease. I have just performed the experiments as I write.

Stereography is most certainly coming in again. Let every photographer who has sense enough to adopt it see to it that his "slides" are properly made, and let him offer for inspection or for sale himself instruments in which they can be properly seen.

W. I. CHADWICK.

ECHOES.

I was greatly interested in the editorial account of the latest freezing method, which I had only a dim notion of from previous hearsay. But that is only available for practical dry-plate purposes on a large scale, while there are many occasions in even the smallest laboratory when a cheap and ready cold producer would be a boon. The nitrate of ammonia method is simple and inexpensive, but, unfortunately, unless it be kept for the special purpose—and that, too, in quantity—it is not available just when wanted.

But our old friend and enemy, "hypo," I venture to think, is usually to be found in any dry-plate worker's establishment, or if not, it ought to be, in sufficient quantity to produce a moderate cooling effect at very short notice. Scarcely any photographer of the present day needs to be told that though not equal to the nitrate in that respect, hyposulphite of soda in the course of solution "produces" a pretty intense degree of cold, quite sufficient for most cooling purposes, as the solution itself descends below the freezing-point. But, truly, it is not a nice thing to have about the dark room in a promiscuous way unless great care be exercised to see that it keeps itself in its proper place.

Fripping—a fault much less frequently met with nowadays than a few years ago—is not caused merely by high temperature, though as a matter of course that is a powerful incentive. Irregularity of temperature is a far stronger temptation, and a gelatine film that will successfully pass through the ordeal of development in nearly warm solutions, if fixed and washed at the same temperature, will

often give in if the intermediate washings are performed with much cold water. It is much the same with human tempers; they may remain placid enough under any amount of one kind of worry, but a multiplicity of troubles will break down the sweetest disposition. This, however, is only a digression.

Now it strikes me as a very simple, and I know from actual use it is an effective plan to adopt in the very hot weather, at least if you are not working on a mammoth scale, to relinquish the use of water direct from the tap or ordinary supply, but to establish a temporary cistern in the form of a jar or jug of moderate capacity, say holding from half a gallon to a gallon and a half, and to place this in a basin or other convenient receptacle packed round with crystals of hypo, kept moist with water far from sufficient to dissolve them. The temperature will be lowered until the water has dissolved as much hypo as it will, when the addition of a little more will re-establish the refrigerating process. When the crystals are all dissolved, the saturated solution can be bottled off for fixing purposes.

That brings me to another leader, in the same number of the JOURNAL, on *Hypo and Hypo Solutions*, in which the dictum of "Watts," on the question of the stability of hypo in solution and otherwise, is queried. I can only say that I have myself long had doubts as to the correctness of the statement quoted in the leading article referred to. I have for years made a practice of keeping a stock of hypo in solution ready for use, and at times this has been many months old before it has been actually used, yet I never noticed any difference in its behaviour. Some years ago, through the liberality of a friend who was retiring from photography, I became the possessor of the best part of a one hundredweight cask of hypo—a quantity sufficient, at my then rate of working, to last the rest of my natural life. At any rate it did last some years, and though it *deliquesced* a good deal, and left a mark whereon it stood for long, I never saw any sign of *efflorescence*, nor did the last of it prove inferior in fixing power to the first.

I did not see the article referred to by Mr. W. I. Chadwick on the *Influence of the Stereoscope*, but I can fully join him in his protest against such nonsense as attempting to condemn the instrument because some lunatic expresses an erroneous idea of its capabilities and uses. I fail to see why "F. M. S." or any other artist should depreciate the instrument, unless it be from motives of envy or jealousy, because it renders a degree of solidity and reality that his poor powers are helpless to emulate. I don't quite see, either, why a photograph, if artistic in its single form, cannot under the necessary conditions be duplicated so as to give in the stereoscope an equally artistic and at the same time true representation of the subject. But it seems to be the practice, if not the prerogative, of "artistic" minds to gird at anything of a "mechanical" or "scientific" nature. Why, then, does not "F. M. S." relinquish the camera?

Some short time back I quoted from a speech of an old photographic friend to the effect that people who preach on the subject of photographic art do not always shine in their efforts. A man may be a good artist because it is in him, but a bad teacher, and therefore he cannot give out to others the artistic sense that he himself possesses. The art was born in him, and he found art easy; the teaching capacity was not born with him, but he expects to find it come to him with equal facility, and without the trouble of learning. Consequently, when such a man commences to try and teach his own particular subject, he generally ends as he begins—by making a glorious mess of it.

From art back again to more congenial topics! I notice that Mr. Cowan has succeeded in tracing the cause of the staining that sometimes occurs with hydroquinone to the employment of a particular bromide—bromide of ammonium—as the restrainer. This, in the hands of a careful experimentalist like Mr. Cowan, would seem to point to ammonia as the real cause, but I cannot say that I have myself any reason to lay the blame in that direction. I have used ammonia as the alkali with hydroquinone, but though I have now relinquished it in favour of soda or potash, I never remember to have had a single instance of yellow stain with ammonia.

Nor do I recollect to have encountered the trouble when using either caustic potash or caustic soda; but with carbonate of soda I was, for a time, utterly overwhelmed by it—not a mere yellow tinge, but a strong, deep, clear, orange colouration in the shadows of the

negative that completely ruined it for printing purposes. I found eventually, that the result was traceable to and increased with the quantity of bromide employed—that, in fact, when the bromide was altogether dispensed with there was no stain, but that it appeared and became deeper as the restrainer was used and increased. In my case the restrainer was bromide of potassium. I have never tried the experiment with carbonate of potash, but I invariably employ bromide with the caustic alkalis, as I say, without any trouble as regards colouration. Can it be that by some reaction with the bromide of ammonium, in Mr. Cowan's case, some other agent comes into action?

My only objection to the proposed adoption of the metric system is the somewhat Hibernian one that it takes the *metre* as its unit. I have long been strongly in favour of a decimal system, but should prefer the English grain as the unit; indeed, this might be easily adopted without in the least upsetting present methods and customs. All that would be needful would be new sets of weights and graduates, which could be worked and used quite amicably alongside those representing our present scruples, drachms, ounces, pints, and pounds. I myself use, besides our regular apothecaries' and airdupois weights and measures, the French metric system as well as the English decimal system, applying each or any as the particular purpose may seem to require. For instance, if I find it too much trouble to translate a French formula I use the French weights. But I do not recommend the practice to all, and it would certainly be a simplification to resort to a uniform decimal system, but let us adhere to grains.

I recently spoke of the apparent inutility of Mr. C. I. Burton's article on the preservation of solutions of pyrogallol, but in the same number appeared a letter complimenting him in the reverse sense. "W. G." must, I think, however, have taken this indirect but kindly method of suggesting two possible printer's errors; but though sulphate and bisulphate of soda and potash may have been misprinted for sulphite and bisulphite, it would require a small army of most malevolently-disposed "comps" to transform any practically useful preservative into, say, mercuric chloride.

JUNUS.

ORTHOCHROMATIC PLATES IN COPYING OIL PAINTINGS.—II.

In my previous article on this subject I referred to the advisability of those having no experience in this class of work refraining from treating their sensitive plates to a colour bath of their own making. My chief reason for so doing was that they thereby avoid some of the many failures which nearly always attend a first attempt at dipping plates. These troubles take the shape of markings on the film, and the plates are also very liable to contract fog. On the other hand, the plates that are offered by the manufacturers are entirely free from such defects, and, so far as my experience has gone, work clean and nice, any amount of density being got in development.

As a rule, orthochromatic plates are more or less sensitive to all colours, but it must, at the outset, be borne in mind, that notwithstanding that they are sensitive to red, orange, yellow, and green, they are more so to the blue and violet, and once this simple fact is fully understood, it follows of a necessity that an operator must vary his mode of procedure when dealing with objects in which the latter colours are prominent or conspicuous. It is no new thing, however, as many suppose, that some sort of coloured screen is employed to cut down these active rays; such means were employed long ago, before the advent of the rapid dry plate, or the more recent colour-sensitive one. And the advantage of so cutting off the blue ray was known to and appreciated by many workers in the days of collodion.

In many instances, therefore, these yellow screens are of much importance in the work we are considering, and once an operator fully grasps the important part they play in the operation, he will have made no little progress in the mastery of this subject.

From time to time various methods have been employed in the production of and manner of using these yellow screens. There are those who advocate the employment of thin films of gelatine, made to the necessary tint by a suitable dye, and these films are also so prepared as to be of varying depths of tints, so as to act more energetically when the blue and the violet rays are specially prominent. Others there are again who recommend the use of an absolutely white glass which has received a coating of collodion, in which has been dissolved some suitable colour—such as aurantia, eosine, or turmeric.

Another important matter, when discussing the utility of these screens, is as to the best position in which to place them. Here, again, operators differ, and some prefer to use them in front of the lens, others in the diaphragm slot, others behind the lens, others in front of the sensitive plate, while there are those who even go the length of coating a part of the lens combination with a suitable material.

In my practice I have confined myself to two methods of working. The first of these is the placing of a suitably-coloured sheet of glass in the cell of the dark slide which carries the sensitive plate; the other is the placing of the screen in the diaphragm slot. In the latter case, however, I use the screen in such a way as I have never hitherto noticed other writers or workers refer to.

When experimenting with these screens, I at first tried them in front, and then behind the lens, and on my coming to work them between the lenses, I happily hit on a neat little plan, which I think is worthy of more than a passing notice.

In my practice I generally work with a three-quarter-inch stop, and one day when I came to try these yellow screens in the diaphragm slot, it occurred to me that were I to get the three-quarter-inch slot placed in a turning lathe, and a sufficient rebate turned out exactly round the aperture, so as to permit of one-inch micro cover glass being fitted into it, that I would have as good a means as any. So I got an optician to turn out just as much as allowed of the micro cover glass to sit in the rebate, and when after coating a number of these glasses with collodion, in which a sufficiency of turmeric was dissolved to give the necessary depth of colour, I found in practice I had hit on a plan which worked most satisfactorily, and one that gave no trouble at all, so far as fitting on the yellow screen was concerned.

I generally coat about a dozen of these little glasses at a time, and so have always a supply of them at hand, and these vary in depth of tint according to the amount of turmeric in the collodion. These little cover glasses are so exquisitely thin and transparent, and fit so nicely in the rebate on the stop, that the smallest modicum of gum or other adhesive substance holds them firmly in position, and enables the stop to be slipped up or down just as if it were not carrying the screen.

In coating these micro cover glasses there is not nearly as much trouble or difficulty as is the case when it is required to coat, say, a circular screen which is made to fit on the hood of the lens.

I generally take a clean sheet of glass, and by means of my ordinary camera circular spirit level I carefully adjust this sheet of glass, and along the edges of it I place in a row, at convenient distances, these little cover glasses. I then carefully drop in the centre of them just sufficient of the coloured collodion as will, when spread and set, nicely cover the glasses. Should there be any little raggedness at the edges it doesn't matter much, for these will be covered up with the rebate of the stop. This done, I leave them to harden, and keep carefully protected from dust; by this means I obtain a supply of screens of different depth of colour, and at the same time free from specs and imperfections. I know of no medium better adapted for carrying the colour than these exquisitely thin little cover glasses, and they are always obtainable in quantities from any respectable optician.

Those of my readers anxious to try the other methods of using the screens, such as in front of the lens, can get a glazier to fit into the hood of their lens a circular disc; this he will cut with the greatest of ease with his diamond set in a circular gauge, but the coating of these large screens is not by any means so easy as the little cover glasses.

I have done very good work also by using the screen in the same cell as the sensitive plate, but in this case I was fortunate in getting hold of a few very suitable pieces of coloured glass. I have tried over and over again to duplicate these glasses, but have never been able to get a new lot so suitable. It seems to me there is more difficulty in getting these coloured glasses free from specs and flaws than in other kinds of glass.

But this cutting down of the blue or violet ray may be accomplished by other means than the employment of coloured screens, such as a specially prepared glass roof, or window, or other similar means of lighting the object; and where such can be effected, without doubt it is to be preferred to the interposition of the film or glass screen, either in front of the sensitive plate, or in proximity to the lens. One argument in favour of the use of such is the undoubted proneness that a screen has to interfere with the definition of the object being photographed. Whenever a screen is employed, be it in any position, the utmost nicety must be exercised in focussing after the screen has been placed in position. A very little observation will suffice to show the beginner, however, that when adequate means exist of lighting the object with coloured light, such interference of definition does not exist; but it does not fall to the lot of every amateur or casual worker in photography to have at hand such means

of lighting his objects, hence recourse must be had to a screen in some form or other, but whenever it comes into play, special attention must be paid to the focussing.

In my next I hope to treat with what is, perhaps, the most difficult part of the operation, viz., the avoidance of reflections when copying an oil painting.

T. N. ARMSTRONG.

TRANSLATION OF ENGLISH FORMULÆ INTO THE METRIC SYSTEM.

[A Communication to the Photographic Club.]

As requested by the Chairman at the last meeting, I have put on paper the remarks I then made respecting the translation of our old formulæ into the metric system, now definitely adopted by the Club. I am sure to many they will be quite superfluous, but to some few may be acceptable, and as the Photographic Club has now formally decided to use in future only the metric system of weights and measures, I venture again to suggest what I consider one of the simplest methods of translating, with the least possible trouble, any of our existing formulæ.

I take it for granted that every one using any formula has always liked to know what proportion the various constituents in it bear to one another, so that if occasion requires he can vary any of them according to circumstances. In our old system this has generally been expressed by the number of grains or minims contained in each ounce of liquid used—in my own practice, for many years, I have exclusively used the grain as the only unit for both liquids and solids—and I propose to show by an example how formulæ thus expressed is immediately translated into the metric measures, without the figures losing their old familiar look and sound, which they certainly will do if they are literally translated.

For instance, take one of the simplest formula for pyro development, viz.:—

One ounce of liquid containing—

Pyro	2 grains.
Sulphite	8 "
Ammonia	4 "
Bromide	1 grain.

Ten ounces of this of course contains—

Pyro	20 grains.
Sulphite	80 "
Ammonia	40 "
Bromide	10 "

If we now literally translate this it will read—

Pyro	1.296 grammes.
Sulphite	5.184 "
Ammonia	2.592 c.c.
Bromide .....	.648 gramme.

Made up with water to a bulk of 233.5 c.c. nearly.

In this form it certainly does not convey to our minds the proportion that each ingredient bears to the others in so definite and simple a manner as does the original formula.

Now what I mentioned last week, and I am almost ashamed to do so again, is to leave the formula alone, and let it translate itself by at once calling all the quantities grammes, when it will read—

Pyro	2 grammes.
Sulphite	8 "
Ammonia	4 " or c.c.
Bromide	1 gramme,

and the bulk of solution 437.5 c.c.

This bulk of solution will be about fifteen times greater than our old-fashioned ounce, but the figures remain almost without fractions, and can be easily multiplied or subdivided if larger or smaller quantities are required.

I have little doubt but that if any one habitually using the metric system had originated such a formula as that used for example, the bulk would have been made up to 500 c.c., or perhaps the amounts of all the ingredients doubled, and made up to 1000 c.c., as I notice in foreign formulæ an almost total absence of the awkward fractions that occur when translating from one system to another.

In connexion with this subject, perhaps I may be allowed to suggest the advisability of always making up the total of any new formula to a definite measure, such as 100, 500, or 1000 c.c., instead of, as is often the case, adding the quantities of the various ingredients to a given bulk of liquid.

ALEXANDER COWAN.

THE LIMITS OF PHOTOGRAPHURE.*

ONE of the beauties of photogravure is the power of giving steady, atmospheric greys. I am not sure that in this great feature it cannot break a lance with every known mode of art reproduction. The extended greys of mezzotint are certainly not better than those of photogravure, but they are very generally worse. I can scarcely call to mind a mezzotint in which the quality of tender atmospheric grey is its one great point. Though I admit its charms of light, yet those lights are small and set up by contrast, whereas in photogravure we get mist whenever we like as well as light. This quality enables the impressionist photographer not only to fix in printing ink the happy triumphs of the camera, but to consult with others and add art to nature's work in the refining of one part, or the strengthening of another part, and thus it must be admitted that a new feature is added to art reproduction in these works. It may be the summer haze over the meadows, or the driving mists of a storm on the coast; they can be caught by the practised impressionist in photography, and they can also be fixed on paper by photogravure in a more living, moving way than by any other mode. This, then, is one special point in the art. Let it be cultivated and encouraged. Nothing pleases men more permanently than a sweetly-rendered aspect of nature, whatever kind of aspect it is—all are welcome in the form of pictures and prints.

There are two branches or classes of picture reproduction in which photogravure shows considerable power. The one is a figure picture, in which clear-cut, well-drawn forms are the chief elements, the smooth surfaces of flesh and drapery lending themselves to the same power that we noticed in the case of the impressionist landscape. The other is where powerful brush work and flashing effects are got, in a manner that labour with a point or scraper can scarcely follow. In both these there is a field for photogravures from pictures.

But in practice I find that oil pictures are the most troublesome of subjects to work from. There is frequently a subtle irregularity in the execution or glazing, or the absence of glazing, the blue-tinted colours; rough touches of the brush afterwards painted over, and many similar things, make it slow and difficult to produce a plate. Although, therefore, one picture may be most happily and beautifully given in photogravure, it does not follow that another will, even though they both look alike in effect, colour, and execution. The camera is a great detective, and it often brings out things that cause much labour to set right. Another fault in a plate from a picture is the want of power to give a whole scale of tints below what it gives as a black. The artist's darkish grey generally comes black on the plate, and then we have to put in by hand several shades of darker tints. This is sometimes a risky and laborious affair.

There may be a dozen different textures and surfaces to render in various plates, and there are as many modes of putting in the colour. For instance, we may use the roulette, which does not go as deep as one would wish; or a small rocker, which is better for depth. Then there is the multiple graver, or the common graver; or a strong etching ground and bite in a lot of etched work, or a re-bite on the old granulations. Thus, added to the trouble of doing the additional work, is the trouble of finding out the most suitable mode. When it is noticed what subtle things will make a method look wrong, it makes one nervous about putting the work in. Big rough points like the teeth of a rasp suit one place; single deep cuts with the graver suit another; and acid on a re-biting ground a third. But it requires years of practice to get the knowledge. Therefore, photogravure should not be regarded as an independent and complete power in itself, but as a new method or means of production, having great beauties when well worked, but not able to meet every case that comes before us in the way of daily requirements.

Seeing that the nature of the original is of importance to know, it would perhaps be welcome to record the results which I have myself noted.

The best working originals are the most seldom obtained in the way of business—viz., oil-painted monochrome, with a steady, solid, impasto treatment. The solid, yet not too solid, effect just suits the process, because it yields a peculiarly agreeable negative.

Perhaps the worst copy usually met with is a water-colour drawing in which much sponging has been used, and where blue is prominent, or neutral tint, with perhaps a warm-looking paper. The vigorous rough Indian-ink sketch is not so intractable by any means, and this must be taken to be what I have already referred to.

A crayon drawing, if not too rough and gritty, also answers well. Some of Holbein's come out very nicely, being most delicately pencilled, and having vigorous portions to bring them out.

Portraits are fairly adapted for reproduction; but it must be remembered that in them we are very captious judges—we want the minutest points in form and shade followed out, as well as a good flesh texture. Portraits from the life are not much better adapted than portraits from painting are. The chromatic changes of the one are only more treacherous than the texture changes in the other. Perhaps the most successful results are those from old mezzotint plates, which always give a level, solid negative containing a slight grain, which is copied from the original mezzotinting.

After these there comes a sort of mixture of difficulties from many sorts

* Concluded from page 384.

of originals; perhaps the most disagreeable of all is a dear old illuminated missal or chronicle, with highly-coloured little pictures. The surface of the vellum is fluff in parts, the colours are uncontrollable, and the work entailed is great. Photographs from nature, such as are commonly executed for sale in favourite localities, also interiors of houses, garden scenes, lead-pencil sketches, sepia drawings, bric-à-brac, and many similar or different things, only present new phrases of difficulty. No two can be dealt with quite alike. The reason being that the eye is very critical, and the camera rather treacherous in the negative it provides for us. I refer at length to these points rather to correct the impression that whatever you ask for in photogravure it is sure to come out prettily.

The point I would specially press, then, is this, that all the methods of photogravure yet practised, when worked at their very best advantage, produce similar results, and the same identical difficulties meet us by whichever mode a plate is produced. One mode does, indeed, differ from another in its power as well as in its method, but the subject in which one fails will most probably fail in another method, and the good subject for one method will be a good subject for another method.

The first efforts at physical photography were said to have been the production of photogravures by the process of printing in a film of bitumen, then, after clearing it, to bite the plate in the clear parts. This mode is still practised on the Continent for line subjects, and it is a tolerable method where skill and patience with good originals and bright daylight combine, but it is practically valueless in England at the present time.

The best line method is that of G. Scamoni, of St. Petersburg, who imparted all its details to me; and though I never gave the care and labour to it that he did, I am sure it is hard to surpass it for line work. The method is to grow a copper plate upon an autotype mould in line. The mould is developed on a surface covered with a fine layer of india-rubber varnish, and it is made conductive by blacklead. The support may be glass, copper, or other metal, not to mention xylonite, which does very well.

This method naturally led up to the desire to get half tones. Scamoni got toned plates from crayon drawings, but not from flat tints. The mode first of all worked was by bronzing a negative or the tissue of which the mould was to be made, and this caused a multitude of punctures in the mould which, when electrotyped, became points in the copper, thus causing the portions of the mould remaining to have various depths. This method now and again gave very fine results, but frequently it failed. Probably, if worked more in the light of modern experience, it would be much better, as in those old days, twelve years ago, we were more anxious to get automatic conduction by means of silver and gold on the surface of the mould than it is now found necessary. It is worth while remarking that plumbago for conducting cannot be excelled, provided all proper means are taken to insure its fineness.

There were also at an early date plates called galvanoplastic. These I know not the method of. They were weak, and required a deal of line-engraver's fine ruling, &c., to put them to rights; they are therefore now quite out of date and also out of memory. But they lead one to refer to the process of Pretsch, which was also practised in England for a time, and which ought to have gone on better than it did. It is worth while mentioning this process as the chief instance of depositing copper on the whole mass of gelatine. There is no mould washed away. It is caused to swell and form an automatic grain, which regulates the tint, and it should be classed with two methods which I will now detail.

The great want of my own bronze-grained plates was that you could not see defects in the plate for some reason, and therefore you could not tell where and how to work on them. I therefore hit on a mode of making a plain autotype mould on a plate, and having no grain at all. This mould or picture was then made sensitive to light again by bichromate of ammonium, and, as soon as dry, it was bronzed all over and exposed to light for fifteen minutes. After the bronze was washed off with benzole, it was put into warm water and the new grain swelled up nicely. I worked this method until I felt the want of true power in it, for it was too fine and velvety at all times, and, for reasons I could not regulate, the grain would vary considerably. But the idea of working from a swelled mould caused me to try moulds of plain sensitised gelatine poured very thin and level on a plate glass, and, after printing them with a toned negative, to print again with bronzed powder on the front; this added a grain just as Pretsch got a grain by chemical means. I was pleased with the result, and went on with it until I found that it could not be made to produce nice flesh tints. It had the much-longed-for property of giving a coarser grain, according as a part got darker, and that was valuable; so also small points of light stood out well, and detail of all kinds, but it was impotent in the very fine greys. The Klick process was then beginning to make a move. About this time Colonel Waterhouse invented a clever grain which we used for some time, and for a certain class of work it was excellent, but its half tones, though powerful, were somewhat dull. The method is to take the mould as it is first washed off, and, while still wet and soft, dust it over with fine sand. Let it dry, and when dry rub the sand off again. The impression left by the sand is very regular and sharp, and it retains its sharpness well during electrotyping, and although it has defects of its own, yet it is a very good method and quick. Its great want is more brilliancy in the dark tones, and also a smoothness in the lightest parts, so that they fail to separate themselves from the pure whites when a number have been printed. The proper mode is to get depth enough in

all parts, and then bring the lights into order by hand work. Another method is coming into practice lately to cure this feebleness in the very light parts. It is to cast over the whole plate a fresh tint by regaining it with resin or bitumen, and biting in with acid until a tone is produced. This tone may be stopped out earlier or later in some parts to save after work, and when all is cleared off a proof is taken, and the lights are put into order by hand work. This procedure also improves the darks of many plates by steadying them. The new grain generally settles on the old prominences of copper, so that the effect is to deepen the old work and not to confuse it. Moreover, the two degrees of tint, where they do come together, or one upon the other, are mutually helpful, and give the look of mystery and depth so often valuable. One depth or one layer of tone generally has a hard and prominent effect, but a double tint looks soft and suggestive. This quality was noticed by the old mezzotint engravers, who very often laid a fresh ground over a plate, which to the ordinary person looked finished; then they had all their work to scrape up again, but the plate was rich in proportion and worth the extra trouble.

This is a proper time to describe another great want of all natural photogravure plates. It is quite absurd to suppose that what a negative has not the power to get, the copper plate made from it shall have. It is, however, very wise to gently work up a negative or transparency to effect that which nature cannot do for it. There are various methods of doing this. If rough texture in parts is desirable, the glass may be matt-varnished on the picture side and the crayon applied on the grain. But if gentle tints are wanted, then the other side should be worked upon. It is, however, often noticeable that when the plate is produced, the hand work is too heavy or misapplied, and it is too late to go back again. This sort of work is most called for in the dark portions of a subject, and it is best not to try too much in other parts.

When this is done, however, it is often only too plain that we have not depth enough in the plate. When an oil painting is placed against a print, it is easily seen that our scale is much shorter than the oil painting; therefore, an abundant power in reserve to give depth and power to the plate is advantageous, so that the printer need not make an opaque heavy ink to get the print right.

The printer's ink should always bear some dilution for the start of a plate, and also for the reason that it is so common that a dark dull solidity comes from a plate having no real depth in it, yet plenty of middling dark. I have seen a plate of Goupil's (whose process I have not further gone into, beautiful though it often is) brought well out by deep etching with acid on the top of the other tint, the lines of the etching being bitten as usual through a strong ground laid on. It is difficult to really blend etching with the tint, but if contrast is called for it will do. Some form of graver is better, because you regulate its depth so instinctively to the needs of each part of the work.

The lighter portions and the use of dry-point work, together with the scraper and burnisher in finishing, are too simple to need any time being spent on their description.

Printing deserves a word. I have found that careful work with the best possible materials is most essential. A paper with a coarse fibre, however excellent otherwise, will never do for photogravures. So, too, size must not be allowed. Thus the paper admired for etchings is quite unable to print photogravures; it is harder in texture and rough, so that it cannot enter into the tiny pits in the process plate. This is unfortunate, because the presence of size greatly adds to the brilliancy of the darks in a print, and that is what we most need from the process plate. However, we have to put up with the colour obtainable on an absorbent paper.

It is worth while, before concluding, to touch upon the field and opening for photogravures. It cannot be contended that every subject is best done on this plan; and as the taste of men will from time to time demand every kind of subject, it must be evident that it will rest with us to confine our efforts to such subjects as have been proved to succeed best. In the matter of publication plates, there are so many fine etchings and such very fair autotypes obtainable that the method of photogravure wants to be particularly guarded from betrayal by some mistaken choice of a thing that will cost much labour and then turn out a failure. In plates for books, and in those folios of pictures from some locality now so frequently seen, it cannot hurt so much if there are partial failures, because they are not exposed to the public view so constantly, and also because if there is a failure there will also be several successes in the same lot.

One mode of use applicable to all kinds of printed books is to leave the space for a picture blank in the printing, and have the pictures printed on a thin India paper elsewhere—perhaps six, or eight, or ten together; these are cut up and pasted in the book at their right places. Mr. Linton's important work, *The Masters of Wood Engraving*, is almost entirely photogravure, and the prints being treated as above look very natural, and fit in most easily without the least harm to the printed book itself, while it is not easy to ascertain that they are produced by an intaglio process at all. Yet the peculiar advantages of the process come out in the result, for the experts are said to wonder how it is that these reproductions are superior to the originals.

Of course, for artistic effects of great power this method is equally applicable, and it is well known that these finer efforts are the very ones that most distress printers and producers of books. Yet it is on these alone that the public sets the greatest value.

I hope I have not been too long and prolix in this little essay on so modern and interesting a subject. It appeared to me far more suitable to

the requirements of all that the result of my own efforts in this branch should form the chief body of the paper, rather than to go into purely technical details and questions, which are all very interesting to a very few, but which experience has taught me are quite discounted by the insatiable public on the one hand, and by the infinite demands of art on the other.

SALFORD PHOTOGRAPHIC EXHIBITION.

A PHOTOGRAPHIC Exhibition was opened on Thursday last at the Peel Park Royal Museum, Salford, by the Mayor of Salford, Mr. Alderman Dickens.

Mr. Alderman Bowes, the Chairman of the Parks Committee, after calling attention to some of the principal exhibits, regretted no society of photographers existed in the borough, and hoped the exhibition would be the means of promoting such a society. Considering the very limited time that was given for the preparation of exhibits, a very creditable collection has been gathered together, filling two rooms. To photographers, perhaps the most interesting contribution at the present time will be a series of twenty-five or thirty portraits by the late Mrs. Cameron, of Ventnor. They are lent by the Parks Committee, and comprise, amongst others, portraits of Thomas Carlyle and Mr. G. F. Watts, exhibiting very clearly Mrs. Cameron's peculiarities of treatment. Messrs. Barrand sends portraits of Mr. and Mrs. Kendal, Mrs. Bernard Beere, and other celebrities. Mr. Warwick Brookes, of Manchester, has some excellent portraits, including Henry Irving, Leo Tyklynsky, Edwin Waugh, and an extremely delicate photo-engraving of Miss Nellie Murray. Mr. La Fosse and Mr. John White are represented by enlarged portraits of the Mayor and ex-Mayor of Salford.

In landscape work a prominent place is accorded to a series of twenty-seven views of the engineering workings of the Manchester Ship Canal, lent by the Engineer to the Ship Canal Company. These are by Mr. H. Garnde, and have never been shown in public before. The same gentleman has also a large series of views of the galleries and grounds of the Manchester Jubilee Exhibition. Local amateurs naturally come most strongly to the front in views of choice bits of scenery. Mr. James Wood sends ten frames of Obernetter prints, which are remarkable for their artistic taste. Mr. W. Faulkner sends twelve interesting frames. Mr. James Higson's landscapes lose some of their effect by the gilt framing, and some of Mr. Tomlinson's would gain by more attention in the mounting. Transparencies are exhibited by Mr. W. I. Chadwick, Hon. Secretary of the Manchester Photographic Society, and Mr. James Higson.

FIGURES IN LANDSCAPE AND GENRE.

[Paper read by Mr. Graham Balfour, M.A., at the Camera Club.]

THE employment of models in photography is, perhaps, verbally a more exact title for the remarks which I propose to make to-night, but that seems somehow to have a more utilitarian, at once a more mechanical and more practical ring than can belong to any hints of mine, and therefore I have asked you to listen to a few suggestions on the use of figures in landscape and genre.

This limitation will, at any rate, serve to show that I refer only to those photographs which are taken as pictures for their own sake. I do not deal with illustrations of places or people, nor with scientific work, but solely with original photographs taken for the intrinsic beauty or interest of the subject, as visibly expressed or actually suggested in the print, and carried to the utmost perfection possible to the means employed.

I assume that the pictures are satisfactory in composition and tone, that they are correctly exposed, happily developed, and suitably printed, for none of these points am I now going to discuss.

In landscapes the necessity for figures is a vexed question, and one with which I at first intended to begin this paper. But it is too wide and important a subject to touch merely as a side issue, and I will here simply state my own opinion that, with two or three obvious exceptions, landscape without the figure of man or beast is a mistake, and that the result of such an omission is want of purpose and of interest.

Genre painting, at any rate, always includes figures, except in those pictures of still life, drawn mostly from the dinner-table and the larder, which are so uninteresting in colour, and in photography fortunately are seldom seen. The exact content of genre is defined by Littré as painting other than historical or landscape, and certainly those are the three classes of the old division of the art. But portraits I would now place in a class by themselves, or, at any rate, exclude from the following remarks, and with the still-life portion of genre I have evidently no concern.

Thus for genre, as the domain of character and incident, I presuppose figures, but the border-line between it and landscape with figures is notoriously hard to draw. Probably no scientific frontier is possible; roughly, the division is made by the size of the figures and the expression of the face, accordingly as it is visible or otherwise. I attempted a classification on the basis of visible expression, but it would not hold, and fortunately an exact definition is here unnecessary. The same rules apply in each case. On the size of the figure chiefly depend the uses to which we put it, the purposes for which we employ it. The smallest

figures are generally introduced as a spot in composition, or to save the picture from being entirely inhuman and desolate. Slightly larger figures, which are still too small to exhibit the expression of the face, yet tell their story by gesture or attitude. Most of the rules relating to facial expression apply equally to gesture, and therefore I pass on, merely noticing that the smaller the figures are, the less effect do they produce, but, at the same time, they are easier and less intractable; for, when the face is not seen the figure is much simpler to pose, and even if the attitude is slightly strained or self-conscious this fault is less conspicuous, and any shortcomings of costume or model are less glaring. Thence we pass into the debateable land where the figures are of exactly equal importance with their surroundings, and the boundary question is mostly settled by prejudice. Beyond this comes the region where figures are all-in-all, and the landscape dwindles away into nonentity. I believe that the whole of this continent is under the same laws, but that the different rules differ in importance in various provinces. To drop metaphor, it is manifest that the larger and more distinct the face is, the greater is the care required in dealing with it.

Most of the general rules of art which can be laid down for the guidance of photographers can be discovered by common sense, and most of the crimes committed in the name of photography are due rather to want of reflection than to deliberate depravity. Many photographers, especially the scientific workers, have a horror of art rules, which they consider altogether unnecessary and arbitrary. It is a fact that once a truth has been decanted into a certain form of words, it has necessarily ceased to be the whole truth, for there is always some leakage and some change in the process. All formulated maxims are very condensed records of experience, and are of little other use than to serve as hints and suggestions, mostly on the prohibitive side. Law making is the first conscious stage of any art, but unless the set forms are sooner or later altered, modified, adapted, and at times broken, that art is incapable of any further progress. Nevertheless, in the dearest formula always there has once been a germ of life, and to preserve this and render it once again useful is the best service any critic could perform. But my point is, that most of the rules of art were not in the beginning mere pedantry and charlatanism, but fresh, vital, and pregnant discoveries.

It is, again, supposed to be cramping and destructive of life and enterprise. An art that is as full of stupid signboards as Mr. Du Maurier's picture of Hampstead Heath is neither pleasant nor profitable. I only hope that I may never say anything that will discourage energy or new departures. Experiment is the life of art, especially of a new art. Genius generally disproves a few rules. If you think you see a new line, consider it fully, then have a dash at it, then see where you have got to. Only, if you fail, for art's sake do not ask any one to believe that you have succeeded, or to follow you. There are wrong ways as well as right ways, and if you can discover which is which, it is only a waste of time to start on the former. Let us proceed to see what directions we can lay down for photography.

I. The first thing to inquire in any art is, What is its aim, and what means has it to carry out that aim? If we discover these means and their capabilities, and do not attempt to overstrain them, we are not likely to go far wrong in that art.

Now every photograph, so far as it is a photograph in any present sense, has been produced by two agencies—by the joint action of man and his apparatus—by the human and artistic element, and by the mechanical and scientific element.

It is thus plain that there are two sets of limitations in photography, and consequently two sets of rules which have to be taken into account.

I will first take the material limitation, the restricted powers of the camera and lens. Now the worst point about a lens is that it has little or no imagination, but is so very matter-of-fact. It sees truly, but it can see nothing but what is just in front of it in an actual, material shape. Thus (a) it can only deal with the present; the past is useless to it, and though a perfect observer and recorder of passing events, it is useless for retrospect. It writes chronicles, not history. (b) It can do no ideal or imaginary work.

Next let us consider the restrictions of the artist himself. The human eye and brain preside over all art. Using other means than the camera, they can call up the past and reclothe it with visible form, or give outward embodiment to ideas which have only existed in the mind, or select certain out of many objects in the scene before the eye and represent these alone, to the exclusion of all else. But the human retina is in some ways less perfect than the lens and gelatino-bromide plate. As far as light is concerned, they are fairly equal, though the right kind of light is cumulative for the plate, which thus in time records what the eye can never see. But as far as art is concerned, the chief difference lies in the power of receiving instantaneous impressions. The lens and plate can record attitudes and effects which the eye can never perceive; and what the eye cannot see in nature, it naturally refuses to recognise in art.

Thus from artistic photographs we must exclude, on the one hand, what does not exist in outward nature, and, therefore, can never itself be transmitted through the lens; and, on the other hand, certain actually existing facts discovered by the lens, yet which the eye can never see, and consequently would never select for a picture.

Now it may be asked why we should concern ourselves with the nature of the means, and why we may not use any results we can obtain and be thankful.

As to the limitation of the human eye, I can only say that art in its present meaning depends upon the human observation of nature. If you develop an art based on instantaneous photography, you embark in an altogether new and distinct enterprise, and you have my best wishes for your enjoyment and success. But you have no connexion with art as it now exists.

As to mechanical limitations, the argument that the end is all in all, and that any means may be employed to reach it, is the one which has been heard oftenest in the battle between the two styles of wood-cutting, the old and the new, the schools represented respectively by Bewick and the *Century Magazine*. The essential feature of wood-engraving is, of course, that it is portion of the woodblock cut away which is rendered white in the print, whereas in metal plates every cut is printed black. Consequently the white line has been treated as the characteristic of the woodcut, and upon it the old craftsmen relied for their effects, while the new school, on the other hand, has set itself to produce masses of half tone with a great variety and delicacy of gradation. The former declare that this may be beautiful, but it is not of the nature of genuine wood-cutting. The young men answer: "That may be true, but what do we care? As long as our results are admirable we will continue to produce them by any means in our power."

I am not responsible for the defence of the new wood-cutting, but, as a matter of fact, I consider it to be quite legitimate, because the white line is not so absolutely essential a part of the prints from woodblocks that any reproach is due to the artists who neglect it. To the outsider any one mode of cutting, if it is fairly within the power of artist and tool, seems as good as another, if the impressions are equal. As long as the change of method does not result in a deteriorated product, greater freedom of working conditions must be a benefit to the art at large.

But with us in this instance it is otherwise. Reality is so invariable a condition of photography that it is inextricably bound up alike with end and means. A photograph cannot be a photograph at all in my present sense unless it has been taken from a real object. It is no case of alternative treatments, which both issue in a legitimate result; but here if the making is conducted on wrong and dishonest principles, the thing made is inherently bad.

I do not wish to introduce any irrelevant philosophy, but may remark that all this artistic morality is quite different from the private morality of the operator, and that transgression of it merely vitiates the product in which such artistic fraud appears. I bring this in because I believe that a good deal of harm has been done to art by the supposed identity of æsthetic and ethical morality; I am certain, at any rate, that a great deal of nonsense has been talked about it; but here I am careful to recognise the distinction, and speak only in terms of art. An art has certain limitations, that is obvious. If it go beyond them by some trick, and produce a result which cannot be what it pretends to be, and only passes because it is a result possible to some other art—that is artistic dishonesty. Not only must it be in the long run unprofitable and disadvantageous, but it cannot have any real and honourable life of its own.

This, of course, does not exclude "dodges," double printings, and the like, which are but remedies applied to the shortcomings of our tools, *provided always* that the results are *more and not less true to nature* than they would otherwise have been, and are consistent with the means which must have been employed to produce them.

Now let us leave these rather dreary generalities and examine in detail a few concrete offences against Reality. This will fall into two divisions—Human, the reality visible to the eye; and Mechanical, the reality confrontable by the camera.

As to Human Reality, there are certain subjects to which it is advisable or necessary to give very rapid exposures, such as animals, the use of which I shall recommend later on. Now, in instantaneous pictures we have to be very careful of our attitudes. Whence man originally derived the idea of the gait of horses, such as we see expressed in pictures, I do not know; I suppose they are, after all, "impressions," that having, like a Japanese artist, carefully studied the animal in motion, the painter then sat down to produce the four legs in attitudes which should give a general effect of its action, and some one early version was adopted as the pattern which, with occasional slight modifications, was followed for centuries. So little capable was the human eye of following such rapid motion, that, as you will find in the Badminton volume on racing, Dick Christian, a man conversant with horses all his life, stated and firmly believed a theory that, after a jump, a horse always alighted on its hind legs.

Some of the attitudes discovered by photography were entirely novel and incongruous, possible only to rapidly-moving bodies, and that for a brief instant; others do not differ so widely from the accepted conventionalities: and these, being the representative and typical parts of the action, we are gradually being educated to adopt. I have noticed, for example, that Mr. Gow is always very careful in the horses in his fine battle pictures to employ attitudes alike truthful and graceful, though I do not know anything about his methods.

But, unfortunately, this fact leaves the success of a good many of our photographs to mere chance, since a moving animal in a prominent spot may come out in a ludicrous neck-and-crop attitude, at once incongruous and apparently impossible. Even the walk of a cow, for example, I have

always found to be more ungainly than would have been imagined. Homer's "trailing-looted" oxen are certainly better seen at rest than in motion. Where the figures are very small, the defect is so inconspicuous as to be outweighed by the advantages of the figures; but for pictorial effects it is better if possible to avoid those attitudes which cannot be maintained long enough to become visible to the human eye; and if there is no help for it, we must just take our chances, and pick our results.

(To be continued.)

CAMERA CLUB CONFERENCE PAPERS.

SOMETHING NEW IN PHOTO-LITHOGRAPHIC WORK.

By W. T. WILKINSON.

THE usual method of making photo-lithographic transfers is upon gelatine made sensitive with potassium bichromate. This is quite sensitive enough to daylight, or to electric light; but if transfers are required when neither day nor electric light is available, then bichromated gelatine is useless, and some other method is wanted. Try this:—Make a print upon any of the ordinary bromide papers of commerce, using a good negative from a subject in line, by artificial light; develop the image with alkaline pyro, then wash and place it upon the inking-board (see fig. 16, p. 141, *Photo-engraving, Etching, &c.*); next, blot off the water with a soft cloth, and dab all over with a sponge saturated with transfer ink thinned with turpentine; let the turpentine evaporate, then take a glue roller, *i.e.*, a type-printer's roller, and roll until the whites are quite clear of ink. Now soak the print in the pyro again for a few seconds, and expose it to the light. Finally, wash free from pyro and hang the print up to dry. When the print is dry it is ready for the transferer, who treats it the same as he would any other photo-lithographic transfer.

The only way to fail with this method is to over or under expose the print, or to use a bad negative. The negative must show perfectly clear lines. Some of the newer papers of commerce contain too little gelatine to succeed perfectly, therefore it is best to make the paper at home. It is not a very complicated process, as the colour of the image under the developer is not all-important. A good formula is—

Gelatine	800 grains.
Water	30 ounces.

When the gelatine is quite soft melt it at 120° Fahr., and add 320 grains of ammonium bromide; stir it until it is dissolved, then add ten minims of hydrochloric acid and stir well.

In ten ounces of water dissolve 450 grains of nitrate of silver, bringing this solution to the same temperature as the gelatine solution; now proceed to pour the silver solution into the gelatine in a very thin stream, stirring it vigorously all the time. Now strain it into a warm dish, and tilt the solution so that it is only along one edge of the dish. Having made a small roll of the paper, lay one edge of the roll upon the liquid, and as it curls take hold of it and lift it slowly up, when the paper will unroll itself, and receive a nice even coat of emulsion. Hang it up to dry, and repeat until all the emulsion is used.

For half-tone transfers use the bromide and chloride of calcium with 200 grains extra of gelatine, drying the paper at as high a temperature as possible without melting the gelatine. Paper with this emulsion upon will be very hygroscopic, and must be kept very dry. Before use always dry the paper, and warm again before developing, so as to encourage the reticulation of the gelatine.

This paper is to be exposed under a half-tone negative, developed and washed, then inked up as directed for the line transfers, followed by immersion in the developer, and subsequent exposure to light, washing, and drying. To transfer to stone, trim with a pair of long shears, then put it into the damping-book until quite limp; then sponge the back of the transfer with a solution of oxalic acid one part, water 100 parts. Take great care that none of this solution gets on the front of the transfer. Lay the sheet in position upon a cold, dry stone, and pull it through the press, with plenty of pressure, five or six times without lifting the tympan. The paper can be lifted off, leaving the image in ink on the stone. Gum it in and leave it for five or six hours before rolling up.

TO MAKE GRAINED NEGATIVES FOR ZINC ETCHING WITHOUT A SCREEN.

By W. T. WILKINSON.

THIS is done by coating the plates with an emulsion containing sulphate of baryta in very fine powder, and well shaken up before coating. Pictures are taken upon these plates and developed and fixed in the usual way, but the image instead of being smooth and nice will be covered with myriads of fine pinholes. These negatives are used for printing on the zinc in bitumen, then etched in relief for type blocks.

Instead of sulphate of baryta, carbonate of soda, &c., may be used in the emulsion, and, after fixing, immersion in weak acid will develop the pinholes. The bromo-chloride emulsion may be used upon collotype

No. 8899.—"Rendering Albumenised and Sensitised Photographic Paper Free from Smell." T. THORNS.—*Dated May 29, 1889.*

No. 8946.—"Improvements in the Production of Semi-transparent Marks or Designs on or in Paper by means of Gelatine Relief Printing." Complete specification. J. HUSNIK.—*Dated May 29, 1889.*

No. 9012.—"Improvements in Colour Photography." Complete specification. A. H. CROES.—*Dated May 30, 1889.*

No. 9161.—"An Improved Instantaneous Shutter for Use in Front Part of the Lens of Photographic Apparatus." G. DICKENS.—*Dated June 3, 1889.*

No. 9198.—"Improvements in Albums for Photographs and the like." S. MARKS and B. FUCHS.—*Dated June 3, 1889.*

No. 9312.—"Improvements in Photographic Box Cameras." G. C. ISKFIN.—*Dated June 5, 1889.*

No. 9403.—"Improvements in Apparatus for Copying by Photography." A. HARR and W. STROUD.—*Dated June 6, 1889.*

No. 9475.—"Improvements in Apparatus for Washing Photographic Negatives or Plates." F. W. ALLCHIN and J. E. ROBINSON.—*Dated June 7, 1889.*

No. 9520.—"The Delivery and Regular Distribution of Gelatino-bromide of Silver or other Emulsion or Viscous Liquid upon Glass, Paper, or other Plane Surface." J. H. SMITH.—*Dated June 8, 1889.*

PATENT COMPLETED.

APPARATUS FOR AUTOMATICALLY PRODUCING AND COMPLETING PHOTOGRAPHS.

No. 5211. KARL RAMSPECK and BARTHOLOMÄUS SCHÄFER, 2^{te} Jacobstrasse, Hamburg, Germany.—*March 26, 1889.*

THE object of this invention is an apparatus which shall be capable of producing and completing automatically the photographic likeness of persons.

The essential features of the apparatus are that a motor, actuated by clockwork, by weights, or by electricity, or otherwise, revolves an upright shaft arranged in a closed box or casing. The shaft carries a radial arm attached thereto, at the end of which is a holder which seizes a plate at its upper end shifted forward from a conveying apparatus. The plate is revolved by the rotating shaft, and during this rotation it receives the necessary preparation for producing the photographs as well as the further treatment after exposure necessary for developing and fixing the picture. This is done in the following manner: During revolution of the shaft, the arm carrying the plate dips the latter by corresponding downward movements first into a solution of collodium and then into a bath of nitrate of silver. The plate thus prepared arrives in course of the further revolution of the shaft in front of the lens, and during a short stoppage of the arm in front of the said lens, a shutter opens and the plate is exposed. The plate then continues its movement, and is successively brought in front of several syringing and rinsing apparatus. Finally the picture is immersed in a solution of lac and quickly dried. The baths arranged underneath the arm are in basins in a circle around the shaft.

Instead of carrying the plate around the circle, the baths can be revolved by attaching them to the vertical axis; the plate then only moves up and down. The intervals of time which are necessary for the immersion and the remaining of the plates in the baths and for the stopping in front of the lens are regulated by the motor.

[A drawing of an apparatus is given with revolving vertical shaft.]

The claims are:—1. In apparatus for automatically producing photographs the construction whereby the series of various operating agents are arranged in a circle about a central holder, in which the plate to be treated is supported so that said plate may be brought under successive operation of said agents for the production thereon of a photograph, by the rotation of said holder or of said series of operating agents.—2. In apparatus of the nature set forth in claim 1 for automatically producing photographs, the construction of the plate holder and of the several mechanisms for performing the stages of the process in combination with said holder, substantially as illustrated and described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 17.....	North Middlesex Club	The Iron Room, Strand Green.
" 18.....	North London	Myddelton Hall, Upper-st., Islington.
" 18.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 19.....	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 19.....	Bury	
" 19.....	Manchester Camera Club	Victoria Hotel.
" 19.....	Edinburgh Photo. Club	5, St. Andrew-square.
" 19.....	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 20.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JUNE 11.—Mr. James Glaisher (President) in the chair.

The PRESIDENT announced that the Judges elected to act at the next Exhibition of the Society are Messrs. Bedford, Blanchard, Davison, W. England, Gale, Robinson, and Taylor; and that they would also act as the Hanging Committee, so would have full opportunities for studying the merits of the pictures.

Mr. T. R. DALLMEYER read a paper on *The Bearings of the Possible Introduction of Spherical Aberration in Photographic Lenses*. He said that the amount of foreground requiring to be brought into comparative sharp focus in photographs is less than the amount beyond the chief object focussed, and that softness and delicacy are given by the introduction of a certain amount of spherical aberration. His late father made a portrait lens which would suit both purposes, in consequence of the demand for such a lens by some of the

leading photographers, although there are widely divided schools among photographers in relation to this subject.

Mr. W. E. DEBENHAM said that the plan of introducing spherical aberration was proposed by Professor Petzval about 1858, but the Professor said that it did not give more sharpness in the outer planes; they looked sharper because there was no sharpness with which to compare them. Mr. Dallmeyer now claimed that sharpness was improved only on one side of the sharpest focus; he (the speaker) had tried experiments on this point and found that it was not the case. If Mr. Dallmeyer's contention could be supported it should be proved by experiment.

Mr. CHAPMAN JONES remarked that some of the best photographers accepted the lens as useful, and that was a proof that it was wanted. He thought that the points of contention between the late Mr. Dallmeyer and the late Mr. Grubb were both proved by the published diagram of the latter, for the image consisted both of nucleus and halo, wherefore he thought it impossible to test the point, which could best be decided by practical experience with the lenses.

Mr. DEBENHAM was not at variance with those who liked spherical aberration. Mr. DALLMEYER replied that Mr. Debenham's method of testing was not quite a fair one; it was best to test by means of the image of a candle flame.

Mr. DEBENHAM suggested that Mr. Dallmeyer should repeat his experiments, but use a black spot on a white ground instead of a candle flame, and that then he might not obtain the same result.

Mr. DALLMEYER responded that with a flame it was easier to see when it was in or out of focus.

Mr. LEON WARNERKE said that he had had a visit from a Russian gentleman who had given him a few small pieces of a new printing paper made by Mr. Suchatcheff, of St. Petersburg. He (Mr. Warnerke) did not know how the paper was made. It required, he said, a little less exposure behind the negative than does ordinary albumenised paper, after which the image may or may not be visible; it is then developed by floating the back of the paper on water, and afterwards fixed by pushing the paper below the surface of the water and washing out the salts. He had found that there was no silver in the paper, and that a trace of hyposulphite of soda in the washing water improved the colour of the prints. The speaker then developed two prints which, by the aid of the hyposulphite, were of a kind of violet-black colour. One print was from a negative he had taken in Constantinople last year; he had not been hindered when taking open-air photographs in that city.

Mr. DEBENHAM thought that the paper might have been prepared with an iron salt in conjunction with a salt of palladium, iridium, or gold; probably gold.

Mr. WARNERKE thought that there was no gold in the paper, which was made commercially for copying engineering and other plans.

Mr. W. H. HARRISON supposed that a bichromate salt might be the chief agent; the colour first produced resembled that due to the reduction of a bichromate by light, but was deeper.

Mr. JOHN SPILLER suspected it to be prepared with mixed gold and iron salts.

Mr. WARNERKE speculated that a uranium salt might be the chief acting agent.

Mr. Friese Greene exhibited a photograph which had been printed and fixed on a card made waterproof, so needed no mounting.

Mr. WARNERKE exhibited a flash-light picture of the previous Council meeting, and suggested that one should be taken by somebody of every Council meeting throughout the year.

The PRESIDENT hoped that photographers would do their best to send in many good photographs for the coming Exhibition of the Society.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 6.—Mr. F. A. Bridge in the chair.

Mr. H. B. Scott was elected a member.

Mr. H. D. ATKINSON exhibited some prints which had been given to him as old photographs; from their appearance he thought that they were among the earlier productions of the Stereoscopic Company.

Mr. W. E. DEBENHAM thought that they dated from 1857 or 1858.

Mr. HERBERT S. STARNES exhibited two large volumes of old photographs, dated 1855 and 1857, which had been lent to him by Mr. J. J. Morrish; the volumes consisted of "Contributions of the Members of the Photographic Club," and were published by Charles Wittingham, London, under the title of *The Photographic Album* for the particular year in which each volume was issued. Mr. Starnes added that the process by which each picture had been taken had been printed in these volumes opposite each print; if the same plan were to be adopted now the prints of our own day might be very useful twenty or thirty years hence. The more permanent of the photographs in the volumes had been printed on Twogood's plain paper by the ammonio-nitrate process and toned with *sel d'or*. The albumenised prints had yellowed considerably. He added that the most faded prints in the book had been taken by professional photographers.

Mr. DEBENHAM stated that *sel d'or* certainly favoured permanency but that it did not answer with albumenised paper; *sel d'or* consisted of hyposulphite of gold, and it yellowed albumenised prints. It threw down much gold on the print, and that was a great advantage, because it thereby gave greater permanency. A photograph in one of the books from a calotype negative showed no halation in a window in the picture.

Mr. W. H. HARRISON noticed that two of the pictures in the volumes had been taken by Sir Joscelyn Coghill, the father of one of the two young officers who were killed in Zululand fighting for the Queen's colours; one of the pictures was the Castle of Chillon and the other the Gorge of Gondo, in Switzerland; both pictures were dated 1855. Sir Joscelyn Coghill had told him that he could take photographs, but said so in such a modest way that he (the speaker) had no idea that he could do such good work by old processes as in the specimens on the table.

Mr. P. EVERETT had a lens which threw an image so that when distant objects were out of focus the motion of the shutter behind the lens seemed to make those distant objects move up and down.

Mr. DEBENHAM remarked that the "out of sharpness" meant that every point occupied considerable space on the plate, and the shutter in its motion cut off successively different parts of the diffused image.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JUNE 4.—Mr. J. Traill Taylor (President) in the chair.

Rev. E. HEALY showed some plates by Kennett which he had developed; they were about thirteen years old.

Mr. W. BISHOP asked what difference there is between bromide of potassium and bromide of ammonium.

Mr. V. BLANCHARD stated that when using bromide of ammonium with the hydroquinone developer a yellow stain is produced, while no stain is present with bromide of potassium.

Mr. A. MACKIE said that with pyro, bromide of ammonium is a more powerful restrainer; some plates, however, are more liable to green fog with it.

Mr. Blanchard was then called upon to demonstrate his new method of toning prints with platinum, several prints toned by this means having been exhibited to the meeting.

Mr. BLANCHARD commenced his remarks by showing two negatives which were the thinnest that good prints could be obtained from, and said that the chief cause of failure with beginners is under printing, as the prints reduce considerably during toning. He then toned two prints which had not been quite printed enough, and successfully accomplished it by stopping the toning at a warm black before too much reduction had taken place. So much platinum is not deposited on the print by stopping the process early, and the printing must be continued to allow the platinum to go right through to obtain good black tones, which were considered much more artistic. He had been using a rough-surface thick paper, which produced results much more artistic than the glass and warm colour of the silver print. Fifty years ago photographs on matt-surface paper were considered correct from an artistic point of view, and, after photographs with a glazed surface had been in vogue for many years, the public were again coming to the belief that a matt surface is more satisfactory. They were indebted for this in a great measure to Mr. Willis for the invention of the platinotype process, but he claimed for his process that combination printing can be done much more easily than with platinotype or other papers that do not print out. It would print quicker than albumenised paper, and he considered that if it were cut up and kept between glass it would be good in two years; it was also a very simple and workable process.

Exposed prints having been handed round, they were washed as ordinary silver prints and placed in the toning solution containing the platinum and fixed in hypo, one to six, for ten minutes.

Mr. W. BISHOP asked if there would be a loss of permanency in stopping the toning early to compensate for under printing.

Mr. BLANCHARD replied that as there is no sulphur compound in the paper as in albumenised paper, they would probably be just as permanent under ordinary conditions.

The next meeting will be on June 18.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

JUNE 7.—Mr. F. W. Webb in the chair.

Mr. F. W. EDWARDS gave a demonstration in *Platinotype Printing*. He fully explained the platinotype process, and having brought with him about thirty undeveloped prints, proceeded to develop them before the meeting. The greatest enemy to success being damp, Mr. Edwards purposely left a print to show what the effect would be if damp was allowed to get at the paper while it was being manipulated. The whole of the demonstration was very successful.

It was resolved that an outdoor meeting be held on Saturday, June 22, in the neighbourhood of Carshalton, the members to assemble at half-past six for tea at Cheam Park.

The next ordinary meeting will be held at 76, Peckham-rye on Friday, July 5, at eight p.m.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

JUNE 4.—Messrs. W. H. Walker and Lewis Wolff were elected first President and Vice-President respectively.

The members are to be congratulated on their selection to fill these offices; both gentlemen took a large share in the formation of the Society, in January, 1887, and have never relaxed their exertions for its welfare.

A discussion on hand cameras followed the election. The HON. SECRETARY made a few introductory remarks, classing this form of camera under two heads, viz. purely "detective" cameras, and those that may be used in the hand without attracting attention or on the tripod in the usual way. Messrs. Marjion's book and parcel detectors were then explained; the Kodak, having been already shown, was not again explained.

Mr. FALLOWFIELD then described the method of working Miall's new camera, the chief feature of which lies in the means of changing the plates by a turn of a button, the change being registered on a plainly visible disc above the button. The low price of this instrument is very noteworthy.

Messrs. Thomas's "Wellington" was kindly sent for the members' inspection, and a representative of the firm explained its points. The use of double backs is applied to this camera; and two of similar construction, by Messrs. Watson and Messrs. Beck, were brought by members and placed on the table.

Messrs. Rouch's "Eureka" was explained, and samples of work done submitted. This was followed by the "McKellen," comment being made on the method of focussing applied.

Mr. H. Sealer submitted an American pattern which he had considerably altered and improved.

The Hon. Secretary also showed Messrs. Hockin's "American," for use with films; its principle feature was considered to be its exceptionally low price.

Considerable discussion arose on the various forms of camera, and the time at the disposal of the meeting was hardly sufficient for the full consideration of this wide question, which will probably be revived at some future date.

At the next meeting, on the 15th instant, at the West Norwood Constitutional

Club, at eight p.m., Mr. Valentine Blanchard will demonstrate his new black platinum printing process. Visitors welcomed.

BRIGHTON PHOTOGRAPHIC SOCIETY.

JUNE 11.—The President in the chair.

A discussion on *Hydroquinone as a Developer* was opened by Dr. REAN, and the subject was warmly discussed by the members present.

The negatives and prints of the views taken on the Rottingdean excursion were then exhibited, also several prints and negatives the work of members.

Next excursion to Lewes, Saturday, June 22. Train leaves the Brighton terminus at twenty-eight minutes to three p.m.

Mr. E. J. Bedford will read a paper on July 9 on *The Art Side of Photography*.

LEWES PHOTOGRAPHIC SOCIETY.

JUNE 4.—The President in the chair.

Mr. A. H. C. CORDER read a paper on *The Platinotype Process*. His paper dealt briefly with the hot and cold-bath processes, the Pizzighelli direct printing process, and the new process just brought out by Mr. Valentine Blanchard. He afterwards developed some prints by the hot-bath process and passed them round for inspection.

A discussion then took place, in which the President, Mr. C. A. Wells, Mr. Foxall, the Hon. Secretary, and others took part.

The meeting then resolved itself into a *conversazione*.

Several members brought negatives obtained at the excursion held on May 20, also prints from them, and, considering the unfavourable weather, the results were considered satisfactory.

The President exhibited his detective camera, which consisted of a quarter-plate camera in a box, and showed work which had been done with it.

Several other members also exhibited work.

At the next meeting, to be held on July 2, the Hon. Secretary will read a paper on *The Artistic Side of Photography*.

SHEFFIELD CAMERA CLUB.

JUNE 7.—Dr. T. H. Morton presided.

Mr. Claude Barker was elected a member.

Several interesting objects were shown, including Carbutt films, stereoscopic views by Mr. G. E. Maleham, instantaneous studies by Mr. J. O. Arnold, F.C.S., also a number of views taken with a drop shutter by the Chairman on Edwards's isochromatic plates; the density and detail in the negatives proved the efficiency of this class of plate.

Mr. ARNOLD then gave a lecture on *Photo-micrography*. He described the apparatus necessary, and mentioned the difficulties which beset the process in its various stages. He said it was essential to have a powerful and steady light, and for moderately dense objects he used a good microscopical lamp with plano-convex condenser, but found limelight and magnesium ribbon more effectual. Transparent sections of wood and tissues generally were best stained brown or red, that is in their structural details; blue stains and pale tints gave very poor results. Opaque bodies, including many rock sections, had to be taken by reflected light, and Dr. Sorby's hyperbolic condenser was invaluable, as it threw no shadow. In regard to the microscope, the lecturer worked with both objective and eyepiece. The power selected depended on the subject; two-inch up to quarter-inch embraced a large number of suitable objects, but a higher magnifier was occasionally needed. Mr. Arnold proceeded to photograph a specimen of mica containing oxide of manganese—a semi-transparent section. After focussing by means of a lamp which was afterwards removed, about nine inches of magnesium ribbon was burned behind the section. The camera slide closed, removed, and plate developed in the dark room with hydroquinone, a very satisfactory negative resulted. Microscopical lantern slides of wood, diatoms, starch granules, and polarised light were shown to illustrate the lecture.

A discussion followed, in which the Chairman, Rev. Clementson, Messrs. B. W. Winder, Maleham, and G. J. W. Newsholme took part.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

MAY 25.—(Outdoor meeting.) The places visited were the Stroud Valley and Cirencester.

Brinscombe was reached about noon, and members here left the rail and trudged off towards Saperton, the first halting place. Some pretty peeps were obtained along the canal bank, and the cameras were fairly busy until three o'clock, when Saperton was reached. By the kindness of the President (Mr. H. A. Hood Daniel) a well-stocked luncheon basket was here awaiting the hungry travellers.

Mr. William Thomas Currey, of Chelvey, Somerset, was elected a member.

The walk was then continued over pleasant ground to Bathurst Park, and the seemingly interminable avenue reached which leads at length to Cirencester. The tower of Cirencester Church terminated the prospect in the dim distance, and seemed to recede before the advancing travellers.

A short time only was allowed in Cirencester town, sufficient for a hasty picture or two of the exterior of the church, which is a noble and remarkable building. The train then took members back to Stroud, whence they drove to the residence of Mr. Lush, of Standish, who had kindly invited them to partake of his hospitality. After a very pleasant hour or two at his residence, they walked across the fields to Stonehouse and took the train home.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, June 19, 1889, will be on *Printing Processes*. Saturday outing at Rickmansworth.

FIRE.—We are sorry to learn of the entire destruction by fire of the premises, stock, plant, and machinery of the Paget Prize Plate Company on Saturday last. We believe that they will be able to recommence work in a few weeks.

Correspondence.

Correspondents should never write on both sides of the paper.

JUNE MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—AN ENGLISH PHOTOGRAPHER WELCOMED.—DELEGATIONS EXPECTED AT PARIS TO COMMEMORATE THE CENTENARY OF THE INTRODUCTION OF PHOTOGRAPHY: PROPOSED BANQUET.—A HAND CAMERA.—HOW TO MAKE A RED LAMP FOR THE DARK ROOM.—A NOVEL CAMERA STAND.—A NEW MEANS OF MAKING LARGE PHOTOGRAPHS OF DISTANT OBJECTS.—HOW TO CHOOSE RED GLASS FOR THE DARK ROOM.—A NOVEL CHANGING BOX.—THE ENEMY TO GELATINE BROMIDE PLATES.—A UNIVERSAL HOLDER FOR LENSES.—PRINTING IN DIFFERENT COLOURED INKS ON THE SAME PRINT.—DONATION OF PHOTOGRAPHIC PUBLICATIONS BY MESSRS. GAUTHIER-VILLARS & Co.—PHOTOGRAPHING RACE HORSES ARRIVING AT THE POST.—HOW TO TREAT NEGATIVES.—ORTHOCHROMATIC PLATES.—AN AUTOMATIC APPARATUS.—PHOTOGRAPHY AT THE EXHIBITION.

The Photographic Society of France held their monthly meeting on Friday evening last, the 7th instant. M. Davanne in the chair. After the election of new members, the reading of correspondence, &c., the Chairman welcomed, in the name of the Society, Mr. Protheroe, of Bristol, saying that the French Society was always happy to see foreign photographers and amateurs among them.

The Secretary informed the members that the Society had received very many letters of congratulation from foreign societies on the occasion of the forthcoming centenary of the introduction of photography, and the information was received that several delegations would be sent to Paris. The Chairman informed the members that the Committee had proposed to unite in a banquet to commemorate that happy event, and to receive the foreign deputations in the most cordial manner possible. The date of the banquet will be published as soon as possible, and the Society would be happy to welcome all foreign photographers present in Paris at that time to partake of their hospitality.

A letter was read from M. Isard, of Clermont Ferrand, stating that the best toning of silver chloride proofs could be obtained by pouring water upon quicklime, then using the said water to dissolve the gold salt—the bath works much better when fairly hot.

M. Mario Carquero, the well-known maker of photographic cameras, presented a new hand camera, which he names "Le Scanty." This apparatus takes up very little room, and is light and convenient.

M. Hervé showed the members how he transformed a petroleum lamp into a safety lamp for the dark room. He informed us that he chose his lamp small enough so that an ordinary red glass gas tube would pass over the chimney of the petroleum lamp. To stop the white rays from going under the red tube, a cardboard box, having a hole in the bottom, was passed over the white glass of the lamp; this hid the white light coming through the perforated brass work of the lamp; it sustains, at the same time, the red tube of glass. The white light from the top is prevented by rolling the tin of an empty sardine box so that the light is intercepted. M. Hervé pastes a piece of red paper over one-half of the red glass tube.

M. Gorle presented another hand camera, differing in principle from others, but similar in the object to be obtained.

M. Le Breton exhibited a camera stand composed of three brass tubes, connected at the top by a triangle, as in other stands. The stand can be heightened or lowered at will by a telescope arrangement at the bottom. About five inches from the triangle on each branch of the stand is a very clever adaptation of a screw system—such as I have seen in some pencil holders; by turning the nut a little, the leg becomes longer or shorter at will. The advantage of this is great. Suppose one's head is under the focussing cloth, and the image on the ground glass is seen to be out of perpendicular, by a very slight turn of the hand the camera can be levelled immediately. It is true the same can be done with the ordinary stand by changing the position of the leg or legs, but by this system the same can be obtained in a more easy and satisfactory manner. In fact, now I contemplate upon the structure of M. Le Breton's stand, this motion is an essential part; because, in order to obtain solidity, the inventor is obliged to connect the three legs of his stand by means of a cross joint composed of three branches overlapping each other in about the middle of the stand; they are held fast as well by means of a brass screw-nut; therefore, the branches or legs of the stand cannot be moved with so much ease—nevertheless, I see that the same motion of the camera could be obtained by means of a universal socket ball adjustment, which, perhaps, would be cheaper than the other. As it is, the stand is very strong and steady, the only fault being its weight.

M. Guillinot presented the Society with the results of his experiments on endeavouring to make large pictures of distant objects. It is well known that many operators have been trying in vain to obtain this result, and have only succeeded by the use of a large telescope—which instrument is not easy to carry about, nor within the pecuniary means of the generality of the adepts of photography. It appears that with a simple camera a bird may be obtained, full size, at a distance of 500 metres—so says M. Guillinot. It appears that this gentleman places upon his camera a lens with a focus of forty-five centimetres, and the image of the distant object is focussed as sharp as possible upon the

ground glass. The latter is replaced by another lens, with a focus of five centimetres; this takes up the rays of light coming from the first lens, and the image is thus enlarged at the will of the operator. I have no doubt that this will cause some noise and great excitement, especially among military men, when it is known that the portrait of a battery can be taken some miles away from the operator.

M. Thouroude made some very useful remarks upon the red glass used in the laboratory (dark room), and warned the members of the danger of employing certain red glass which allowed the violet rays to pass through. It is not always that an ordinary spectroscope can detect these rays, said he; one must have a perfect instrument—too expensive to be in every studio. When once a piece of red glass has been obtained which is known to be safe, it is easy by its aid, and without a spectroscope, to know if another piece of red glass be good for photographic purposes.

"Take," said M. Thouroude, "an engraving, lay upon it a small piece of the red glass which is known to be good, and alongside it the glass to be tested. If the dark lines of the engraving are seen through the two glasses in the same manner—that is to say, the same intensity and colour—the glass may be counted as good, but if the black lines of the engraving, instead of being of the same colour, are grey or paler, the red glass must be put aside as useless."

M. Thouroude then presented a hand camera, the invention of an amateur. The camera is not unlike the thousands which we see at the present day, but it is in the changing box that a new feature is to be seen. He showed us that it did not require a second to change a plate, so that sixty shots could be got per minute. I will endeavour to describe how this is obtained. The changing box is formed of two rooms one above the other. The upper room contains all the plates. Each plate is held in a light brass frame. All these frames are pushed forward by a spiral spring at the back. Under the front plate is a slit communicating with the under compartment, which contains a spiral spring of the same strength as the upper one. A rolling shutter works in a groove on the top of the box, and when this is pushed home it masks the front plate and so prevents the rays from the lens falling upon the plate. When this shutter is drawn back the front plate, pushed by the spring, goes forward and takes its place. The plate is then exposed. The operator now pushes home the shutter, and this is what takes place: The edge of the shutter being about three-sixteenths of an inch wide, catches upon the top of the brass frame bearing the exposed plate and pushes it down into the lower room; by pulling the shutter back again the next plate goes forward, is exposed, and down it goes to join its companion below, and so on until all are exposed. The system is very ingenious, and, above all, simple, and will do away with all the old-fashioned changing boxes so apt to get out of order.

Some glass plates were presented to the Society simply coated with pure gelatine, in order to demonstrate upon the difficulty of preparing gelatine plates, &c., in warm weather. Large spots were seen here and there upon the surface, like small-pox upon the face of the human victim of that disease. It is now proved beyond a doubt that all the ills to which gelatino-bromide of silver plates are subject during the summer season may be traced to the decomposition of the gelatine brought on by animalcula. The only means to prevent this disease is an antiseptic, or, what is better, rapid drying in a current of air devoid of dust.

M. Molteni presented the Society with an apparatus intended to do away with the great number of heavy front boards to hold the different lenses which are required in a studio. It is well known that every lens must be screwed upon a piece of wood ready for use; sometimes the wood is warped or cracked, and time is often lost. It has been often asked if a universal adapter for all sized lenses could not be made. M. Molteni has tried to solve the difficulty in this wise: He has made a double ring large enough for the body of the largest lens of a photographer's collection to go through it. One part of this double ring is fixed to the front board by means of screws, the other part of the ring can be separated from the other, as it is mounted in the bayonet fashion. If an artist possesses ten different lenses he gets ten discs cut out of a sheet of ebonite; these discs must fit exactly the inside of the double ring. A hole must be cut in the centre of each disc according to the size of the screw on each lens. The brass ring is unscrewed off the lens, the ebonite ring put in its place, and the brass ring being screwed up nips the ebonite ring between it and the body of the lens and keeps it perfectly tight. The ebonite ring bearing the lens is then placed in the large ring before mentioned; the front or second part of the double ring is placed in its companion, and with a turn of the wrist it is sent home and nips the pieces of ebonite bearing the lens so that it cannot move. It will not take a minute now to take out the lens and change it for another. Mr. Protheroe found it so good that he begged me to solicit M. Molteni to allow him to have the one presented to take home with him to England.

Another member, M. de Villecholle, came with the intention of presenting a similar order of ideas. He does away with the front board of the camera and replaces it by a square piece of zinc, having a hole in the centre of a size to admit the back screw of the lens. This zinc plate once on the lens, the brass ring is screwed up and keeps it firmly fixed. This plan is very simple, simpler than the other, and at the hand of every photographer. The great advantage I see in both of these plans is that we no longer screw the ring or flange of the lens upon the front board, as this has been always a weak point in the camera, especially in the field,

and more so when a rapid shutter is adapted to the lens. The shock of the latter is sure, sooner or later, to loosen the screws and cause damage.

M. Gravier presented some gelatino-bichromated paper, which, after having been exposed to light under a lace window blind, was covered with different coloured fatty inks. This paper having been washed before, the Society abandoned the ink in those parts rendered insoluble by the light, whereas it stuck to those places protected from its action. The consequence was we had a pretty pattern of a window blind printed in different colours. The paper, I learn, was, and is, manufactured by M. Fisch, of Paris.

M. Gauthier-Villars, the photographic editor of France, kindly made a donation to the Society of several new books on photography lately published by him—*How to Obtain Enamels*, by Geyanet; *Permanent Pictures on Chinaware, Glass, &c.*, in Platinum, by the same author; *Photographic A.B.C.*, by W. H. Burton, translated into French.

M. de la Manna sent in some proofs for inspection, which prove sooner or later that photography will take the place of the umpire in horse races.

M. Guilleminot presented, at the last meeting of the Society, several negatives which had been under exposed and over developed no doubt, as that gentleman initiated the members into a secret process by which harmony could be obtained. The back of the negative was covered with a coloured collodion sensitive to light, the negative is laid in the bottom of a deep box (so that the rays of light should be parallel) and exposed for a short time to light. When washed the colour remains in those parts impressed by light, and leaves the collodion in those protected by the design from its influence. All practitioners can now see the value of this dodge. I must add, however, that long ago M. Germeil Bonnaud made a very interesting communication, not only to harmonise a negative, but also to intensify one when too feeble, and that by the best retoucher—light. This was sent to THE BRITISH JOURNAL OF PHOTOGRAPHY by your humble servant.

Messrs. Boissonas sent in a report of the value of orthochromatic plates and their superiority over ordinary gelatino-bromide of silver plates, especially if a yellow screen be employed. They say that the exposure is not lengthened by the interposition of the coloured screen.

M. Enjalbert has invented an automatic apparatus intended for the Exhibition. Every one now is acquainted with the weighing-machines and the sweet and chocolate apparatus, in the which, by putting a penny, one can have one's true weight, or some chocolate, sweets, matches, cigars, and what not. The automatic photographic apparatus invented by M. Enjalbert is intended to be placed in public resorts. A person desires his or her portrait, gets on the apparatus, and puts into the hole a silver half franc piece. Immediately the works are set in motion. A ferrottype plate passes under a mechanism and is coated with collodion; it is balanced in every direction on its way to the silver bath, in which it remains one minute. It then passes behind the lens and receives the impression, goes into another bath and is developed, makes its way through water into the cyanide bath, washed again, and is then plunged into a bath of alcohol, dries, then falls into an elegant brass frame, which is folded by machinery. It then makes its appearance, and is then seized by the owner, whose features it would be very interesting to study at that moment. A great deal of time and mechanical ingenuity have been employed by M. Enjalbert to complete this complicated machine, which we hope will repay him for his talent.

The French photographic department of the great Exhibition is not yet completed, nor is the Exhibition yet finished. I should counsel my readers not to come before a month if they do not desire to be deafened by the hammering or pushed about by the workmen running like busy bees in all directions. As to the English photographic department, it does not honour the nation nor please those who see it.

196, Rue Legendre, Paris.

PROF. E. STEBBINO.

SIDEREAL PHOTOGRAPHY.

To the Editor.

SIR,—Having lately read the report of the discussion which took place in London in the month of January last between Mr. Common, Mr. Clark, and the Chairman of the Camera Club (THE BRITISH JOURNAL OF PHOTOGRAPHY, February 1, 1889), on the subject of celestial photography, certain ideas have been suggested thereby which I take the liberty of putting before you.

The Chairman on that occasion (Mr. Traill Taylor) has rightly pointed out that a photographic objective ought only to present the image of a star as a geometric point without dimensions, and that this is the case no matter what be the intrinsic brightness of the star. All the photographs, however, which have been taken, even with the most perfect instruments, show definite discs, whose size increases with the brightness of the star. The attempted explanations of this kind of irradiation which have been given are scarcely very convincing. Mr. Traill Taylor attributes, with some plausibility, this curious phenomenon to reflections from the second face of the plate, which would produce an effect like that of the well-known halo in photographs, which, according to him, is due to this cause. Although Mr. Common only ventures to attribute this increase of size to a remarkable disposition of providence, he seems to me inclined to adopt Mr. Taylor's explanation.

If this explanation be correct, it involves a consequence of considerable

importance with regard to the accuracy and exactitude of the results obtained in stellar photography. As a consequence, in the case of a star situated exactly in the prolonged optic axis of the instrument, the reflection of the luminous rays from the second surface of the glass forms a conical bundle, which surrounds the luminous image of the star occupying the centre. But in the case of stars situated away from the centre of



the field matters are different; the luminous conical bundle, whose apex is the real image of the star, continues its direction obliquely, gets reflected from the second surface, and on its way back is intercepted by the first surface, where it forms an ellipse more or less elongated, whose centre will be removed the further from the true image the more oblique was the incidence of the luminous rays—that is to say, according as the star was situated near the limit of the field.

With a sufficient obliquity (such as that depicted in figure 2) the true image might be altogether outside the reflected image. It is more than probable that in practice this would not occur, as the actual obliquities are too insignificant. It is not less true that if Mr. Taylor's explanation is confirmed, the centre of the figure, which up till now has been considered as the position of the geometric image of the star, is not altogether so, and that it would be necessary to introduce a further correction in making the final reductions. It would, therefore, I think, be useful to verify directly the truth of Mr. Taylor's hypothesis.

This is the manner in which I think one might proceed. In employing a plate whose second face had been chemically silvered it is plain that the reflection would be exaggerated, and that the phenomena (due to it) would be produced with special intensity. On comparing negatives taken on plates of this kind with others on ordinary plates, or plates whose backs have been covered with a mixture of lampblack and glycerine, under equal conditions of exposure and development and of the emulsion, one would be able to ascertain the effect produced by reflection, and to allow for it in subsequent reductions, if it really exists.

Please accept, Mr. Editor, the assurance of my most distinguished consideration.

HENRY MORIZE,

Astronomer of the Imperial Observatory, Rio Janeiro.

LENSES.

To the Editor.

SIR,—There are several points in regard to photographic lenses which have often cropped up when talking to others on photographic matters which I think would be of interest to many of your readers if you could spare a little space to explain.

First, in what way do two lenses of the same focus and both working at, say, $f/45$, but one of the rapid rectilinear type and one of the wide-angle rectilinear type, differ from each other when used to cover the same sized plate?

Second, what are the disadvantages of a doublet made with two lenses similar to the front combination of a portrait lens compared with a rapid rectilinear, both working at, say, $f/8$?

I have never seen these points, which must be understood by any one with a knowledge of lens construction, elucidated.

I was in hopes that these points would have been touched by Mr. Conrad Beck in his lectures a short time since, but I cannot find that they were.—I am, yours, &c.

H. G. M. CONYDEARE.

The Hut, Ingatestone, June 4, 1889.

[In reply: 1. There will not be any difference in the resulting photograph. But it would be possible to cover a larger plate with the wide-angle lens, owing to its lenses being placed closer together than in the other. On the same sized plate there will be no difference. 2. The disadvantages are that with a doublet composed of two such lenses as specified, the field would be very round, and the marginal definition bad. To obtain uniform sharpness over a moderately large area, a very small diaphragm would have to be employed. In doublets of this class it is imperative that the lenses be of the Meniscus form.—ED.]

HYDROQUINONE.

To the Editor.

SIR,—In reference to your hydroquinone experiments on Alpha paper, perhaps it may interest you if I give my experience, which is somewhat at variance with yours. The phenomenon you describe exactly fits one case in point with my own experience, but not with Alpha paper. During

last winter I worked a good deal with gaslight and bromide paper, and used hydroquinone to some extent. My subjects being frequently *hoarfrost* pictures were well adapted to such papers, and served as a very delicate test of quality of result. I used three kinds of paper—Ilford slow bromide, Ilford, Alpha, and Morgan & Kidd's ordinary bromide. With the first paper—slow bromide (and using in each case hydroquinone, two grains to one ounce of water with hydrate of potash)—I almost invariably succeeded (time of exposure being correct). With Alpha I succeeded fairly well, but did not get quite such nice prints as with the slow bromide, or as when I used ferrous oxalate, but I have had no case of double image, such as you describe. I used fresh developer for each print, and always a *small* dose of bromide. So far my experience does not tally with your use of Alpha paper, but the strange part is that with Morgan & Kidd's bromide paper every print I tried was a failure from the cause you mention. The development was slow and delicate up to a certain point, then, when slightly more potash was added to get more force, development commenced at the edges, and gradually attacked all the darker shades of the print, producing intense blackness in a patchy way, which quite ruined the result. It is rather strange that I should succeed comparatively well with Alpha (containing chloride) and fail with a well-known brand of bromide paper, whereas I succeeded perfectly with the same bromide paper and negatives when using *ferrous oxalate*. Will you try the effect on Morgan & Kidd's paper, and see result? In that case it can hardly be a question of chloride of silver, as it is one of the best quick bromide papers in the market, and I suppose would not contain any chloride.

I find the hydroquinone to give a pleasanter-toned spirit than ferrous oxalate, not such a blue-black, more the tone of warm Indian ink as compared with cold Indian ink water colour, and softer in detail, fuller of half-tone. Ferrous oxalate prints tend to hardness, hydroquinone to softness. —I am, yours, &c.,

GEORGE BANKART,

President Leicester Photographic Society.

Penrith, Cumberland, June 4, 1889.

Exchange Column.

*• No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange a Victoria camera with nine lenses, complete, for studio accessories.—Address, WARREN, 22, Archway-road, Highgate, London, N.

I will execute enlargements in oils, water-colour, or monochrome, in exchange for a good safety bicycle.—Address, A. HAMILTON, Kingsdown, Bristol.

Wanted to exchange, Field's Grammar of Colouring, price 3s., clean, for H. P. Robinson's Picture Making by Photography.—Address, G. ATKINSON, 40, Cambrian-view, Chester.

Will exchange Marion's half-plate camera, rapid lens, three double slides, tripod, dishes, lantern, &c., equal to new, for safety bicycle.—Address, A. HARCOURT, 52, Vicar-road, Liverpool.

I will exchange Victoria camera with four lenses, also double-back Gem camera with twelve lenses (takes twenty-four on half-plate), for a Ross' symmetrical lens, half-plate.—Address, J. SIMPSON, Photographer, 7, Sneyd-street, Staffordshire.

Wanted, good background (in oils), interior or exterior, in exchange for balustrade equal to new; send photograph of background for photograph of balustrade. Also will give new 12x10 stand (outdoor) for porcelain dish, size 24x18.—Address, BEAUX & BARNARD, Photographers, Newport, Monmouthshire.

Will exchange 180 weekly volumes of Cassell's National Library for a good five and a half or six-inch compound condenser for enlarging purposes, a quarter-plate Newman's pneumatic diaphragm shutter in perfect condition, a Grace's rainbow spectroscope, or an optical lantern to value.—Address, HERBERT CLARK, Heckmondwike, via Normanton.

Answers to Correspondents.

*• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

THE article by Captain Himly in our last was omitted to be credited to the *Wochenblatt*.

J. G.—We removed the varnish from the transparency by placing it in a bath composed of caustic potash one ounce, and ten ounces each of alcohol and water.

GEO. FERRIS.—To remove the pyro stains from your fingers, treat them with hydrochloric acid, diluted slightly, and afterwards wash thoroughly in warm water.

P. N. W.—You may prepare the negative for being retouched by applying gum thus dissolved in benzole. But numerous other methods have been published.

WILLIAM MAYOR.—Your friend had better purify by distillation. There is no other reliable method he can adopt to suit it to photographic requirements.

S. HERBERT.—If the paper be tinted with a fugitive pigment, as most tinted albumenised papers are, it is not a matter for surprise that the tint fades on exposure to light.

J. F. BLACKMORE.—With the same brand of plates you are using we get good density in the sky with the hydroquinone developer, as made by the formula given in a previous page in this number, and should recommend you to try it. You might also with your present developer try the effect of increasing the proportion of pyro and bromide, which will favour density in the sky.

E. ELLIS.—If you have tried all the remedies for blisters you mention without success we fear we cannot help you, except by saying get a fresh brand of paper. Have you tried using the fixing bath and the salt or other solution of exactly the same temperature? We do not know the formula for the commercial retouching medium which you say is compounded of a mixture of "turps and a salt of iron."

FERRIDCYANIDE.—1. The price you are paying for hyposulphite of soda is very low; but we cannot say that for that reason it is impure.—2. Any operative chemist will supply you with *chemically* pure hyposulphite of soda. Get a little and compare it with that you are using.—3. The proportions you are employing for reducing are quite right; you may modify the action of the reducer by dilution, or employing it more concentrated, as occasion may require.

W. G. P.—Any paper maker will supply you with a suitable paper if you give him to understand what you require. Or if he does not stock the article you require, he will make it to your order. But of course you will have to take a good quantity at a time. Carbon tissue makers, as a rule, have the paper made to their order. Saxe or Rives paper answers the purpose very well, though somewhat expensive, and if you only require, say, a hundredweight or two, it will probably answer your purpose better to pay the extra price than to order a special making.

CAUSTIC says: "I have been trying to dissolve the varnish off some old collodion negatives, using methylated spirit and ammonia. With several of them it has been a failure, leaving on them dense patches of undissolved gum. You have several times given a recipe containing caustic potash, alcohol, and water; but after long search I cannot find it. Would you be kind enough to give me the proportions?"—Possibly the varnish was made with resins which are not soluble in alcohol. Hence it will be well to try some other, say benzole. Methylated alcohol, with acid, caustic potash, or soda, may also be tried, say thirty grains to the ounce. So may also methylated spirit, used warm. This seldom fails to remove the ordinary negative varnish.

I. C. A. writes: "I have got two photographs which I value very much, which are mounted and framed, but through having got damp, from damp walls, are entirely spoiled, by having a yellow mark down the centre, this being caused through a crack in the backboard. If there is any possible means in getting rid of these marks, I should feel obliged by an answer to the same through your 'Answers to Correspondents.'"—We fear that the marks cannot be successfully removed. By treating the prints with a dilute solution of bichloride of mercury the yellowness may be destroyed, but this will not restore the lost detail. The best plan will doubtless be to copy the pictures as they are, using orthochromatic plates, with a pale yellow screen. Sometimes by this method of procedure it is possible to obtain better reproductions than the originals would lead one to expect.

Mr. W. R. BAKER has shown us a new camera he has just devised, in which are certain good features. By means of a mirror placed diagonally the image on the focussing screen is seen, without the aid of a focussing cloth, until the moment before exposure. Three double dark slides, each half an inch thick, are kept in the camera itself. There are many ingenious mechanical contrivances in connexion with the slides and the manner of opening the dark shutters, but these could scarcely be understood without the aid of drawings.

"PHOTOPEL" is a very convenient form of tablet in which Messrs. Wyleys & Co., Coventry, compress pyrogallie acid. It forms the perfection of portability. Each tablet contains, in addition to the pyrogallie acid, such other substances as are from experience found to be desirable in developing negatives, lantern slides, and bromide prints. Messrs. Wyleys & Co. write: "We start out with the idea that to the amateur such a pellet will be found useful from its simplicity, and that even a professional photographer might find its portable form convenient under certain circumstances." We have tried and like the pellets very much, especially when used, as the makers advise, with caustic potash, a bottle of which accompanies each tube of the pellets.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1520. VOL. XXXVI.—JUNE 21, 1889.

WIDE ANGLES IN STEREOSCOPIC VIEWS.

PERHAPS the best way to introduce this subject is to make a brief extract from the letter of an esteemed correspondent, Sir James D. Marwick, who, *inter alia*, writes :—

"When I was last in London, I saw for a moment, but had no time to examine, a couple of stereoscopic slides which took in a much greater field than any I had previously seen. I was told that they had been exhibited in the Crystal Palace Photographic Exhibition a couple of months since, and that they and the stereoscope were the productions of a French maker of lenses and photographic apparatus. If they are really successful, and give with equal brilliancy and stereoscopic effect, as the Wheatstone Brewster stereoscope does, pictures including a much wider angle than the old stereoscopic pictures, it would be worth while to give some information concerning them. If I had possessed time I would have called on you and suggested that you might deal with the subject in the JOURNAL, and complete what you have already written on the subject. Should you do anything of the kind, it would be desirable to know something, not only of the principle of construction, but the name of the maker and the cost of the stereoscope and the relative slides."

There are two things implied in the foregoing; first, the embracing of a large angle of view in the picture, and, secondly, the means of examining such picture so that it shall approve itself to the spectator as embracing that large angle—in short, that it shall be panoramic.

The first is easy of attainment. It only suffices that the view be taken by a lens of short focus, which, by being well diaphragmed down, or otherwise, shall delineate the whole field covered in perfect sharpness, or such sharpness as shall display no falling off towards the margins when viewed by moderately high-power eyepieces. And here arises the question, What is a short-focus lens, and what is a wide-angle? Let us assume that the area of delineation—the size the picture is to be, when trimmed—is two and three-quarter inches wide, and this is quite wide enough for every purpose; then to include an angle of view of, say, fifty degrees, the focus of the lens employed must be just a trifle over that of the dimensions given, which focus is, in our estimation, much too short for any save very special purposes. This focus of lens has nothing to do with the dimensions of the plate that is to contain the subject, but only with the amount of subject that may be crammed into a given space, which we have stated should be two and three-quarter inches, although this may, on occasion, be exceeded just a little, which it should not ordinarily be if the centres of the binocular pair are to be the maximum of three inches apart when properly mounted.

But the general panoramic perception of a stereoscopic picture is more dependent upon the focus of the lens through which it is examined than upon that by which it was taken. The perfection of a stereoscope for imparting the idea of magnitude or angular extension to the subject on the slide lies in

the lenses which form the eyepieces being of short focus and achromatised.

When writing the articles on *Stereoscopic Photography* which appeared in the ALMANAC for 1887 we spoke in terms of the highest approval of achromatic eyepieces of six inches focus. We have since then had a stereoscope constructed with lenses of five inches, mounted as then directed, and find this a great improvement in the rendering of the combined pictures on a scale of apparent great magnitude, conveying quite the idea of a panorama even when the pictures were taken by lenses having foci of five and six inches.

We have not seen the pictures to which reference is made in Sir James D. Marwick's letter, but from our own experience we know that in the foregoing remarks we have covered the ground.

IRREGULAR TONING OF GELATINE TRANSPARENCIES.

WE have received a letter from a correspondent detailing a peculiar case of irregularity of action upon a gelatine film which, though not, perhaps, a very common occurrence, is sufficiently typical in its character to bear repetition in these columns with the view of suggesting a possible explanation of other similar mysteries.

In our issue of November 16 last we described, in the course of an article on *Toning Transparencies*, a method based upon the bleaching of the developed image with mercuric chloride, followed, after due washing, by treatment with sulphide of potassium, a plan which, in our hands, has produced most pleasing results, both in gelatine and collodion films. Our correspondent, however, though following implicitly the instructions we gave, has not succeeded, and thus describes his method and his results :—

He says, "I used —'s lantern plates, and I followed your instructions to the letter in developing, fixing, and washing. After the long washing following the fixing the plates showed signs of frilling, although they were passed through a chromo alum bath. After this last long washing I proceeded to bleach the image in the chloride of mercury and chloride of ammonium bath made according to your formula. It took, at least, ten minutes to bleach, or rather whiten. I then washed the plate for half an hour, after which it was placed in the toning solution, consisting of twenty-five grains of sulphide of potassium (commercial) to the ounce of water. The high lights instantly turned blue, while the deep shadows remained white for a long time, at least a quarter of an hour, when they became black, not blue. I should say the transparency was very dense before

it went into this bath. As soon as the white had disappeared I proceeded to wash the plate, when I saw at once that it was doomed. The film commenced to swell in zig-zag lines, about one-eighth of an inch wide, all over the plate, and I could follow these lines forming all over like worms, and in about a minute the film was off the plate."

Such are the plain facts of the case, and at first sight it does not seem easy to point to the cause of the trouble, which does not appear to have been an isolated case, but to have followed every repetition of the treatment. Looking at all the circumstances, however, and comparing them with kindred phenomena, noticed in our own previous experience, we make the suggestion that the abnormal behaviour arises from purely physical causes connected with the gelatine films themselves, and which we will try to explain and follow throughout their course.

The particular plates mentioned by our correspondent are, we know, pretty heavily treated with chrome alum, as a preventative of "frilling." Now, in the first place, though a film may be so treated as to render it insoluble, it does not necessarily follow that it will not frill. On the contrary, if the insolubilising action be carried too far, the film may possibly have its tendency to leave the glass actually increased, for such treatment causes a shrinkage or contraction of the gelatine, which is quite as powerful an inducement to loosening from its support as is the more common fault of swelling. Hence we need not be surprised at these particular plates frilling, especially after an extra dose of chrome alum.

Next, we have the length of time occupied in bleaching. This is only the natural consequence of the ultra hardness of the gelatine itself, coupled with the additional fact of a very dense image (as we are told), which naturally adds to the impermeability. The bleaching solution, chloride of mercury, still further adds to the hardness of the gelatine, and still further clogs its pores by the deposition of subchloride of mercury side by side with the silver-formed image, so that it is scarcely surprising that the toning solution should act with even greater slowness than the bleaching liquid. That this is the true explanation of the irregularity is partly proved by the recorded fact that the high lights, which represent but a scanty deposit and a comparatively porous film, were toned instantly to a blue colour—over toned in fact—while the deep shadows resisted the toning action for a quarter of an hour, owing to the dense mass of material to be acted upon and its closer character.

That the final colour of the shadows should be black instead of blue, is due, we imagine, merely to the presence of the greater mass of material which, though blue or blue-black in a thin, semi-transparent layer, would become opaque and black in a greater mass.

The final lifting of the film from the glass is the simple result of the repeated hardenings of the gelatine by alum, by the action of the developer, and by the bleaching solution of chloride of mercury, each of which, by causing the film to shrink or contract more or less, tends also to cause it to leave the glass. The action of the final solution of sulphide of potassium is in an opposite direction, inclining rather to soften the gelatine, and this, with the assistance of the osmose set up in the last washing, finally brings about the vermicular swelling culminating on the film leaving the glass.

Such seems to us the explanation of what our correspondent seems inclined to set down to chemical causes, though we can find no possibility of believing that to be the reason, so

frequently has the method succeeded in our own hands. No doubt many of our readers have noticed similar if not identical vagaries on the part of gelatine films that have been over treated with chrome alum, which frequently, besides rendering the gelatine impermeable, brings about the very fault—frilling—it is used to prevent.

PHOTOGRAPHERS AND FIRE INSURANCE.

THE late conflagration at the Paget Dry Plate Works, and the contiguous premises of the Woodburytype Company, together with another fire in Derby, recorded elsewhere, naturally reminds one of photographers' fire risks generally and the high premiums they have to pay for insurance. By the way, we are pleased to learn that both the companies named are fully insured, though they must still be considerable losers by the catastrophe, in the matter of loss of immediate business.

Photographers have always had good ground of complaint at the high premiums they are charged by the insurance companies. In the collodion days photography, by reason of the inflammable materials used, might well be classed as a hazardous business. Furthermore, there is no gainsaying the fact that, at one time, several of the offices had many claims to meet in somewhat rapid succession. But, with one or two exceptions, we do not remember a fire that could be directly attributed to the combustible nature of the materials employed in the business. From the fact, however, that such explosive and inflammable compounds as gun-cotton, ether, and alcohol were being in constant use, coupled with the circumstance that a large number of fires did occur on photographers' premises, the insurance companies were at one time, perhaps, justified in materially increasing their rates. But now that collodion is abolished, or practically so, the risk is certainly reduced to that of any ordinary trade. And, so far as we are aware, of late years there have not been a larger proportion of fires amongst photographic than other businesses. Therefore it is not a matter for surprise that photographers should protest, as they are continually doing, against the high premiums they are at present charged. This is a subject that might well be taken into consideration by the newly-formed photographic section of the London Chamber of Commerce, when it gets to work.

In fixing the rate of premiums, it may be mentioned that the insurance companies have to take into consideration not only the hazard, but the probable value of the salvage in case of accident. Here is an example. A few years ago a photographic friend of ours relinquished business and removed a good portion of the apparatus to his private residence. On insuring it here he had to pay more than double what he was paying on the household furniture, notwithstanding that it was stipulated in the policy that the apparatus was not to be used on the premises. The explanation was this: Salvage furniture was generally of some value, as it might be repairable, but this was seldom the case with photographic apparatus.

It can readily be imagined, when a fire occurs in the studio, that through the medium of the blinds and curtains the whole place is quickly ablaze, and although the heat attained, before it is subdued, may not be sufficient to actually consume the contents, they are generally so much injured as to be next to worthless. For example, the heat may not be such as to injure the lenses by itself, but a stream of cold water projected upon them while warm would split the glasses into fragments. We have seen a valuable portrait lens that was in a studio when on fire which, apparently, had suffered no injury whatever

from the heat itself, but it was cracked into a hundred pieces by the water. Cameras and other photographic apparatus are of little use after a fire, for although they may escape the flames, they may be totally ruined by water.

There are several things in connexion with insurance which are frequently overlooked by photographers. In the policy, for example, it is usually stated that the value of the negatives is limited to a certain sum, usually one shilling each, though some may be worth several pounds. If any higher sum than the shilling be desired, then these negatives must be insured individually. It must not, however, be supposed that the insurance company will necessarily pay even the shilling, unless it be shown that the negatives destroyed were actually worth that sum. Usually the value of any individual lens is limited to ten pounds, unless it is specially referred to in the policy.

Many photographers from time to time add to their stock of apparatus without giving a thought as to whether it is covered by the existing policy. We know that since the demand for large direct portraits there are many lenses in use which have cost enormous sums, for which only, say, ten pounds could be recovered in case of their destruction.

There is another point connected with the wording of the policy which is frequently disregarded by photographers. It is very common in the policy to separate the goods insured into sections, mentioning an amount for each.

In an insurance for, say, eight hundred pounds, it may be worded thus—on furniture, two hundred; on negatives and pictures, two hundred; and on studio and plant, four hundred. Now, at the time the insurance was effected, this sum was ample to cover the property in every department, and with a good margin to spare. But, with an increase of business, the plant has from time to time been added to until its value is far greater than the four hundred pounds. Yet the insurer often rests content, because eight hundred pounds may still be sufficient to cover the value of the entire stock, inasmuch as the furniture, negatives, &c., are not worth the full amount named for them in the policy.

Suppose a fire occurs, and the studio and plant are totally destroyed, while the furniture and negatives suffer but little injury. Although the damage sustained by the studio and plant section might amount to, let us say, fully six hundred pounds, and that by the others jointly to but one hundred—total seven hundred—five hundred pounds only can be recovered, because only four hundred is mentioned in the policy for the plant section. Some insurance offices, however, have, we know, dealt very liberally with insurers under circumstances similar to those just detailed. Insurers should, however, examine their policies occasionally—especially if they are old ones—to see that the amounts are sufficient to cover all losses in case of accident.

An excellent example of the usefulness of photography for scientific illustration is seen in the May number of the *Chemical Society's Journal*, which contains the Presidential address illustrated by a series of reproductions of the diagrams used when delivering it, and which are evidently executed by a mechanical photographic process. For the reproduction of diagrams, of course the objections we hold to the use of engraving processes for the exhibition of photographic results do not apply; but it is satisfactory to see the field that might be legitimately occupied by engraving successfully filled by process work.

In a recent issue of the *Scientific American*, a simple method of making a fluid as a basis for a spectroscopic prism is described, and as

some of our readers who might otherwise wish to experiment in this direction may be deterred from spectroscopic work by fear of the cost of a carefully ground glass prism, we may briefly describe the one we allude to. It consists in effect of a three-sided tin box forming a liquid-tight receptacle, and provided with a neck, closed by a cork, for introducing the liquid. Two of the sides of this box are pierced with circular apertures one inch in diameter, and over the whole of each side so pierced a piece of well-selected, clear, plate glass is cemented. Into this tin case carbon bisulphide is poured and the prism is complete. Certain little precautions, however, have to be taken to enable a success to be secured. Before cementing the glass, the tin vessel should be freed from the slightest trace of grease by washing with a dilute solution of caustic soda or potash, rinsed with distilled water, dried, and blackened inside with a thin solution of glue in ink. To cause the glass to adhere to the bright metal, acetic acid must be used in making the cement. Fine white glue is steeped in water for a while, melted, and the liquid thinned by glacial acid and a drop or two of glycerine added. Care must be taken not to squeeze out any of this cement upon the face of the glass. Forty-eight hours will suffice to harden the cement, and then the bisulphide should be poured in so as to leave a trifling air space when a good cork is pushed in level with the top of the neck. This also should be varnished over with the acetic glue as above. Finally, it is better to cover the prism over with thin, dead, black paper, leaving apertures to correspond with those in the tin.

PHOTOGRAPHY is utilised in the construction of a new balance which has lately been brought before the scientific world. In this novel instrument of precision, after the weight has been roughly approximated, instead of continuing the trials in the usual manner, the beam is allowed to come to rest, which it quickly does by means of an ingenious air buffer, and then the extent of the bending of the beam through the difference of the weights is observed by a microscope fitted with a network of parallel cross wires directed to a small micrometer fixed at the end of the beam. This micrometer is made by a photographic process, and carries figures and lines distant from one-twentieth to one-fiftieth of a millimetre apart. The introduction of Bunge's short-beam balance—comparatively speaking a few years ago—almost revolutionised weighing operations, owing to the despatch with which they could be carried on; it remains to be seen whether the new instrument, in which photography plays a part, will be an epoch marking one.

In the Paris Exhibition is exhibited a collodion product of a remarkable character, neither more nor less than an artificial silk. To manufacture it, pyroxyline was first prepared by the conversion of a specially pure cellulose, obtained from certain parts of young wood, and then dissolved in a mixture of thirty-eight parts of ether and forty-two of alcohol. Through a series of concentric tubes the collodion is forced out, under pressure, in a stream, and then immediately solidifies by contact with water, the thread so produced being wound off on to a bobbin. Next, this thread is denitrated by being soaked in weak nitric acid, which renders it insoluble in ether and alcohol, and also non-explosive. The threads are now dried and used as ordinary silk; they are capable of being dyed, and are about three-quarters the textile strength of ordinary cocoon silk. In appearance it is stated to excel the natural product of the silkworm.

It is not generally known that although celluloid, now so prominently brought before photographers in one of its forms, is not explosive, some samples are, under certain conditions, capable of being exploded. If heated to a certain point, and then subjected to concussion, that kind composed largely of gun-cotton may be exploded by a shock.

A RECENT work by Major Cundill upon explosives may be read with advantage by those who are experimenting with magnesium flash lights, especially those of the pyrotechnic kind. He declares chlorated mixtures to be unsafe, and though his remarks are directed to explosives proper, seeing so much use is now made of gun-cotton in its explosive form, and compounds that, being intended for "instan-

taneous" combustion, must also be ranked as such (they have already caused death), we cannot do better than quote his words of advice.

He writes, "The function of an explosive is to explode. Remember this in dealing with them. If an explosive is described as 'absolutely safe under all circumstances,' do not treat it as some people treat a big dog, and try how much it will stand. There is no explosive within my knowledge which, when exploded in a confined space, does not give off noxious or deleterious gases. . . . In using an explosive with which special instructions are issued, it is wiser to read them before an accident happens than to have to refer to them afterwards to see if they are not issued for some good reason." We conclude our extract by another dry but pregnant remark of Major Cundill's. Speaking of careless handling of these preparations, the result of which is generally a verdict of "accidental death," he says the verdict in such cases would more justly be—suicide or manslaughter.

COLLODIO-GELATINE PLATES.

In your issue of May 10, Mr. G. V. J. Poirin made mention once more of an old favourite process of mine, which he and I were simultaneously experimenting with just four years ago, and which I at one time had hopes might be made for some purposes to supersede gelatine. That hope I am afraid has long since disappeared, not by reason of the failure of the process, but solely on account of the vast change that has taken place in the whole system of photography, and in the requirements of photographers.

It matters not what class of photographers we turn to, we find now that the requirements and mode of working of ten years ago are completely changed. The universal adoption of commercially prepared plates, by both professional and amateur, has not only practically killed the experimentalist, but has established a system based on the principle of not doing a single thing the performance of which can be secured by payment. Consequently, any process or method that requires the exercise of any individual attention beyond development with chemical phases is doomed to neglect.

Still, I cannot help thinking, especially after that little stir the announcement of Dr. Hill Norris's new (?) rapid collodion process caused, that there must even yet remain some few photographers who would find uses for a rapid collodion plate, and who, indeed, would welcome any method by which they would be placed in a position, if not of making the whole of their plates, at least of improving them for special purposes, or in special sizes when required. To enumerate only a few of the possible applications of such a process as the one referred to by Mr. Poirin, and available either for professional and amateur, will not take long, and the list includes making enlargements generally, but especially enlarged negatives, transparencies, lantern and stereoscopic slides, copying and negatives for process work, as well as the production of the humble "tin type." Let us see how it can be done.

As compared with Dr. Norris's marvellous process, the one now proposed is simplicity itself, although it necessitates the making of two separate emulsions—one of collodion, and another of gelatine. I do not think it would be a practical process to work commercially, because the plates must necessarily be more costly than gelatine, and, indeed, could not possibly be made at anything like present prices; while the only advantage gained would be a greater adaptability to certain special purposes than is the case with gelatine plates, but with a reduction in rapidity of working; for my claim in favour of the composite plates does reach to equal rapidity with gelatine, and in that respect I think Mr. Poirin's opinion is the same as mine. I speak, of course, of the highest rapidity possible with gelatine, but they can easily be made as quick as what are known as "slow" gelatine plates.

It would be necessary then for the photographer to make his own emulsions as well as coat his own glass, but as the operations involved can be performed on a bulk of material that will serve for a vast number of films, the trouble and time devoted to each individual plate becomes really very small, and in this respect the process compares very favourably with Dr. Norris's innumerable and almost interminable soakings and washings.

I have said it will be necessary for the photographer to prepare his

own emulsions, though it is true collodion emulsion is procurable commercially, and gelatine emulsion in the dried or condensed condition would also, no doubt, soon become a trade article if the demand arose. But for reasons I shall point out, I think it would be better for the consumer to make his own emulsion.

The collodion emulsions procurable commercially are almost of necessity "washed" emulsions, to insure that they will bear keeping. The operation of washing, though it may not deteriorate the product for ordinary purposes, to my mind certainly does so for this application; and I am of Mr. Poirin's way of thinking that an unwashed emulsion is preferable. Such an emulsion, of ordinary rapidity, and possessing the power of giving any degree of density, will keep for a comparatively long time, though not so long as a washed one, say, probably, several weeks; and as the chief function of the second or gelatine emulsion is to confer the rapidity lacking in the first, the dense slow emulsion is probably the best to use as the basis.

But to gain the highest degree of ultimate sensitiveness both emulsions should be as rapid as possible without sacrificing the density-giving power of the collodion. In effecting this object the unwashed emulsion offers peculiar advantages over the washed, since a preparation with excess of soluble bromide to such an extent as to confer upon it almost unlimited keeping powers may be resensitised with an excess of silver a short time before use, in which state, for a brief period only, it possesses a very high degree of sensitiveness, combined with the most perfect physical properties, and is particularly suited as the basis upon which to apply the second layer of gelatine.

A washed emulsion may be adapted in a similar manner, though not with equal effect, for the reason I have mentioned above. Still, a much quicker, and, moreover, denser result is gained by adding two or three grains to the ounce of cadmium bromide, and, finally, say half an hour or an hour before use, sufficient silver nitrate dissolved in alcohol to leave an excess of about two grains to each ounce, with a grain to the ounce of citric acid. If this acid should make the collodion too "lumpy" or glutinous, substitute nitric acid, and do not "resensitise" more emulsion than can be used up at once, as it rapidly passes into the foggy stage.

In making the emulsion, I do not think any better bromising formula can be adopted than equivalent proportions of the bromides of cadmium and ammonium. Bromide of zinc gives a rich opaque film, not liable to halation, and of good rapidity, but it also has a strong tendency to produce veiled images. The proportions must depend upon the character of film required, but a quantity of the mixed bromides to combine with fourteen grains of silver to each ounce will be ample for anything.

With regard to the second or gelatine emulsion, I need only say that it should be as rapid as can be made without fog, and that it should contain but a moderate proportion of gelatine. As regards the details of manufacture, I prefer a bromo-iodide emulsion containing, say, five per cent. of iodide made by the boiling process, to be made up so that twenty grains of silver nitrate and from ten to twelve grains of gelatine go to each ounce of finished emulsion.

If the collodionised plate be washed in hot water and coated with this gelatine organifier, the surplus poured off rapidly, *but not drained*, and the plate placed in a level position for the thin coat of gelatine to set, the film may then be dried, or, if more convenient, may be exposed wet, and will be found to possess a rapidity at least equal to the "slow" gelatine plates of commerce.

ERNEST GRAHAM.

ECHOES.

THE method of recovering silver bromide from spoilt emulsions or plates mentioned in the leading article a fortnight ago is a most useful as well as convenient one, especially for amateurs, at least so far as the extraction of the silver is concerned. The subsequent precipitation in the form of sulphide follows as a matter of course, and up to this point I think no fault can be found. But I should myself scarcely like to place my trust in a sample of silver nitrate made as recommended in the same article by the direct action of nitric acid on the silver sulphide.

Sulphide of silver is insoluble in dilute nitric acid, but dissolves with tolerable ease in the concentrated acid, especially at a high tem-

perature, sulphur being at the same time liberated. I am afraid to speculate as to what degree of purity is likely to be secured in crystals obtained from a solution in which free sulphur has been digested at a high temperature in strong nitric acid. I should distinctly prefer to fuse the sulphide, or, failing the facilities for carrying out that operation, should send it to the refiners.

I think, however, for amateur purposes, or where it is intended to perform the reconversion into nitrate without outside assistance, the acid method of separating the silver is preferable. Every atom of silver may be thrown down with the greatest ease in this manner, and in such a condition that it can be perfectly freed from all organic impurities and brought to the condition of practically fine bromide or chloride of silver. For reduction to the metallic state there is no better plan—after fusion—than the process with glucose and an alkali. The haloid is boiled with a little caustic alkali and almost any organic substance—such as sugar, starch, gelatine, capable of conversion into glucose or a glucoside—until upon testing a small quantity of the blackened precipitate it is found to be perfectly soluble in dilute nitric acid. After careful washing the result consists of the purest metallic silver it is possible to obtain by any conversion process.

Instead of using acid to separate the silver from the emulsion, caustic alkali may be substituted, in which case the decomposition of the gelatine supplies the necessary glucosides, and separation and reduction proceed simultaneously. But it is extremely difficult to free the fine deposit of metallic silver thus obtained from the filthy black or dark-brown liquid accompanying it. I have known traces of this discoloured liquid to remain after many days' washing, hence I prefer to get rid of the gelatine first of all by the separate treatment with acid.

In Mr. W. M. Ashman's interesting paper on emulsion processes in photography, I notice he fixes the date of the first mention of an emulsion process—on the authority of Dr. Eder—as far back as 1853, Alexis Gaudin being the experimentalist whose work is referred to. I cannot lay my hand at the present moment upon my reference, but I do not think this is the earliest suggestion of an emulsion. In one of a series of works published by Bingham—if I mistake not, in the "forties"—reference is made to an emulsion, or what is now so called, of iodide of silver to be spread upon glass plates or paper. As this was anterior to the introduction of collodion—1840 was, I think, the date of the work—the vehicle mentioned is gelatine, and that, I fancy, will rank as the earliest instance of a gelatine emulsion.

By the way, it seems curious that Mr. Ashman should adopt the collodio-chloride emulsion as his type, since it was neither the earliest nor the best known. On the contrary, chloride of silver was the last of the haloids applied to emulsions, and has, perhaps, been least used of any.

After reading the fearful description of the new instrument named the actinograph, I cannot help congratulating myself that I had had opportunities at an earlier date of judging for myself of the difficulties and troubles of landscape photography. Had it been otherwise, and I were now contemplating embarking in the fascinating and fashionable pursuit, I am quite certain the perusal of the terribly "scientific" instrument would have changed my intention. As it is, I am content to go on exercising my own judgment in the matter of exposure, feeling certain that I can thus secure at least as high an average of accuracy with far less trouble.

The inventors of the terrible instrument, however, seem to set up difficulties on purpose for it to cope with. Practically, they say there is no such thing, or very little, as control in development. That "the effect of abnormal addition of alkali is merely to hasten development and eventually to fog the plate, and the effect of abnormal additions of bromide is simply to retard development and eventually to prevent it altogether." Now, if that be not "control," I don't know what it is! But it requires to be applied with brains, instead of *actinograph*!

What horrible sufferings the users of German dry plates must have to undergo! From the interesting "Foreign Notes" column I gather that the latest trouble is a form of plate with "black rims," black edges, in fact, which fit it better for mourning purposes than for the ordinary pictorial application of the photographer. Herr Stoll attributes the defect partly to the employment of "soda as a finer," and partly to the paper used in packing, in which latter opinion Herr Vogel agrees. I don't know what "using soda as a finer" means, so

can't make any suggestion; but as regards the paper, I would propose the use of a *finer* sample, containing less acid sulphurous or otherwise. Dr. Vogel's view does not reflect much credit on the quality of German paper, nor on the judgment of German plate packers.

The same speaker then gave his experience with a new developer, which is called "paraphenyl diamine," and with which "clouding" is easily produced. What in English are "paraphenyl diamine" and "clouding?" Another funny substance mentioned in the "Foreign Notes" is "brenzcatechine." I know what *catechine* is, but what means the prefix?

It is refreshing to find that there still exist some of the old style of enthusiastic amateur, for he must be an amateur who, according to the report of the Pacific Coast Photographic Association, in order to help to complete a series of lantern slides to illustrate a district, has undertaken a journey of 800 miles in order to secure a single picture. The man who would travel all the way from London to Aberdeen on a similar errand would be considered "plucky" in this country, but he would undertake a light task, and one that might be performed in luxury, compared with that of the gentleman whose duty it is to penetrate the wilds of California, mostly, no doubt, on foot or on horseback in order to secure a photograph of the San Diego mission. Bravo!

In "Answers to Correspondents," Mr. W. A. Meigh mentions an effect of backing plates which, at the present day at least, is almost, if not entirely, overlooked, namely, the increased clearness and density of the negative obtained. The prevention of that form of halation caused by reflection from the inner back surface of the glass is usually supposed to be the only function of the backing, but it does not require a great deal of consideration to show that the principle of its action in that capacity may be extended; it is only where strong contrasts exist that the effect of halation as such is distinctly visible, but it is clear that the same sort of reflection in a less degree is going on over the whole surface of the plate. This subsidiary reflection, while not sufficiently powerful to form a double or blurred image, suffices to produce an action on the film, which is equivalent to a brief exposure to diffused light, and which produces a result precisely similar to that of the "auxiliary exposure" on a so fashionable. In other words, by producing a slight amount of general veil it gives an effect of increased exposure, but this at the expense, of course, of absolutely clear shadows.

It is not necessary to suppose that absolutely clear glass is either necessary or desirable in a perfect negative, but it would not be difficult to show that any departure from such absolute clearness produced by the effect of diffused or reflected light inside the camera is a decided objection. The action of a good backing in thus preventing this slight general veil is very easily proved by covering only a portion of a plate with the backing material and exposing on an ordinary subject in which there is no tendency to halation proper. The result will undoubtedly be a clearer image on the "backed" portion of the plate, and most probably an apparent *retarding* action, or, at least, an effect of decreased exposure. For landscapes, including distance, for cloud negatives, and for all subjects in which delicate gradations exist, which are liable to be lost, the practice of backing is of the utmost value, the resulting negatives possessing a far greater printing value and better gradation, without any increase of density or of the time required in printing. To such negatives, in fact, the distinction between "intensity" and "density" specially applies—they are more "intense" without being any denser.

Mr. A. Cowan's way out of the difficulty of conversion of French weights and measures into English is beautiful in its simplicity, and it is surprising that it should have to be explained to any adult individual. But there seems to be a tendency on the part of many when the idea of a "gramme" or a "cubic centimetre" enters the head to allow all common sense to take its departure. One such individual amused me a few years back, and showed me to what depths of helplessness an otherwise pretty smart fellow could descend on some points. Quarrelling with a formula which was stated in terms of the metric system, he wailed out something to the effect that if only the "lunatics" would state their formulæ in "parts" it would be plain enough. I ran my pencil through the "grammes" and substituted "parts," but it was some time before I could persuade him that the formula was not thereby altered, and a still longer time before he would freely acknowledge he had been a—"duffer."

Our societies are indebted to Mr. Warnerke for a very practical suggestion. In the annual selection of officers, especially members of the Council, the general members like to have some guide as to the utility of their selections, and to guard against merely "ornamental" names being added to their lists. The Parent Society some years ago started the rather cruel plan of publishing in the JOURNAL just before "nomination day" a list of the attendances at Council meetings during the past year, in which it was always noticeable that the President with his "good boys" headed the list, while those whom the powers that then were wished to dispense with were correspondingly low down. It used to look rather "rough" on "Mr. A." to find that he had only a little "2" to place alongside the President's big, big "9;" worse still for Mr. B. with his "1;" but Mr. C.'s chance of re-election was utterly hopeless after the appearance against his name of the fatal "—." I never could understand quite why that system fell into disuse, but I have a strong suspicion that the "good boys" got into irregular habits, while the newly-elect "Phyllistines" became the most constant attendants. Could it be but fancy, I wonder?

Now Mr. Warnerke suggests that a flash-light group be taken of each Council meeting, and the idea is not a bad one, for the publication of a sheet of pictorial records would supply all the information required by those interested, without unnecessarily gibbeting any particularly "irregular" member. There is only one difficulty I can see, namely, that where the friendly pipe or more aristocratic cigar accompanies business, the excluded smoke may interfere with definition; or, worse still, the presentation of the revered features of the President adorned with a short "cutty" might so influence the minds of the electors as to destroy all confidence in him. I don't know whether the "smoking habit" prevails at Pall Mall Councils, but I sat next to a councilman who had just come up stairs one night, and if it was his "off side" neighbour that smelt so strongly of tobacco, I am glad that I was as far off as I was.

The mention of Sir Jocelyn Coghill's name in the report of a recent society meeting takes back my memory to the good old days when, if there were fewer photographers, there was proportionably more good work. In those happy days, when to be a successful amateur photographer, especially a successful exhibitor, meant something more than the possession of the wherewithal to purchase a camera and a dozen plates, when it was, in fact, necessary to know what you were doing, and to know it well, and, what is more, to be able to do it yourself—in those days Sir Jocelyn's name was one "to be conjured with" amongst photographers of the first rank. Would there were more of them now and fewer "pot hunters!" JUNIUS.

A DEFENCE OF THE STEREOSCOPE.

It seems to me incredible that the attempt (and to my mind a laudable one) to revive the popular interest in stereoscopy should have met with opposition in a quarter least to be expected, viz., from a contemporary journal of yours that possesses a title which should cover all branches of the art of "light writing," and therefore should be not only interested in, but encourage all possible useful, artistic, or commercial developments of it. Mr. Chadwick is quite able to make good his case by showing in what way the nearest approach to perfection can be obtained as regards the preparation of stereograms, but if no one else takes up the cudgels it may be thought there is no real revival or *bona fide* interest left in an instrument entitled to rank as one of the best for scientific amusement. It certainly has not the same practical value as the microscope and telescope has in some hands, but from my experience during the past twenty-five years, in which I have been brought in daily contact with purchasers of scientific instruments, I can truly say that the majority of persons who buy these and kindred instruments do so mostly for amusement, or as a hobby, for the pleasure derived from their use is to them as great as a game at billiards or lawn tennis is to others, or may be to themselves at another time.

After work must come amusement or recreation in some form, and if by stereoscopic photography pleasure can be derived by the operator and amusement afforded him and a circle of friends afterwards, there must be some use in it, and it is, therefore, a peculiar objection to make that a stereoscopic slide is *not* an art production and has no "atmosphere" in it. Why one picture of the stereoscopic slide is acceptable, and the two together viewed through a stereoscope are not,

I fail to see by any process of reasoning; and as regards objection to solidity one might as well say have no sculptures, as a painting shows the subject so much better. There are few but admire nature, and the nearer any representation approaches the natural, not only the more effective is it, but the greater is the pleasure derived from viewing it. I call to mind reading the other day about two friends, one a sculptor and the other an artist, having an argument as to which was the more perfect art of the two, the sculptor claiming his was, because it was possible not only to show the form from one side, but to give a faithful representation (in a statue) on all sides, whereas the artist rejoined that if a bet was made he could also show all sides of a figure on one canvas, with the addition of correct colours. By an artistic trick he was able to win the wager, by showing not only the figure as seen direct, but reflections in mirrors placed round the room of the other points of view of the same figure. The artist's license is largely availed of in order that distance, solidity, and space shall at once appeal to the senses, the contrast of colour being the chief means to that end; but with photography no colours can be relied on, and therefore, if by employing the two eyes the Creator has given us we can see with *solid* effect, why not do so; and the energies and knowledge we possess should be used to obliterate faults and bring about the nearest approach to perfection, and the stereoscope should not be allowed to lie dormant because by a wave of fickle fashion it has been temporarily shelved.

The object of the stereoscope being to combine two slightly different pictures so as to produce to the mind the same impression as would result from the view of the object *naturally*, were it actually before us, it is only necessary to take care the instrument is sufficiently carefully made to insure proper vision, and the stereograms are taken from points of view equivalent to the average distance between the eyes, and, when printed, mounted correctly. As regards the instrument, there is no doubt it should have the means of quickly and exactly adjusting the distance between the two achromatic lenses, and for this purpose, where a person is odd-sighted or astigmatic, the eccentric action patented by Mr. Douglas Hamilton may be found very useful, for it not only separates the lenses the necessary interval to allow of persons whose eye centres are from two and a quarter to two and three-quarters getting their proper width, but allows of the plane of the two to be varied to correct any error of axial refraction. If each lens has a separate focussing adjustment, then the eyes can be accommodated to correct focus without having recourse to spectacles.

I feel sure, from a commercial point of view, the stereoscope can be again made a popular instrument if well constructed at a moderate price, for amateurs will be able to make their own slides with equal ease as they now do lantern transparencies; and with an increased demand professional photographers would find it worth while to produce glass stereograms at prices as low, if not lower, than the celebrated French slides. Why should not some of the semi-transparent mediums be tried as a substitute for glass? They would probably be found equally suitable for producing the beautiful transparency necessary for the pictures, and would be lighter and not so likely to get damaged. I trust the revival of the stereoscope in popular favour will be thorough, and it will again take the position it deserves as a scientific instrument.

G. R. BAKER.

ORTHOCHROMATIC PLATES IN COPYING OIL PAINTINGS.—III.

PERHAPS there is hardly any other part in the operation of copying oil paintings which gives more trouble, when operating in places not specially suitable for the work, than the difficulty of overcoming reflections from the surface of the canvas. It does not fall to the lot of every novice to have a studio specially so constructed as to enable him to overcome this trouble with ease; for doubtless it is the case with most amateurs, and very often with professionals also, that they are called upon to undertake such work in places where several cross lights exist, and also where the surroundings are such as to cause no end of reflections. Neither is it practicable on all occasions to get the painting sent to the studio, and, therefore, an operator must just battle as well as he can with the circumstances as they arise.

A by no means uncommon case is where an operator is called upon to copy some paintings, say, in an artist's studio. In such a case the work is not so difficult to overcome, for it is more than likely that such premises will be found to have a sloping top-light. Still, there will be found on placing the picture on its support that this difficulty is nearly always more or less present. A little attention, however, to the surroundings of the room, and by carefully placing the picture in the best light available, will in the end amply reward what little trouble is expended. In such a case, first let the operator place the picture (which should be taken out of the frame) under the best light

the place will afford; this done, let him scrutinise carefully and see what reflections are present, and having found out these, his next step must be to find out the cause. This may arise from several sources, such as a glazed picture hung on the wall, a white piece of cardboard lying about, or any other article that is reflected from the face of the picture, which acts in a sense just as a mirror. A little "flitting" of such prominent objects will in due time tend to remove the difficulty. Attention must also be given to the floor and the articles on it; and where such are objectionable they should be covered up with some material, such as dull cloth or drapery; and, finally, let the operator cover up all the brass work and shining parts of his camera, and even go so far as to button over his waistcoat and shirt front and collar, for I have seen these cause the trouble. An artist's studio is by no means a place to be despised for working in at this branch of photography, and with proper and due precautions taken to overcome reflections, most excellent results are to be obtained.

One word about the tripod. My advice is, don't go about this class of work with an ordinary three-legged affair, but get a good studio stand, and one that will enable the operator to square his camera to the picture without much trouble. It is not at first an easy matter for a beginner to get the picture and camera so set as to register in correct shape on the ground glass. A very little deviation from the true position of the camera to the picture will suffice to make one side or top or bottom of larger or smaller proportions; hence, particular means must be employed to insure a correct registration. In specially adapted studios, where there are provided means for overcoming this difficulty, but little trouble will be met with, but an amateur working on and off will experience some difficulty in this respect also; but perseverance, however, with simple means, such as carefully measured tape lines, and also by a system of lines ruled on the ground glass of his camera, will generally overcome this difficulty.

An artist's studio is at all times to be preferred to an ordinary room for this work.

Let us now proceed to view the subject, however, from the standpoint of having to work in an ordinary room. Here, most likely, we are driven to contend with one or more windows, which, of course, means a side light, and where there is more than one window in the room I have no hesitation in saying the first thing to do is to select the best one and proceed at once to block out entirely all the light from the others. Do this in such a manner as to have "no light behind the camera." Then proceed very much as in the previous case and examine for reflections. Find out their cause; which done, remove them. The picture must be placed so as to receive as even an illumination as possible.

It will sometimes be found, in the case of pictures which are what some may term coarsely painted, that is, where to secure some desired effect the painter has had recourse to apply the paint in masses, that such will show little knobs or protuberances, and these little points, standing out as it were from the surface of the canvas, are very prone to cause bright specks of light, no matter how carefully the picture may be situated as to lighting. If such should give any bother, and if after all possible means have been employed to overcome them in the lighting, then an operator should not hesitate just to go ahead and make his exposures, with the view of bringing out a negative as full of detail as possible, notwithstanding the presence of these objectionable little specks of light. In my experience I, however, never failed to get rid of them subsequently, not by the application of a retoucher's knife or any system of rubbing down, but by what I consider a far more preferable method—of throwing off a transparency, and then with an ordinary system of retouching remove these defects. In fact, I sometimes think that there is no negative, however successful it may be as a direct outcome from development, but is capable of being improved upon by throwing off a transparency, and then from it print a duplicate and final negative.

Once an operator grasps the situation and comes to realise the improvements and benefits which can be got from such, he will not think of the extra bother and cost such an operation entails.

To some it may appear a roundabout way of going to work, but I can safely say that flaws and defects in an original negative are sometimes easily removed, even in cases where a novice would deem it impossible to remove them by merely looking at the first negative.

Of course such a procedure necessitates some slight acquaintance with retouching, and I think every one who aspires to the name of photographer ought to possess some knowledge of this most necessary adjunct to the art.

The above remarks refer more particularly to small defects. Broad masses of reflected light should never be allowed; when such are present then the lighting is wrong, and an operator ought to move things up and down till such are overcome.

It is wonderful what an improvement, however, is effected by

working up a transparency by contact, and then pulling off a duplicate and improved final negative.

And now just a few remarks as to the development of orthochromatic plates. I am aware it is at all times good advice to use the formulae recommended by the makers, but in this case I make bold to assert I have got better results on Edwards's plates by a judicious use of the following. When going to develop, prepare one ounce sulphite soda; twenty ounces water.

Saturated solution carbonate soda.

Saturated solution carbonate potash.

A ten per cent. solution bromide potassium.

When going to develop, exercise judgment as to the quantity of solution necessary to well flood the plate. Of course, much depends here on the size of the dish and plate which you work in. I prefer always to work in a large white porcelain dish. I can see when such a dish is clean and when it is dirty better than would be the case in a black one. I like the dish large, because it is not so "sloppy" to work in, and hence the developer does not go over the edges. Another advantage which a big dish gives is this: It permits of a good dose of developer being used. Some may say, What does it matter whether I develop, say, a whole-plate with one and a half ounce of solution or three ounces of same, provided the solution be of the same strength? Kind reader, there is a difference; and if you want good harmonious negatives, let me impress on you the necessity of using a full and liberal supply of developing solution. Just try the experiment.

Well, having made up your mind as to the score of quantity, take, say, two grains of pyro per ounce of the sulphite solution, and add same "dry" to it in a wide-mouthed tumbler, and don't forget, having given a liberal exposure, to add a little bromide (only a little).

Now flood the plate with this, and while on the plate add cautiously equal quantities of the saturated solutions of carbonate of soda and potash, about ten drops of each at a time, until development is seen to begin. *Don't hurry!* If your exposures are anywhere near right, and you have not put in too much pyro, you need not fear chalky negatives.

I don't say this formula is new, but I do say it is a jolly good one.

Wash well before fixing, and don't forget to run the plate through a weak solution of chrome alum before and after fixing.

Common alum is not in it with chrome alum.

The secret of success lies in slow development, a liberal quantity of developing solution, and pyro dry added at the time of flooding the plate.

With Edwards's isochromatic plates density is easily got, so too much pyro should be avoided at the start, and if during development it is seen more vigour is wanted, it is easy to mix up a fresh developer with more pyro and bromide.

In my hands most excellent results are obtained in the copying of paintings, working on the lines I have laid down; and I am sure that were many amateurs to turn their attention to such they would find pleasurable enjoyment therefrom. T. N. ARMSTRONG.

"GOOD BUSINESS."

Now that everybody who has to work for a living, including photographers, is complaining of bad business, it is time to think over some method or methods of reviving the same. When trade is depressed, it has often been found that the introduction of a novelty will cause a run, more or less sustained, according to the hold it obtains on the public, and the extent to which it hits their purses. The difficulty with photographers just now is to find a novelty, but there is a chance that the re-introduction of what was a novelty some time ago, and has since been forgotten and overlooked, might be just as useful. The nearest approach to novelties that we have at present are flash-light portraits and permanent portraits printed in platinum and mounted on india-tinted plate paper in imitation of steel engravings. I remember some ten years ago, when operating in the little island of Malta, we had quite a run upon what was then a genuine novelty there, and which I have never seen introduced here. We gave it the title of the "new group of one," and it was so in reality, being a portrait of one person in two positions in one picture.

It must not be imagined that I refer to the so-called duplex or triplex portraits, for the "group of one" differs very materially therefrom, in being to all intents and purposes one picture, three-quarter or full length, whereas they were really two or three medallion or cameo pictures, printed on one piece of paper and mounted on one card.

The method of taking the "group of one," which I fancy may be a very successful introduction into most studios, is very simple, and all

the apparatus required in addition to that in use in all studios can be procured very cheaply. Two wooden doors will be required to be fixed in the camera. These must be of a similar form to the so-called folding doors often found between two rooms, and so constructed that each of them, when closed, occupies exactly half of the camera, and fit perfectly together, the inside edges being perfectly plain and accurately planed. When the doors are made they should be hinged on to the camera so as to open inwards, and as close to the focussing screen as they can possibly be placed. Of course, it is needless to say they should be dead blacked. To take the "group of one," open the right hand door only, pose your sitter carefully as though there were another figure there, and focus on the part of the screen which is illuminated, put in your dark slide, and expose; then close the right hand door and open the left, *without moving the camera*, and re-pose your sitter on the space of the focussing glass now illuminated, which will necessarily be the opposite half to that exposed before. The sitter may be in the same costume, or different if desired, and capital results may be obtained in such poses as standing up reading a paper, or sitting down listening to the same, in fighting attitudes, &c.

On developing the plate there will be no mark to show that there have been two exposures, the whole appearing to be one picture, that is, of course, if the wooden doors have been accurately made and the camera has not been shifted between the two exposures. It is in no wise a necessity to show the sitter how the thing is done, these pictures usually being thought to be the result of careful combination printing. When giving the order for a pair of these doors, impress on the cabinet maker that the edges must be plain and not have a rabbet or ledge, which would give a line down the centre of the picture.

Ghost pictures have, I think, had their day, but if any one should like to introduce them in any town where they have hitherto been unknown, perhaps the easiest mode of producing them is as follows:—Pose and focus your sitter, carefully noting the exact position occupied upon the focussing screen, and when the picture is exposed be careful that no articles of furniture in the picture are moved, or if they are, remove them altogether from the space occupied by the picture. Now, after your sitter has departed, introduce a draped figure into the space formerly occupied by the sitter, stop the lens down, and give an instantaneous exposure; on development the result will be found to quite equal the spirit pictures taken by any of the more intricate and difficult methods. In some places this may be found "good business," but I would advise the photographer who introduces "spirit pictures" to especially state to his clients that they are *trick* pictures, or he may lay himself open to a charge of obtaining money by false pretences.

The "Angelo," or "statuesque," portrait is obtained by placing a cardboard pedestal in front of the sitter, whose hair and face are powdered, and shoulders draped with white, and using black velvet for a background. These pictures are sometimes very effective, resembling a photograph from a marble bust; and though they have been to the front for some time in America, and on the Continent, they do not seem to have been introduced by many photographers in this country, and may prove "good business" for some one yet.

In the States, caricature portraits find considerable favour, and are produced in much the same manner as the "statuesque," without the necessity for powdering or making up at all. The main advantage of this style of picture lies in the fact that it is the figure only that is caricatured, the face being photographed from the living model, and the figure being from a picture placed in front of the real figure. These foreground pictures may be drawn in crayon by any one with a knowledge of drawing and a natural taste for the grotesque. As the picture is avowedly a caricature, there is no necessity to make the drawing the size of nature; in fact, if the body is drawn about two feet or two feet and a half it rather enhances the effect. To those who are unable to manufacture their own foreground drawings, I would add that they can be obtained in considerable variety at a very low figure from Mr. C. M. Coolidge, of New York. I am not aware that any of the London dealers have as yet stocked them, though once they are asked after I have no doubt they will be able to supply them, and by so doing I have no doubt they will insure "good business" to many of their customers. In introducing novelties in the photographic business, I would beseech one and all to introduce no more new sizes; what with midgets, promenade midgets, *cartes*, Malverns, cabinets, promenades, boudoirs, small panels, large panels, Imperials, &c., I opine we have variety enough and to spare so far as size and shape are concerned, although I cannot say I believe in any set size or shape for landscape or general outdoor work, which pictures should always be cut to suit the subject, and not by any rule but that of art.

C. BRANGWIN BARNES.

THE DEVELOPMENT OF THE DETECTIVE CAMERA.

The primary principle of the detective camera is its portability. Its original *raison d'être* was its freedom from the tripod. An operative camera without a tripod was, of course, impossible in the time of slow plates. A portable camera did, indeed, anticipate the quick plates, for Mr. Brainerd, at least, visited the Centennial Exposition in 1876 with a small legless camera, with which he managed to break the rules by taking pictures here and there without a permit; but this portable camera required a rest and time exposure. With the advent of the quick plate the emancipation was complete. This emancipation was not accomplished without sceptical opposition. Mr. Schmid, of Brooklyn, who first patented a detective camera, was confidently assured that the idea was infeasible. There must at least, he was told, be a rod or upright of some kind upon which the box might be rested while focussing was being accomplished. When Captain Ericsson proposed to propel *veasela* with a screw in the stern, the experts asked how under heaven he expected to steer the craft. A boat propelled from the stern could not, they said, be steered from the stern. The experts were, of course, mistaken. So were the photographic experts who cavilled about the focus. The focus is merely a matter of arithmetic; and just as the quick plate and automatic shutter banished the tripod, the lever and indicator removed the necessity for ground glass and cloth. These two primary principles being settled, there came a less vital but highly important element in the "finder"—a camera-obscure attachment which revealed to the operator the scope of the lens. This finder bears precisely the same relation to the camera that the sight bears to the rifle. "It is not used in rapid skirmishing. No operator could be considered fully skilled who was dependent upon the finder in rapid or stealthy work. An operator dependent upon his finder would be continually at a disadvantage. But while it is not invariably brought into play, the finder is a necessary adjunct, and we should as soon think of leaving it off the camera as we should think of leaving the sight off the rifle."

Upon the basis of these three elements—the shutter, the focussing lever, and the finder—the modern detective camera has grown. Step by step it has developed from a crude and primitive beginning to a mature, exact, and more or less perfect instrument. In many respects this growth has been remarkably slow—slow for an invention of American origin. Perhaps this was because for a long time the portable camera was looked upon as a pretty toy, scarcely entitled to scientific attention. The immense significance and utility of the camera were long overlooked, under the supposition that serious and particularly artistic work could be done with the tripod camera only. Since it was decided that the detective had come to stay, some interesting scientific developments have been made in its construction. Some of the latest types are really worthy of admiration. But there is still much to be done.

It has always struck me as curious in the matter of photographic apparatus that so many good ideas should be wretchedly executed, and that so much good workmanship should be lavished upon mechanism that is unreasonably awkward. I have never heard this phenomenon satisfactorily explained.

In its best forms the detective of to-day is a beautiful machine, capable of doing work of a high degree of perfection, and imposing upon the operator the minimum of inconvenience. As compared with the tripod camera, the portable camera, in its better forms, has absolutely no limitation but that of size, and this is neither an artistic nor a scientific limitation. It is a limitation in the size of the immediate print, but enlargement somewhat modifies this deficiency. Certainly there are portable cameras so small as to seriously impair their usefulness. The quarter-plate, $3\frac{1}{4} \times 4\frac{1}{4}$, should, I think, be the minimum of size. The 4×5 plate seems to me to be the ideal size, small enough to be portable, and large enough to be practical. A 4×5 plate allows for some reduction in making lantern slides, and this is desirable even with perfectly sharp negatives. Slides made by contact are relatively deficient in crispness and brilliancy. Contact slides shown in the group are often very satisfactory, but when shown with slides made by reduction the strain is severe.

All perfect portable cameras are arranged for time exposure, which removes any limitation imposed by the speed of exposure. It has been very illogically urged that a camera made for "detective" work should be built for that work only. It is true that the primary significance of the instrument should not be forgotten, but it cannot be improper to fit a camera for all the work it can possibly do. There are a number of highly important reasons why the detective should be capable of use in time work at short notice. When taken on a journey a camera should be ready for any emergency. The detective should, indeed, be the universal camera in the matter of equipment. And this does not necessarily imply any deficiency in the arrangement of its strictly portable apparatus.

In other words, the portable camera begins where the older camera leaves off. It begins with all the capabilities of the tripod camera, and adds to this capacity many functions of which the older camera is incapable. It is the camera of the future. It has led the way in many of those directions in which the tripod camera is bound to follow. The idea of the finder and of the focussing lever or screw has already appeared in the conventional apparatus. The detective is the pioneer. It has made us impatient with all except the most convenient forms of camera, whether worked with or without the tripod.

Yet the best of portable cameras is still far from perfect. The ideal detective camera will be a greater triumph of mechanism than any we have yet seen. It will have a certain number of features which we may conjecturally enumerate. Some of these features have already been realised, in fact. It will have two or more lenses—long and short focus—within the box, and quickly interchangeable. It will have a quickly operative focussing adjustment for both lenses, and a simple system of stops quickly changed from the outside of the box. It will have a shutter with great versatility of speed, and a changeable aperture for different conditions of exposure, operated between the discs of the lens or behind both, with a spring that will never vary in strength. It will have a substitute for glass plates in holders, yet better than the modern paper or film. It will carry sensitive surfaces for at least a dozen negatives, and the more the merrier. It will change the position of these sensitive surfaces without opening the box at any point to the light. The camera of the future will at least have these features, and all these operations will be effected from the outside of the box by mechanism not discernible to the passing glance. The camera itself will be inconspicuous in form, of light weight, and moderate price.

ALEXANDER BLACK.

—Anthony's Photographic Bulletin.

JACK AND I IN NORWAY.

I.—NEWCASTLE TO BERGEN.

"Yes, Norway is the place for a month's good photography when you have a month to spare," exclaimed Jack, when I met him at the Glasgow Convention, where he turned up immediately on his return, having hurried up the latter part of his trip to get back in time for the week's Convention outing. "And look here," he continued, "if you care to go next year, I'm your man. You just bear it in mind; and we'll go over together, say next June."

"All right," I said; "if nothing comes in the way I am open for the trip."

So the matter was arranged; and from the time of this conversation up to the date on which to go the proposed trip Jack posted me up in all the various items necessary to take to form a complete kit. As the roads were rough and the space for luggage limited, owing to the very primitive mode of travelling over them, Jack got me to build a travelling case to hold all the photographic apparatus by itself. Our size was whole-plate, and, to save the carrying of glass, we arranged to work with a roller slide and films. The camera, with lenses, shutters, focussing glass, finder, &c., were packed into a canvas waterproof case—size, 11 x 12 x 6 inches—fitted with a broad shoulder strap for carrying. The roller slide, with black velvet focussing cloth rolled round it, was fitted into a similar case—size, 12 x 9 x 4 inches. These two cases were arranged to fit into the special packing box along with other things, such as the tripod stand, reserve stock of rolls of films, canary cloth and ruby paper, dark-room lamp, a hammer, screwdriver, nails, tacks, string, candles, with every necessary added that was likely to be wanted; and they all came into requisition pretty much, I can tell you, before we were done with our journey.

The box for holding all was thirty-six inches long, sixteen inches deep, and six inches across; it was fitted with a loop and padlock, but this was a mistake, for the unavoidable rough usage during travelling caused it to get so crushed and broken that it had to be repaired over and over again. I would recommend a lock set into the box with the holder set into the lid as a safer and handier arrangement. We had a strap screwed to each side and buckling over the top, which was a great convenience when handling. This box proved on the journey an invaluable packing and carrying receptacle. It was just a right size—rather too neat a fit sometimes—to fit on to the back of the conveyances used all over the country, and named carriages and stole-carries (the spelling is doubtful, but they are pronounced so). We found that the box would not have done to be any larger, for in some cases it took up the space from wheel to wheel, just filling without grazing, and when we stood it on end we found it too deep to fit under the seats of some of the vehicles. The length of our box—thirty-six inches—was determined by the length of the tripod stand, so that if a shorter tripod was used the case could be made so much shorter to fit; and where the apparatus is smaller the other proportions would be comparatively less. One thing to be observed is this, for convenience' sake, keep rather within our sizes than over them. The carriage has but one seat and carries but one traveller, the stole-carry is seated for two. The body of the vehicle behind the seat is where the luggage is packed, and on the luggage the driver or caretaker sits, for, as a rule, you drive yourself, so that on the way, when any picturesque bit strikes the fancy, you just pull up, off with the box on to the road, out with the apparatus, take your picture, pack, and away again, not taking more than ten minutes to do the whole thing. Jack had been there before, and he knew exactly what was wanted. Another thing that he was most particular about was the carrying of hammer, tacks, string, &c., all of which we found absolutely necessary during our journey.

I thought that Jack was overdoing it when he told me that none of these things were to be obtained when travelling in the country districts—and it was pretty well all country districts. He said that if I asked for a piece of string they would very likely hand me the dried twig of a tree—and trying it during the journey that was really offered me. We arranged to go from Newcastle to Bergen in the *Norge* in preference to going by the

tour steamers that take you about from place to place. We chose the *Norge* because, when we reached Bergen, we were free to go where we pleased, and stay as long as we liked at suitable places and pleasant spots without being bound by time and circumstance, as one unavoidably is when touring through the country in a floating house. Some may prefer the water-touring system, but, as a matter of choice, commend me to the other, for by it we enjoyed freedom and pleasure beyond our most sanguine expectations, and any who follow in like way will find it full of charming enjoyment.

We reached Newcastle on Tuesday, June 5, and at six o'clock in the evening we started in an old river tug away to the *Norge*, which was moored a few miles down the river. I had not been on the Tyne at Newcastle for years, but the same old feelings that had possessed me when it was a more familiar scene again came surging up. No matter where you look, all along this river near to the town, one is impressed with a still feeling of general desolation hanging all around: dilapidated stores, broken walls, chemical works out of repair, stony patches, showing here and there at the river's edge, deserted-looking villages, everything looking dirty, dark, and grimy, with but a healthy-looking house and patch of green left here and there to brighten up the pervading gloom. We sail on, leaving behind us the depressing influence, and our spirits rise as we come along side the *Norge*, for, white from stem to stern, she looks like a great white swan lying in the rippling water waiting for us, and panting impatiently to get away.

We were lucky enough to be among the early visitors of the season, so that there was plenty of room on board the boat: we had some sixteen passengers in all. Jack and I got a sleeping cabin to ourselves, and it was very comfortable indeed. In our company there were three clergymen, but there was not a Jonah amongst them, for the Captain informed us that the sea on this occasion was not really as rough as usual. We had on board a lady and gentleman who were going to travel Norway on tricycles; they also carried apparatus to photograph on the journey. It seemed to me that in such a hilly country they had some hard work before them. Mr. Gade, the American Consul at Bergen, was with us. He has an estate, called Fantoft, a few miles out from Bergen, on which is built one of the old Stavkirke, or wooden churches. He kindly invited us out to see this curiosity. It had been removed from Fortn, on the Lysper Fjord, and erected at his place.

We no sooner got free from the breakwaters, and out into the open sea, than the vessel began to tumble about a bit. Not being a good sailor at the best of times this made me uneasy. I did not get exactly sick, but squeamish, you know; I believe one half of that sort of thing is produced by thinking about it. Jack never gets sick, and, hence, never has sympathy; but he is great on medicines, and he insisted on me trying ten drops of his *cuscuta-agrafa*, which I did. This special specific was good for everything, and Jack had it in a newly-invented dropping bottle, the mechanism of which he was explaining to me during the time he was dosing me, then he put it away carefully into his hand bag; but, alas! when he went to his bag again the bottle was empty—it had dropped all away into his tobacco; the patent had gone wrong somehow, and Jack was left with nothing but a medicated smoke for the rest of the journey!

As we neared Bergen the custom officers came on board, but they passed the photographic case without any trouble. I fancy that they must be getting familiar with "sets" of every size and description now.

In the sunshine of the morning we sailed into the Bay or Harbour of Bergen. The first view we got of the town was strikingly picturesque, shut in all round by mountains, the white houses, red-topped, rising tier on tier from the water's edge and clustering away up the hill sides, produced a charming effect. To the left on entering the bay, and filling up the immediate foreground, were some rather imposing buildings standing out in strong relief and looking like forts or military stations, all the more effective when compared with the white wooden houses settled in hundreds on the shelving rocks, quite filling up the background. The centre of the view was filled up with streets of more substantial buildings—banks, warehouses, churches, &c.—whilst away to the right the commercial part of the town is situated, where nestling close down to the water's edge the gable ends of stores and warehouses were hanging in a dangerous-looking position over the bay, not one in twenty of them standing plumb. These house-ends lying over the water were painted every conceivable colour, which the sun caught up, reflecting them in the bay, lending a holiday aspect to the scene, enhanced by the dozens of rowing boats dotting the dancing waters all over; whilst in the near distance the hundreds of masts of trading vessels standing up dressed in their slanting network of ropes and ladders gave a finishing touch to the picture, that looked a perfect model of a pretty seaport town. As we neared the landing stage, we took a very good negative of the surrounding shipping, with the crowds of people on the quay, after which we packed and went on shore, where we were immediately swallowed up by the crowd, noise, and bustle that meant business.

MARK OUTE.

FIGURES IN LANDSCAPE AND GENRE.*

NEXT we come to Mechanical Reality, things which must not be attempted in photographs, because the camera can never confront them. These may be unattainable, either because they have no bodily existence, or because they always elude the camera.

* Continued from page 398.

I will first take an instance of the latter.

Mr. H. P. Robinson has told us, in *Landscape Photography*, p. 44, that he once wished to introduce a stuffed heron into a landscape, but finally decided against it, though apparently he could not himself quite understand the reasons on which he instinctively acted, and even fancied that he was making quixotic concessions to unworthy critics. Also, in Pall Mall the year before last there was an elaborate, very evenly lighted photograph of a stuffed lark leaving its nest. I heard the public admiring it, but it was most palpably unreal to the least observant expert. Now I do not believe that the critic's annoyance really rises from the fact that the bird is always badly stuffed, and does not accurately represent nature, but that the result is always unreal in that we never do see the wild bird at such close quarters, and with so much detail, as the photograph of the sham displays. We never see a heron standing quietly in a pool within a few yards of us, while we admire at our leisure heaven and earth and it. When we do get close to a heron, we come upon him suddenly, and all we really see is a confused flapping, a long neck doubling up, and a long pair of legs trailed rapidly away out of our sight. Or something unexpectedly goes up like a firework from under our feet, and that is all we see of the lark now leaving her grassy nest. From our knowledge of birds we may reconstruct and explain these scenes, but we see little more of them at the moment than of the separate positions of the legs of the trotting horse, and for the same reasons they are as unreal to us at close quarters. We do not see the bird at rest, because it will not stay; we cannot see its exact motions, because it flies off too rapidly. These facts, however, are not at first so obvious to us, because we can inspect birds at rest through a telescope, and thus form truer conceptions of them than of instantaneous movements, which we can only see in photographs and cannot verify in nature.

Secondly, come the subjects which are unreal, because they do not exist in the flesh. From what I have said it is natural that I should regard ideal studies as unmeaning in photography. An ideal study means an abstraction—a face or figure representing some one abstract quality or emotion from which all other sentiment has been withdrawn. How is this to be represented in a picture which we know to have been taken from a concrete human model, dressed in garments made by the costumer, and sitting in front of a portrait or R.R. lens? It is a contradiction in terms. Most of these studies, it is true, I suspect of having been taken first and named afterwards, and no doubt Resignation, Despair, or Patience on a monument could be adequately illustrated by most amateurs from their own collection of portraits. It may also be an agreeable excuse for exhibiting a beautiful woman in a fancy dress, posed in an attitude which displays her to advantage. But I do not see how these renamed portraits can claim to be ideal. We do not meet embodied qualities walking about in the everyday world; it is only in dreams like Spenser's "Faery Queen" that we encounter them, and into dreamland no material cameras are passed. No doubt some rare individuals may now and then be taken almost as representative of some especial attribute; but even with these the illusion is never perfect—no human being is a mere abstraction, but something much better and more complex. I believe that the best expression of an actual portrait is all that we can ever hope to render, and that only by a stroke of good luck added even to the best management.

On the other hand, I may add, parenthetically, that what unfits the camera for ideal work does not disqualify it for character-studies, in which individual character and details of personality are to be brought out as much as possible. These require skill in eliciting expression such as is only to be found in the best portraitists, and great dexterity and insight, but the results are among the surest title-deeds of photography to a place in art. A portrait may also be a good character-study, but the difference between these two is that the former must be a good likeness of the individual—must represent his habitual expression; whereas the character-study need only make the most of some picturesque expression of which the face is at any time capable, whether it be characteristic or not.

The portrait of an imaginary person, again, is another matter, and is as far astray as the ideal study. Mr. H. P. Robinson has told us of his conversion (by a critic) from this form of offence, and I need not dilate upon its depravity. It is, in its very conception, unreal to a fatal degree. Characters from Shakespeare—Rosalind, Portia, Hamlet; from Tennyson—Maud, Elaine, Rizzani; or from any of the poet or novelists, are absurdities in photography. They never lived on this dull earth; where could they have been photographed upon gelatine or collodion? At best the pictures could only represent some clever people acting the parts with complete success. The painter can depict them, because he sees them with the inner eye in the region of the imagination, where they were born and dwell; but even for him it is dangerous to approach a favourite hero or heroine whose worshippers have already formed for themselves a conception of their idol. Even the painter is apt to be dominated by his model. I think I am not mistaken in instancing out of thousands of greater failures a picture by a painter of the highest promise, Mr. J. W. Waterhouse, in last year's Academy, of the Lady of Shalott. It was admirably painted as far as skill went, and represented in a boat among reeds and willows a curious, fair-headed girl, to whom no objection could have been raised but for her pretensions to the Shalott title. My fancy is that the artist had been struck by certain possibilities in a model's face,

which were still to be seen in the picture, but the task had been too much for him. He had not been able to import enough imagination into his work, enough expression, enough transfiguration into the features, and it remained a clever picture, but never became the Lady of Shalott, with her lovely face and her weird carol.

Now, if this be frequently the case with the painter and his free-ranging art, how can the camera transform the model into the heroine? A photograph of the individual from whom a great writer had drawn a character would be most interesting in other ways; but even had he described the original as literally as he could, there would yet have been the medium of his imagination, which could not be interposed between the lens and the person photographed.

We may console ourselves by reflecting that these ideal and imaginary studies must have been most difficult, and it is something to be absolved from attempting the impossible. Think of the self-consciousness of the model! How could we get any one to pose for a representative of the Spotless Hero or the Perfect Beauty, of the Graces or of the Virtues? Unless, indeed, we tried "Piety," and adopted the suggestion made to Rogers when he announced that he would never have another portrait of himself painted except in an attitude of prayer. "Yes," said Sydney Smith, "I suppose with your face in your hat."

My censure for impossibility would fall on photographs of contemporary creations, of Anna Karenina and Daisy Miller, of Daniel Deronda and Richard Feverel, but into my other examples comes the further easily recognised voice of anachronism. It would, to vary a law phrase, be an impossibility upon an impossibility to have a photograph of an imaginary person who was supposed to have existed in the ages before photography was invented. Thus a photograph of Ivanhoe would be even worse than one of Aurora Leigh. But I will take the best instance possible of this class, a photograph representing Don Quixote, by Mr. Lake Price, to whom I apologise for picking out his work as an example. *Corruptio optimi pessima*. It is the best work on wrong lines which is the most misleading. You saw it here lately. A wonderfully good model was procured; the details were excellently carried out, and the composition and execution were beyond any praise of mine. But it was not, you knew it could not be, the real Don Quixote, and with that all its charm and all its value fell to the ground. Anachronism, of course, would equally upset photographs purporting to represent historical personages, even were models secured exactly resembling people as well known to us as Van Dyck's Charles I. or the Philip IV. of Velasquez.

So far I have spoken of anachronism chiefly as it used to be found in exhibition catalogues, in the pictures themselves it is mostly a matter of costume, for faces are not necessarily identified with any one period. In costume the temptation to anachronism is greatest because the necessity for keeping to dresses worn at the present day specially hampers photographers. Whole classes of figures and incidents are thus forbidden to us even as accessories, such, for instance, as were habitually introduced by Cattermole, or are now painted by Sir John Gilbert, to say nothing of the classical figures of Claude and Turner. Modern dress is notoriously a stumbling-block to painters, and it is even more vexatiously in our way, for to them it is sometimes possible to make something of the colour while adopting unobtrusively the most recent fashion in form, as in some of Mr. Whistler's or Mr. J. J. Shannon's pictures. We, on the other hand, can only render the cut and trimmings, and these fix the date within a few weeks if they are of the latest Parisian mode. To take an actual example, the other day I saw the date of a wedding group settled by the hair and dresses. Now, while on the one hand we avoid anachronism, on the other it is better not to indicate the date of our work too exactly. Although we cannot alter or make typical the face of a model, yet we can do something towards generalising a gown. I mean that it is better to use those simple, useful forms which have been worn for generations, and which do not attach closely to any one brief date. I may well be asked to name any instance of such extraordinary constancy and stability, but I think that most rustic garbs and the homeliest kind of women's dresses present no salient marks of recentness or temporary fashion. Such are the shawls once worn over the head by the lower classes almost everywhere, or the kerchief which at times took its place; but there are also classes of men and women whose dresses are adapted to their callings, and can thus never be widely varied. This is more especially the case with those engaged in the earliest occupations of all—the tilling of the land and the care of animals. The groom, the huntsman, the sailor, the hedger, the milkmaid, the haymaker, the butter-woman, the henwife, these types remain fairly constant, and these typical dresses are, moreover, a great aid in telling a story with clearness.

If costume is to be in fear of anachronism on the one hand, on the other it must never create a sense of incongruity. This is in part an offence against reality. A person in the finest clothes seen bareheaded on a moor strikes us as a phenomenon never seen in nature, if not actually inconceivable. But, on the other hand, the object may be only too real and too true, and yet, like an advertisement on the Great Pyramid, incongruous and discordant with the whole sentiment of the picture. There it becomes vulgarity, in so far as it betrays an imperfect conception of an ideal, a confusion in which an inferior note is struck, inconsistent with the higher harmony at which we aim.

Incongruity is perhaps the last of the errors which can be attributed to losing sight of reality. I may be told, however, that there are other

photographs, taken from actual models, which are no less unreal than those which I have been abusing; that elaborate groups acting out little episodes, such, for instance, as some by Mr. H. P. Robinson, are unreal, for had they been genuine and spontaneous, the persons engaged would have broken off when the camera drew up in front of them. "If it were so, it were a grievous fault," but the defect would only lie in the execution. It would only argue the absence of the master art, the art of concealing art. Their fault would be one which could be improved away, a self-consciousness or want of spontaneity, one which it would be possible to cure; the errors I have attacked are fundamental and can only be remedied by extinction.

I hope I have not wearied you, in regard to reality, with incessant repetition of a truism, and solemnly insisting that two and two make four, and that what is not within reach of a camera is, *ergo*, out of its reach. If I have not said what was too obvious, I hope that neither have I been insisting on a moral now useless. Certainly we are not at present overburdened with ideal work in our exhibitions, or with any pictures which are brimming over with imagination. There is a phrase, introduced, I believe, from America, of "flogging a dead horse;" and even to assist at that pastime is not exhilarating. But in the first place there are signs of life about the beast yet; few exhibitions are entirely wanting in photographs which transcend reality and possibility. But my metaphor has broken down, for I do not want the monster to get up and go on, but to die quietly. Secondly, I hope there will be much more activity of imagination in the future; and if this be so, it is important that the old misconceptions and stumbling blocks should be removed, and a start made on the right lines.

To resume. We established reality as an absolutely indispensable condition of photography, and on this ground we found that ideal studies, imaginative portraits, anachronism of dress or person, and incongruity were to be avoided; but incongruity, as we said, was partly a falling into vulgarity, and vulgarity we will now examine. GRAHAM BALFOUR, M.A.

(To be continued.)

ART: ITS BEARINGS ON PHOTOGRAPHY.

[A Communication to the Bristol Camera Society.]

It is the essential nature of art to deal with two distinct worlds—the spiritual or religious one, and the earthly one. Many clever writers have compared art with a book; in one sense it is a book, but one of the greatest importance, as its contents are for the greatest part historical—in fact, we may safely speak of art as a history, inasmuch as it deals so very largely with events past for many hundreds of years. But art is even beyond a book; it is, as it were, a camera, which, on looking into, we see a perfect image of the soul: its aspirations after which are noble and good, its mighty passions, its conflicts with evil, its doubts and its joys, and (using Whyke Bayliss' words) "like as a mirror to the soul, so art is also a record and a witness of the glory of the natural creation."

Again, art is a language: but not a language which is confined to England, France, Germany, or any other Continental power; it has its resting-place all over the world, even the barbaric races discourse with the language of art. Look at the Japanese and the Chinese, and see how they treat this universal language; certainly they localise it, but still it is readily readable. Take a bird's-eye view, and endeavour to see how and where it originated, and you will find how extensive the use of it has always been, and how at the present time it is extending—and extending on every side. Art may still further be described as poetry. It is actually the poetry of the soul, which rears at its best when health, happiness, and contentment are ours. It is impossible to produce it when trouble, care, and anxiety hold us, as it were, tightly bound. The mere attempt to produce a work of art, or soul poetry (if I may use the term), will be a complete failure (attempted under the last-mentioned conditions, as art belongs to the quiet moods of life).

E. J. Poynter, R.A., in one of his lectures, says, "The qualities of mind required to produce a work of art are two, the power of design and the power of imitation." He further tells that the power of design is also divided into two kinds, constructive and ornamental.

The fitness of Mr. Poynter's remarks is felt by us all, and I fear that the want of the qualities is regretted by most of us every time we have to undertake an art work of even small importance.

Take the first quality—design, which is always the foremost difficulty we have to encounter. In arranging our compositions we, of course, take into consideration the constructive value of our picture, or whatever art work it may be, and if we are sketching from nature we oftentimes find ourselves at a loss as to how to introduce or dispose of the objects before us, with which we are wishful to form our composition. We are apt to move about from place to place with the idea of blocking out little things which we think are likely to obtrude, and we endeavour to see other little things and effects which we imagine will be of more service to our work; but usually throughout all this manœuvring we are entirely ignorant of the constructive quality for which we should aim. In our endeavours to obtain a pretty picture we forget the different values which are required, be they composed of objects or lights and shadows. If we knew how to balance one object by another, or understood how each ray of light brought about its corresponding value in shadow, considerable time would be saved and better work be done.

The ornamental quality spoken of by Mr. Poynter does not bear so directly upon the composition of landscape as it does on figure composition or arrangement of conventional objects. Yet it is not to be entirely overlooked, even in landscape; its virtue should be felt by us in arranging our subjects to agreeably fill given shapes, or in the even distribution of light and shadow or again in the symmetry of certain lines, &c.

Now we come to the quality of imitation. In landscape painting this quality is of the greatest value; we cannot hope to accomplish any great work unless we most studiously copy the noble works of nature. Portraiture, of course, relies almost solely upon imitation, although other qualities are doubtless required. In still-life painting imitation supplies our every want. Before leaving this quality I should add that if the student carefully adheres to the rules laid down by nature his work is certain to be of high merit, for imitation, if cleverly done, is a sure means of giving realism, and true realism is one of the highest forms of art.

Realism should always be thoroughly displayed in all compositions; it will at once impress the mind of the critic with the story you wish to tell; it will give force and strength to your work, and will appeal to the sympathy of the soul; it will bring out the dignity of conception, the pathos of sentiment, and will give such character to your work that it will imprint on the memory the leading thought upon which you have based your whole mind.

After realism we come to idealism. If realism is one of the highest forms of art, then surely idealism is the highest.

A great painter once said, "My duty is sobriety. I could by two strokes of my brush make an expression of extreme intensity, but I should gain nothing by it, for it would not be nearer to nature. If I am to paint truly I must also paint soberly. Whilst I wield the power of producing mournfulness by turning down a lip, or merriment by turning it up, I must use it to walk with nature soberly, producing an effect real and ideal at one and the same time."

It has the power of giving a most poetic rendering of a most matter-of-fact subject; by it we can call smiles on the most solemn faces, and bring forth tears from eyes which a moment before brightly shone with joy. Again, idealism can be used for disposing of some of the harshnesses which realism is apt to give us, and, what is more important still, idealism deals with things spiritual. We are indebted to it for such glorious works as Michael Angelo, Raphael, Rubens, and others of the old school left behind for our study and admiration. The many beautiful conceptions of the Holy Family, and pictures of a similar class, are all due to idealism and its great co-helper, realism.

Simplicity also comes to the front when we are dealing with composition. The ancient Greeks in their compositions considered simplicity as a characteristic of perfection, and this idea is evidently carried out by our great artists and sculptors of to-day. If the Greeks were right, and we have every reason to believe that they were, then we must seek the same virtue for our works.

The one great point in favour of simplicity is that it prevents confusion; it gives to each figure or object a position, and there it has to remain; there is no stepping out of place and jumbling together, as we often see in pictures where simplicity has been overlooked. It acts as a means of quieting down, and gives an understandable meaning to the duller observer. This feature bears directly upon photography in several ways; first, in the subject itself, again in use of backgrounds, again in quality of light and shadow, and further still in the arrangement of light and shadow. The old-fashioned photograph invariably suffered from hardness of tone as well as exaggeration in the light and shadows, and generally failed to do more than remotely suggest what it attempted to represent; and even now those representing living persons are so stiff and generally uninteresting as to leave much to be desired, although they arrive at a stage considerably nearer to life.

Following on in the train of art, we encounter another great treasure called "expression." It would be interesting for us to see how the Greeks availed themselves of this treasure, and then to compare their use of it to the many uses to which it was applied during the period of mediæval art.

We find that they have one idea in common, that is, they take the human figure as the exponent of what they want to express. But beyond doing that they appear in a great degree to separate; the ideas of the Greeks, as it were, turned into a cold channel, whilst the ideas of the mediævalist turned into a hot one. This breach is mostly attributed to the different uses of expression.

Classic art relies upon its wonderful beauty and strength for whatever it has to tell, but it fails to tell as enough; it stops short at the very point where we are most anxious for it to proceed. Of life, the one great theme, it tells us very little; we have the manifestation of life, but beyond that we receive nearly nothing. The Greeks have left for our instruction and admiration objects of art which are perfectly invaluable, objects which in the smallest detail contain evidence of the most charming beauty, whilst the grandeur of mass and truthful simplicity of composition place their works in the foremost rank of art. But apart from their beauty, how do these wonderful works appeal to our sympathies? Personally, I feel a something which prevents any direct response as it were from my soul; there is a want of touch with our emotions which stops us from being able to accept them as of living people. Yet how is this! The forms are most beautifully and accurately executed, the proportions are unquestionably perfect, they possess every member of the body as we do, and yet there is that unfathomable something which causes us to stop short of acceptance.

What is this something? If it is not the fault of the form, then it must be the fault of expression. This is where I think the fault steps in; these most perfect examples of the sculptor's ability simply appear to us as stone because that one quality which gives life has been withheld. Sorrow and pain are only depicted on one or two examples; yet how can we feel compassion, or where is our sympathy, two most noble emotions, which act as a godly tie of one human being to another! There can be no compassion without the existence of sorrow, no deep sympathy without suffering. Yet the Greeks must have thought these unworthy subjects to receive perpetual remembrance in art. It was by the careful avoidance of such appealing emotions as these that the Greeks lost the one touch of nature which makes the whole world akin.

Now let us take a look at the art of the mediæval period, and we see for ourselves that, instead of being content with a cold grandeur, as were their predecessors, they go almost to the other extreme, and aim for life with all its passions. At the same time, they by no means overlooked or undervalued the grandeur of classic art, but they felt the want of touch with their sympathies, so straightway earnestly introduced into their pictures and statues that which had been previously left out.

Expression is the very soul of art. First, the expression of action, which gives force and meaning to our figures, and, in many cases, is even more im-

portant than the expression of the face. Take, for instance, a picture, statue, or photograph. Although each may be most cleverly handled in the execution, yet if expression is wanting how uninteresting they become. How accurately does even the quietest attitude express the character, spirit, and intention of the man, and how easily different passion are expressed and detected.

The power of portraying expression lies entirely with you. It is only for you to imagine yourself to be the very person whose position you are aiming to give, and if you can vividly realise the character you will naturally fall into the proper position.

Again, in the expression of the face, it is almost impossible for any master to help you. It is the artist himself who feels the very sentiment he wishes to express, be it either grief, mirth, fear, hatred, and so on.

I have heard it remarked that amateurs take better photographs than professionals. In landscape work this, to my mind is very true, and even in portraiture (that is, if we are to regard photography as an untouched print) the amateur is again in advance of the professional, for the reason that it too often happens that the professional photographer merely uses his negative as a kind of base upon which he is to set to work; and unfortunately he does set to work, with the result that the negative is retouched in such a manner that it is transformed from what was originally a photograph into a piece of stippled work, which either gives the portrait the appearance of polished marble, or is so coarse as to resemble a bad case of smallpox, and when we come to look for the expression—well, I will leave you to imagine how that has fared. I fear from what we are in the habit of seeing of professional work that it is more a matter of *l. s. d.* with him than sentiment, and yet it is the sentiment which gives a sterling value and an irresistible charm to our works.

The Archbishop of York, in a recent address on art, made the following remarks:—

"He sometimes saw in shop windows portraits of an elderly statesman, who had in reality furrows on his face, which were the wounds of the battle of life, the marks of victories won or conflicts gone through. But the photographer took care that none of these furrows should be seen. Touch after touch was made upon the negative, until at last the face was reduced to the condition of something that had been boiled. For himself, he declined to part with his wrinkles; they were the character of the man."

Look at the different faces we see every day of our lives. Often and often we pass faces by which contain the most charming beauty, so far as regularity of features go, yet we never take any further notice of them beyond giving them one passing glance. How is this? We are all anxious to admire beauty when we see it, and yet here we are passing it by without a regret. It is another case of classic art—there is nothing in the face that appeals to our sentiment. But meet a face which contains expression, and then we are not inclined to pass it by! No; we are like our fathers of the mediæval period, we have had our sympathies aroused, and we have become interested. It is only by this quality of sentiment that a firm alliance is formed with the affections in all works of art. And it is to strengthen this alliance that the photographer should make his aim. His productions are now used by the etcher, the engraver, and the lithographer, and are certain to be more used in the future than they are at the present time, for the reason that photography has two great advantages over the old system, namely, cheapness and greater accuracy of detail.

In conclusion, I would impress upon all present that art is nothing but divine sentiment. If you have not the power to ably produce a work of art, you have that which is next to it, you have the power to love art, and in exercising that love you are giving life to a divine passion which elevates to the highest degree.

JOHN FISHER.

Foreign Notes and News.

DR. M. ANDRESEN, of Berlin, has increased the already large number of recently discovered or recommended developers by yet another, to which he has given the picturesque name of Eikonogen, a name which would appear to be designed as much to keep secret its composition as to recommend it to the amateur in search of something new. This substance is said to possess considerably greater developing power than either oxalate or quinol, and to be only approached in this respect by pyro, from whose other unpleasant qualities, however, it is said to be free. Amongst other advantages claimed for it are cheapness, freedom from poisonous qualities, and durability, as it may be preserved for an indefinite period without fear of alteration.

M. GEORGES GUÉROUT has recently addressed an interesting proposal to the Académie des Sciences, namely, to bring the aid of photography to the help of the phonograph, for the purpose of reproducing before an audience listening to the delivery of a speech by the phonograph the gestures and changes of expression by which the speech was originally accompanied. He proposes, when the phonograph is set, turning to take a series of instantaneous photographs of the speaker, at intervals of one-tenth of a second. When the phonograph has been, say, thirty seconds in motion, 300 impressions will have been taken. After development they are arranged in a phenakistoscope, which also revolves in a period of thirty seconds. Now, impressions on the retina last for a period of one-tenth of a second, and as each successive impression is consequently presented before the previous one has completely disappeared, the effect would be to reproduce all the movements of the person in virtue of the principle of persistence. As there is no word which can be pronounced in less than one-tenth of a second, the gestures and changes of expression would exactly follow the words uttered by the phonograph. In this manner M. Georges Guéroult thinks it may be possible to store up and reproduce for the benefit of posterity, not only the words of an actor or speaker, but

also the quality which Demosthenes maintained to be the first and last requirement of an orator—his "action."

M. SCHLEUSNER writes to a French contemporary to put amateurs on their guard against too venturesome experiments. A friend of his, it appears, recently informed him that he had been attempting to improve the quality of albumen paper by immersion in an ammoniacal silver bath, and, having tried various substances without success, proposed to M. Schleusner to precipitate the silver with caustic potash. "*Figurez vous les résultats!*" exclaimed the alarmed M. Schleusner, and proceeded to point out that, had the ingenious amateur proceeded to carry his idea into practice, an explosive compound would have been formed capable of blowing him and his laboratory into fragments. He proceeds to warn amateurs against precipitating nitrate of silver with caustic potash in presence of ammonia, which produces fulminating silver; also against adding ammonia to sub-chloride of gold, which produces fulminating gold.

HERR OTTOMAR has demonstrated that it is possible to photograph a projectile during its flight, even with an initial velocity of 400 metres per second; the exposure occupied only one-tenth of a thousandth.

In reference to an article by Dr. Vogel, on the warping or expansion of gelatino-bromised paper, the editor of the *Photographisches Wochenblatt* remarks that, for photogrammetric prints, the drawback of expansion or contraction may be obviated by printing on the sensitive film at the same time as the image a network of parallel lines crossing each other at right angles and a centimetre apart. This may be done by tracing the network with a sharp point upon a sheet of glass coated with collodion stained with aurine.

EVERY one interested in optica has heard of the new glass said to be most suitable for telescopic and microscopic lenses, as manufactured by the firm of Schott & Genossen, Jena; but every one may not be equally well aware that the new Jena glass is the outcome of a series of experiments made by Dr. Abbé, Dr. Schott, and the late Dr. Karl Zeiss in the glass works at Jena, subsidised by the State. Formerly the only five substances used in glass making, the optical action of which had been examined, were silicic acid, potassium, sodium, lead, and calcium; but they resolved to set on foot experiments with a great many vitrifiable, inorganic substances, and from amongst them to choose the most promising for optical glass. Besides the five usually employed substances, other twenty-eight were incorporated in glass in proportions of not less than ten per cent. The result of the experiment being that the secondary spectral colours may be done away with in crown and flint glass by boric acid, which induces a specific contraction of the blue and a corresponding increase of the red end of the spectrum, just as fluorine, potassium, and sodium produce the inverse effect. Boric acid has now become the base for all sorts of flint glass in which diminution of the secondary spectrum is desired.

In *L'Amateur Photographe* Dr. Nelson-Pautier indicates the methods he employs to avoid in his positive prints the haloes which in negatives of interiors appear at the edges of the windows by which light enters. A luminous halo appears all round the window, and any details that may have been obtained disappear in the toning bath. He takes a piece of oiled paper the size of the front of the printing frame and cuts out a piece the size and shape of the halo (not of the window), which shows black on the negative. He then gums the sheet of paper at its four corners and sticks it in front of the printing frame. The part covered by the oiled paper will thus print in the same time as the uncovered part, and thus details will be got in the windows.

Our Editorial Table.

THE INTERNATIONAL ANNUAL OF ANTHONY'S PHOTOGRAPHIC BULLETIN.

New York: E. & H. T. Anthony & Co. London: Hiffe & Son, 93 Fleet Street.

THIS annual, which (the same as last year) is edited by Dr. A. H. Elliott on the American, and by W. Jerome Harrison on the English side, is not only out in time this summer, but quite maintains its reputation as a capital reading-book, containing contributions from writers on both sides of the Atlantic. To avoid jealousies, the editors have adopted the system of inserting these contributions in the alphabetical order of the authors' names. Looking over the various papers in this annual contributed by writers in the old and new worlds, we find many that are valuable and suggestive, and on every conceivable department of the art or "art-science" of photography.

In a humorous article on the *Art of Lying as applied to Photographers*, Mr. C. C. Verers, alluding to Oscar Wilde's remark that "lying, as a fine art, is fast falling into disuse," observes that Oscar must have been very imperfectly acquainted with photographers, and the statements made by dealers and manufacturers; and he cites examples, comprising photographs in natural colours, children taken instantaneously by a new process, permanent photographs (on albumenized paper); every make of plates has the largest sale in the world, every maker's lenses embody the utmost perfection in extraordinary definition, depth of focus, flatness of field, and are equalled by none, and so forth. Among the many good articles there is one by Dr. Clarence Woodman, of New York, on *Depth of Focus and Angle of View*, in which he expresses his preference for a wide-angle doublet of a focal length not less than the base line of the plate employed. The English editor, Mr. Harrison, contributes a series of notes on apparatus and books; while the American editor writes concerning the oxidation of sodium-sulphite solutions.

The work contains several excellent whole-page illustrations, with a list of all the American and English societies. It sells at two shillings.

In connexion with this Mr. Jerome Harrison writes:—

"Sir,—Will you kindly allow me to inform the contributors of papers to *Anthony's International Annual of Photography* that, as the author's copies, which will be sent to them, have to be specially bound, it is not possible to send them out till a short time after the publication of the ordinary edition? They will be despatched by parcels post as soon as ready."

CUT-OUT MOUNTS.

FROM Messrs. Mann & Son, London, we have received an assorted sample of cut-out mats for both stereoscopic and lantern transparencies. The forms of the apertures are diverse and faultless, this latter owing, doubtless, to their being cut out by hand. Owing to the high degree of magnifying to which they are subjected, it is of vital importance that the mats of lantern slides be perfect in every respect, and in these productions of the Messrs. Mann we have that required perfection. The shapes of the apertures are square, cushion, dome, and circular. The paper (black) of which the mats are made is smooth, firm, and quite opaque.

COLOURED GLASSES FOR ORTHOCHROMATIC PHOTOGRAPHY.

A SUITABLE kind of glass for use with the lens as a coloured screen when copying paintings, or any subject having strongly pronounced colours, by ortho or iso-chromatic plates has long been a desideratum, and this notwithstanding the directions for varnishing glasses, or staining the surface of the lens by collodion containing colouring matter.

We have just had samples, in four degrees of intensity, of coloured glass manufactured for orthochromatic photography by Mr. J. R. Gots, of 19, Buckingham-street, Strand, London, than which it is not possible to conceive of anything finer for the purpose. The colour is in the substance of the glass—that is, it is not flashed—and the transparency is of a high order. Both surfaces of the glass are optically worked, hence the perfect homogeneity of the plates. One is a very pale yellow, the others progressively advance in colour. Having a set of these glasses, one may now laugh at the most formidable oil painting or most variegated floral bouquet which is brought to him to be photographed.

The advent of these plates supplies a want.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 9027.—"Improvements in Photographic Shutters, specially adapted to Cameras of the Detective Class." E. MAWSON and C. WINTER.—*Dated June 11, 1889.*

No. 9825.—"An Improved 'Washer' for Photographic Plates, Films, Prints, and the like." L. E. PERKIN, F. L. PERKIN, and A. RAYMENT.—*Dated June 15, 1889.*

No. 9469.—"Improvements in or relating to Instantaneous Shutters for Photographic Cameras." Communicated by G. Eastman. A. J. BOULT.—*Dated June 15, 1889.*

DEATH OF NORMAN MAY.—We are sorry to learn that Mr. Norman May, of Malvern, died on the morning of Wednesday, June 19, of consumption. He had been somewhat delicate for many years, so much so that two years that he had been unable to attend personally to business. His end has caused considerable excitement in Malvern, as many of his friends had built hopes on his recovery. On Tuesday he was driving and walking on the hills, in the evening he ate a good supper and went to bed in high spirits, the following morning between half-past seven and eight he breathed his last.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 24.....	North Middlesex Club	The Iron Room, Strand Green.
" 25.....	Great Britain (Technical).....	5A, Pall Mall East.
" 25.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 26.....	Burley	Bank Chambers, Hargreaves-street.
" 26.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 27.....	Burton-on-Trent	The Institute, Union-street.
" 27.....	Halifax Photographic Club.....	Mechanics' Hall.
" 27.....	Liverpool Amateur	St. George's-crescent North.
" 27.....	Oldham	The Lyceum, Union-st., Oldham.
" 27.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 13.—Mr. T. E. Freshwater in the chair.

Mr. C. H. COOKE, in the course of some remarks on retouching, said that retouchers were wretchedly paid.

Mr. A. COWAN stated that retouchers were the best paid of any photographic employers when they were competent.

Mr. COOKE thought that they advertised to do work at too low rates.

Mr. W. H. PRESTWICH believed that small heads could be profitably retouched at three shillings per dozen, but not large heads.

Mr. COOKE said that photography is always untrue, especially in the deep shadows, and truly artistic retouchers can correct that without interfering with the portrait; photography always gives a want of detail in the shadows.

The CHAIRMAN remarked that he recently attended in Barnet a society of photographic amateurs which met once a week at each other's houses, and at the beginning of each year drew up and printed a programme for the whole twelve months, consisting of a list of subjects for competition during each month. The subjects were adapted to the particular season; for instance, last month the subjects were birds' nests and relics, and some of the competition pictures were very good indeed. One of them represented a nest in an old letter box. That which was selected as the best was from still life, and included two stuffed owls. In relation to relics, the best picture was that of Old Temple Bar, as rebuilt in the grounds in Hertfordshire of Mr. Menx, the brewer.

At the next meeting of the Association, Thursday night, June 27, Mr. A. Haddon will open a discussion on *Practical Methods of Testing Photographic Lenses*.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

JUNE 17.—Mr. Humphries in the chair.

Mr. S. Quincey was elected a member.

Photographs of lightning flashes taken in the late storm were exhibited by the members, one (by Mr. J. Treadway) in which the flash had apparently struck a tree.

Discussion was raised as to the cause of the different varieties of flash, but no definite conclusion was come to.

A sample of the dusting-on process was shown, and the method of working explained, the one exhibited having been taken from a negative which was disfigured by spots from chemicals having been accidentally dropped on the film; but in the copy obtained by this method no trace of them was visible.

A new detective camera on the screw principle was shown, which was generally approved, the size being, when made in three-eighth and five-eighth inch wood and fitted with five-and-a-quarter-inch focus lens, 9 × 7 × 5 inches.

Mr. MARCHANT: How ought I to proceed to make a lantern slide from a half-plate negative?

Mr. HISCOCK: The best way is, if you have an enlarging camera, to use that, putting the negative to be copied where the enlargement would usually be, and the lantern slide in position where for enlarging you would place the negative; or with an ordinary camera it could be done by placing the negative from which you desire to obtain the slide upside down in a frame against the window, taking care that the film is inside, and then placing your camera inside and photographing it in the usual way.

Mr. WALKER stated that he had lately bought some waxed paper cloud negatives, which were very good, but that in printing there generally appeared on the print a number of greasy spots.

It was suggested that this might be due to too much vaseline (which was used to make them transparent) being left in the paper, and he might overcome this by heating them very strongly over a paraffin lamp or gas stove, or a safer method was to place them between pieces of blotting paper and pass a very hot iron over them.

All future meetings of the North Middlesex Club will be held in the Jubilee Hall, Hornsey-road, next to the Hornsey-road Railway Station on the Midland.

The next meeting will be on July 8, when Mr. Valentine Blanchard will demonstrate his platinum black process, and will commence punctually at a quarter-past eight. Visitors invited.

UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

JUNE 11.—Mr. J. T. Leon, B.Sc., in the chair.

Paper read by Mr. E. S. Warrall on *Exposures* [this will appear in a future number].

A long and interesting discussion took place on the subject of the paper, for which the negatives taken by members on the excursions afforded excellent material.

A resolution adopting the metric system, as suggested by the Photographic Club, was put to the meeting and carried unanimously.

At the next meeting the Treasurer (Dr. Plimpton) will introduce the subject of *Phototype Printing*.

The next excursion of the Society will be to Elstree, on Saturday, June 29.

HOLBORN CAMERA CLUB.

JUNE 7.—Mr. E. CLITON demonstrated the method of coating dry plates, and briefly explained the action of developers upon them. The lecture was attended by about thirty-five members.

JUNE 14.—Mr. G. A. FREEMAN, B.Sc., F.G.S. (one of the Vice-Presidents of the Club), lectured on *The Chemistry of Photography*, explaining the action of light, the construction of lenses, the composition of developers, what chemicals will act together, &c.

JUNE 15.—In spite of dull weather, eight members visited Windsor, as arranged, and had an agreeable outing.

Photographers will be glad to know that shortly there will be a dark room available for their use at the Castle Hotel, Windsor, as the proprietor intends to fit one up as soon as the press of work caused by the Agricultural Show is over.

Messrs. C. L. Yates, W. Turvey, Alfred W. Dolland, and Thomas Fenaughty were elected members of the Club.

HACKNEY PHOTOGRAPHIC SOCIETY.

JUNE 13.—Mr. Henry Burton in the chair.

Mr. FENTON JONES (the Hon. Secretary) made an announcement with regard to his editing a *written* journal for the use of members only, wherein all the transactions of the Society could be recorded for future reference.

This proposition was enthusiastically received and carried unanimously.

An election of new members then took place *en bloc*.

Mr. C. Hoddle, of Mare-street, exhibited a neatly made camera constructed by himself.

The Chairman showed some very interesting photographs printed by him upon Pizzighelli paper. It was remarked that they were as good prints as could possibly be expected by that process.

Mr. Hodges also exhibited some excellent 12×10 prints both on platinum and silver.

Dr. ROLAND SMITH (who promised to read a paper at some future time) brought a very fine transparency taken on a Fry's German plate in proof of his contention that, although he never backed his plates, he was not troubled with this defect. The subject, an interior of a church, received one hour and fifty minutes exposure, and did not show any sign of the fault mentioned.

The CHAIRMAN then called upon Mr. J. Hubert (Vice-President) to read his paper and give a demonstration on *The Platinotype Process*.

Mr. HUBERT, having read a poem composed by him for the occasion, explained the process in detail, and proceeded with development by the hot-bath process. He also brought some samples of the Pizzighelli paper, which, however, bore no comparison with the patented process.

A member asked whether it was possible to print without the indiarubber pad.

Mr. HUBERT replied that he had occasionally done so without detriment, but thought it dangerous if the atmosphere were in a moist condition.

Another member questioned whether an ordinary good silver printing negative would be suitable.

Mr. HUBERT remarked, though it would be preferable to use a slightly denser negative, it was quite practicable.

Another member asked whether the prints dried much darker.

In reply, Mr. HUBERT said that the additional density was but slight; he further mentioned that he deprecated a gloss for platinotype prints, but would recommend the use of encaustic paste, which imparted a beautiful richness.

The prints developed were mostly recognised as local celebrities, and much admired. Mr. Hubert then passed the negatives round for inspection.

The CHAIRMAN complimented him upon his very able demonstration.

The meeting then adjourned to July 13, when it is hoped that another paper will be read by a gentleman of note in the photographic world.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

JUNE 13.—Mr. P. H. Phillips (Vice-President) in the chair.

Messrs. V. Pothergill, William Rowlandson, and E. O. Fricker were elected members of the Association.

Mr. J. A. Forrest exhibited some very fine pictures which he had taken at Bournemouth and Dolgelly.

The Hon. Secretary exhibited the competitive prints *re* Chester excursion, the first prize being awarded to Captain Ching, R.N., the second to Mr. G. Latimer, and the third to Mr. W. Tomkinson.

Mr. KENNEDY exhibited two half-plate negatives, one developed with hydroquinone, and the other with pyro and ammonia, both of which had the appearance of fog. He stated that several plates which he had exposed lately turned out the same way after development.

Mr. F. EVANS, in replying, stated that he had had similar results, and could only account for them by the plates being fogged before exposure. Sometimes he found that the slips of paper placed between the plates by the makers caused fog.

Mr. H. B. SHARPE then proceeded to practically demonstrate the process of *Transferyotype*, during which he transferred a half-plate print by squeegeeing on to a piece of opal; he next floated a film, half-plate size, from the paper and transferred it on to a piece of opal, enlarging the film during the operation to full-plate size, and showing at the same time the simplicity of enlarging by this process.

FROM Mr. Kenneth McK. Ross, Hong Kong, we have received a photograph of a flash of lightning of transcendent brilliance and dimensions. It was secured during a severe thunderstorm that passed over Hong Kong on the 29th of April. Mr. Ross has enclosed two extra copies, with a request that we give them to any scientific society to whom we think they would prove of interest. This we have done.

Correspondence.

23 Correspondents should never write on both sides of the paper.

DEFECTS IN SIDERAL PHOTOGRAPHS.

To the Editor.

DEAR SIR,—I am happy to see, by the number of THE BRITISH JOURNAL OF PHOTOGRAPHY for June 14, 1889, just received, that you are discoursing therein on a subject you are so well qualified for, both chemically and optically, and that you hold to that dual origination of the halated enlargement of the discs of certain stars when photographed in certain telescopes.

You have indeed just received a letter from a high astronomical authority, accusing the optical source alone as being at the bottom of the mischief, by means of light reflected from the back of the plate at some other angle than 90°, whereby your correspondent would explain ovality of star images increasing to astigmatism, and confusion of rays thrown towards the edge of the plate, to be then reflected still further outwards as they pass through the plate's substance diagonally up to the sensitive film again. A trick of light proposed to be rendered more indubitable by silvering the back of a plate, thereby getting the effect doubled, and then destroying it by coating the backs of other plates with *light-absorbing* materials, such as brown-red pigments, lampblack, and water.

All this is true enough for camera plates of large angular subtense at their objectives, and was found very useful thirty years ago by those who employed that test of patience, the tannin dry plate of the period. But if any astronomers are detected in the year 1890 publishing star photographs sensibly inaccurate in figure or place by reason of either not having used so well-known a remedy against halation at all angles as the above, or, on the other hand, childishly attempting to photograph too broad a field for the lens to cover without its breaking down in definition or altering in focal length towards the borders of the plate to an extent only too visible to any one's passing glance, let the justice of the nations now assembling for the star photography of the whole heavens be executed upon him as they will.

The particular optical cause, however, selected by your authority for denunciation is not, in all the cases I have seen from the observatories, even allowed there to attain really large dimensions, whether the plates have absorbent backing or not. So that your first theory, the chemical, strikes me as far the more important of the two difficulties which astronomers are now contending with. Even this one, too, they have largely reduced in dimensions of late years, for I can assure you, Mr. Editor, that some of the earliest photographs made of the nebula in Orion showed every bright star included as a huge, though faint globe—a something positively fearful to look at and ponder over its possible meaning; for the effect was universal and all over the plate, wherein the physiognomy of one star differed from that of any other merely in the size of its grey globe, which followed very nearly the brightness of its light as a point.

Wherefore that really appalling appearance of *swollen* stars, or blown bladders, when photographed in that day (by pure photography, too, be it remembered, which is usually considered to give out nothing but the naked truth) was due, as I ventured to hold at the time, to the wet collodion, and the particular sensitising salts employed for it, in that early day—or, in fact, to your chemical explanation. For the rise of the modern extra-sensitive *dry* plates, soon after that epoch, drove wet collodion out from all observatories, and then the stellar balloons in photographs quickly collapsed to far more moderate dimensions. Not perfectly though to points; so that there is still an evil influence of pretty considerable magnitude to be investigated, and exorcised if possible—firstly, perhaps, by comparing dry plates, successively sensitised by every likely salt under the sun, and trying them on stars with the same stellar instrument; and then by a little further examination of the optics to which telescopes are far more amenable, or in danger from, than are either portable cameras or small glass plates.

Should the telescopes, for instance, be dioptrics, and achromatised for eye-vision, the yellow rays of a star are brought up nicely to a point; but at the very same time the violet ones necessarily form a halo of that coloured light, or a residual and circular spectrum, which is in a manner photographically bound to represent a grey disc of light round about the star, if only exposed long enough; while, if the telescope's objective be achromatised more properly for the violet rays near G, and those rays be then brought well up to a point when in focus, yet not only will the red and yellow rays be left outside, making haloes of those colours, but the invisible rays of the ultra-violet, which have never yet been included in any achromatising formula, will be left outstanding at their end of the spectrum, and from their large spectral range are pro-

bably the chief delinquents in so spreading outwards the light of a bright star that no very faint one in its immediate proximity in a photograph is left unextinguished by it.

But should the astronomer, in desperation of ever completely curing all these lenticular difficulties, attempt to cut the Gordian knot of their entanglements by adopting a reflecting telescope without any lenses, and thereby obtain perfect freedom from all circles of differently dispersed light, rejoicing instead in a brilliantly intense white point of light, from a white star, when in the middle of the field—how soon he comes to appreciate that the optical field for sharp definition with that kind of telescope is so violently curved to short radius that only a very little of it can be utilised on a flat plate.

A mathematical theory was indeed recently published showing how, by altering the figure of the great speculum from parabolic to elliptical, or to just the other side of the simple and primitive spherical, a flat field might be obtained; but then with the loss (which the talented author did not prepare his readers for) of all fine definition from every part of the field, central as well as circumferential.—I am, yours, &c.,

Clova, Ripon, June 17, 1889.

PIAZZI SMYTH.

To the Editor.

SIR,—Having read with much interest the letter of Prof. Morize on the subject of *Sideral Photography*, as also the masterly articles in which the same subject is dealt with, both in the current issue of THE BRITISH JOURNAL OF PHOTOGRAPHY and in one of the issues of January, it has occurred to me that there is one aspect of the question—one possible explanation of the matter in dispute—which has been omitted from the controversy. The point at issue is, I understand, as follows:—Why, when the images of all stars produced by a photographic objective are mere mathematical points, do the brighter stars appear on the developed plate as discs whose diameter decreases with the brightness of the stars? Mr. Traill Taylor attributes this phenomenon apparently to two causes assisting one another: halation from the back of the plate, and lateral reflection of light from one particle of silver bromide in the emulsion to another. Prof. Morize seems to think the matter to be explained by halation alone, giving a somewhat elaborate explanation of how this takes place. Prof. Morize's letter would have been still more interesting had he actually tried the experiments he proposes and communicated the result, which his position as Astronomer of the Imperial Observatory, Rio Janeiro, would perhaps have enabled him to do. But even before we know the results of the experiments he proposes, we may, I think, conclude that his hypothesis does not explain everything.

Let us consider one of the cases alone which he handles—that of a star situated exactly in the prolonged optic axis of the objective. The light from this star on passing through the objective forms a cone of rays, which, when the objective is focussed for the first surface of the plate, has its apex at the point where the first surface of the plate intersects the optic axis; it forms a second cone whose base is the second surface of the plate from which it is reflected back, and on intersecting again the second surface gives rise to the disc in question. Now, from this it would follow, first, that the disc appearing on the negative would increase in diameter the thicker the plate used; secondly, that its size would depend on the angle of the cone of rays, i.e., the focal length of the objective; and, thirdly, that the same thing ought to occur with stars of the very smallest magnitude, and though the illumination of the disc formed by their light might be too faint to show under ordinary circumstances, still by employing larger exposure or a more powerful developer they would ultimately appear also as discs. These are, I think, correct deductions from Prof. Morize's hypothesis. Do they agree with actual facts?

Mr. Traill Taylor's suggestion seems to be much nearer the mark, inasmuch as the lateral reflection from point to point of the emulsion would naturally extend further the more strongly the point from which it originated was illuminated. I do not, however, feel sure whether the optical continuity of the emulsion is sufficiently imperfect to permit of this irregular lateral reflection; and then there comes in the fact that a body which is decomposed by light usually only reflects those portions of the light which are inactive on itself.

May not the true explanation be somewhat as follows? The decomposition effected by light on silver bromide, or any other chemical compound, is universally considered to be due to a vibratory action set up within the molecules of the body in question by the undulatory motion of the waves of light. The light, in fact, shakes the molecules apart, and this action increases in intensity the brighter the light, i.e., the greater the amplitude of its vibrations. There seems to be no doubt that this vibratory action occasioned in the particles of silver bromide is propagated from one particle to another beyond the point actually influenced by the light, and this action will extend further from the point of origin the greater the amplitude of vibration at that point, just as the widening circles in a pond extends further from the spot from which a stone has been dropped into it the greater the height from which the stone has fallen. A photographic plate exposed to the firmament behind an objective is really being subjected to a decomposing vibratory action at a number of points, but the amplitude of the vibration varies at these points with

the brightness of the star. Is it not natural that the decomposing action occasioned thereby would extend the further from its centre of origin according as the amplitude of vibration at these points is greater or less, and so produce discs corresponding in size to the brightness of the star?—I am, yours, &c.,

R. N. LUCAS.

8, Featherstone Buildings, W.C.

PRETSCH'S PHOTO-GALVANOGRAPHIC PROCESS.

To the Editor.

SIR,—In an editorial under the above heading, in the issue of the 7th instant, reference is made to a previous inquiry of mine as to the neglect of the above system of process printing. Therein the difficulty of depositing the copper on a wet gelatine relief, owing to the solvent action of the acid sulphate of copper solution, is mentioned, and the necessity imposed by this degradation of much and expensive handwork on the copper plate is justly pointed to as one objection to the process.

The writer is apparently unaware that practically this difficulty was avoided (although probably this fact has not been published) by taking a mould of the relief in a mixture of, I believe, lampblack and guttapercha melted by heat, from which a cast being taken, was used as a matrix for the deposition of the copper printing surface.

Subsequent experiments were made by Messrs. Corelli Bers and Theophilus Ward with the object of producing a gelatine relief which could be safely used direct for the electro-deposit. I have been shown an old formula-book by the first-mentioned gentleman, in which there are some notes describing their method, in which, after development, the relief was flooded with spirit, subsequently blotted off, and coated with bronze powder, then treated with a twenty-five grain solution of nitrate of silver, the copper being deposited on the silvered surface. Prints by this process were successfully produced, and some photographic portraits of the Royal family were executed by it for the late Prince Consort, who was much satisfied with them. In the manuscript-book above mentioned I observed a further note that the addition of a considerable amount of albumen to the gelatine renders it free from action of the acid sulphate. I am inclined to think that the real reason of the death of these processes was one mentioned in the issue referred to herein: "That the period was not then ripe for mechanical processes," and also the jealousy with which the profession then regarded them as likely to interfere with their regular trade.

HENRY E. DAVIS.

Exchange Column.

. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, pair of stereoscopic lenses in exchange for 18 x 16 enlarging camera (focussing from ten to about sixty inches) or other apparatus.—Address, ARTIST, 30, Radcliffe-road, Fulham, London, S.W.

Answers to Correspondents.

. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

Thomas Protheroe, Bristol.—One photograph of the late Mr. Samuel Cook, Professor of Music.

J. Browning, Exeter.—Two photographs of Sir Thomas Acland.

Miss M. Corrie, Alresford.—Two photographs of For Memorial Chests in Winchester Cathedral. One photograph entitled "The Batter Land."

W. B. S.—See our "Editorial Table" notices in this number.

Col. J. B. AMOTT (Quebec).—See article on the subject in present number.

CARSTIC.—In answer last week, instead of "acid caustic potash" read "and caustic potash."

B. C. D.—So far as we are aware, paper specially prepared for Woodburytype printing is not an article of commerce in England.

DR. W. RICHARDSON wishes for information respecting Coventry's plate-coating machine, described in our ALMANAC for 1887, page 277.

F. SCOTT (Fulham).—Inattention to our plain instructions respecting such communications is almost invariably attended by delay. Read the notice at head of this column.

X. X.—You will find formulae for reducing agents on page 569 of the ALMANAC for 1889, and on page 607 of that for the current year. Both of these are simple and good.

D. M. PIERSON.—The best negative varnish which can be applied to the negative while it is cold is one of dammar and benzole—about thirty grains of the resin to the ounce of solvent.

READER FROM THE FIRST.—We are requested to ask you to write to Messrs. F. M. Perkins & Sons, Seaford-street, King's Cross, from whom detailed particulars of their means of producing cold may be obtained.

E. C. MAY.—There is rather more difficulty in stripping when hydroquinone is used; but the difficulty may be overcome by immersing the negative in dilute hydrochloric acid—thirty minims or so to the pint of water—after the negative is developed.

VIGNETTE writes: "Will you please inform me, through the medium of your 'Answers to Correspondents,' the way to produce vignettes with dark backgrounds instead of white ones?"—Several methods of producing this kind of picture will be found in a leading article on page 465 of our last volume.

BICHROMATE.—No work on ceramic photography has been published of late years. The last was a small manual by J. Solomon, 22, Red Lion-square, Holborn, London, which contains much practical information. It is quite possible to use gelatine instead of collodion as a foundation for the image.

GWENT.—We do not know of any lens which, having such a focus and working with such an aperture as yours, will work any better than it. You might try some of the cemented rapid doublets, but their aperture would be smaller than that with which you are working, and hence their action would be slower.

S. WARRELL.—You are a little mixed between the two processes. In the collotype process it is a fatty ink that is used, and in the Woodburytype the gelatinous one. The printing in the former is done from a gelatine film, and in the latter from the leaden mould. The above clears away the mystery.

DOT.—If you are sure that the dark slides are in register with the focussing screen—and the fact that all your other lenses yield sharp negatives with the same camera goes to prove that they are—you should certainly return the lens to the one who supplied it. Clearly its optical and chemical foci are not coincident.

A. REID complains of yellow stains on some of his bromide prints, and sends us an example.—The stains are undoubtedly due to imperfect fixation—too short an immersion in the fixing bath, or the solution too weak. The stability of bromide pictures is too frequently jeopardised from want of care in this direction.

J. WRIGHT.—The want of sharpness in the pictures sent is not due to the shutter jarring the camera, but from the movement of the objects themselves. All the stationary objects are sharply defined, but it is the moving ones only that are blurred. The shutter is not rapid enough for such work unless it can be made to act quicker.

A COUNTRY PROFESSIONAL.—You are quite right when you say that the prices charged by some photographers for portraits are far too low; but we fail to see that this is a question that can be dealt with by the Photographic Section of the Chamber of Commerce. Every one has the right to charge what he chooses for his work, and no law or power can compel him to charge more.

H. A. H. HUTCHINSON.—1. The proportion of carbonate of ammonia in the fixing bath is not very important; about a quarter of an ounce to the pint will answer.—2. Probably you have used too much bromide in the hydroquinone developer, hence the hardness.—3. You would do better to keep to the formula; the omissions you have made will account for the yellowness.

J. W. L.—1. We consider the camera named to be reliable and efficient; we say this after having had considerable experience with it.—2. Quite suitable for street scenes.—3. No finder, and, in our estimation, not necessary.—4. Any lens will do for rapid work that has a moderately large aperture. In bright weather one bearing a stop equal to $f/15$ will take views with great rapidity.

A. S.—1. If the silver is not precipitated from the old fixing baths by "liver of sulphur" it shows that the latter is at fault; probably it is decomposed by keeping. Sulphide of potassium quickly decomposes unless carefully protected from the atmosphere in well-secured bottles.—2. Citrate of soda is formed, which does not retard the action of the toning solution so much as citric acid would do.

W. CAVE.—Your idea to use a long-focus lens so as to secure good covering power with a large aperture is very good, but you must bear in mind that a long-focus lens employed on a small plate means a very narrow angle of view. A seven-and-a-half-inch focus lens on a quarter-plate detective camera will include only a very limited angle—far less than is usually obtained with this class of apparatus.

F. W. MORGAN.—We have not time to make such an examination of the cardboard as would be necessary; any analytic chemist will do so for you. You can, however, arrive at a fairly good estimate of its suitability for silver prints by steeping it in water, blotting it off, and then pressing it in close contact with the face of an unmounted print for a few days, afterwards noting if any change has taken place in the print.

BEX writes: "I want to make some enlargements, about 17×21 ; I have made some trays in wood covered with mackintosh; will you kindly tell me if I can put iron, acid, hypo, &c., in these without danger to the paper? I find the price of glass here (Bex, Switzerland) prohibitive. How can I make a negative printable that has stains (from paper getting wet) completely through the film?"—The mackintosh will not act injuriously. If the stains are merely superficial, try Mr. Werge's panacea given in a recent number.

W. SHAWCROSS.—We cannot speak as to the permanence of the prints, so, as far as we can see, beauty rather than any enhanced degree of permanence forms the claim for consideration. You are correct in your hypothesis.

G. J. W. writes as follows: "A customer left a water-colour drawing with me to copy; unfortunately, a drop from an oil can has fallen upon it and made the paper at that part nearly transparent. Is there any means of extracting the grease without injuring the colours?"—The best plan will be to moisten the grease spot with clean benzole and then dry with blotting paper. By repeating this operation several times, both back and front, the grease may be taken out without injury to the water colour. It is scarcely necessary to say that both the benzole and the blotting paper must be scrupulously clean.

ROMEO says he fails completely in carbon printing, for, "after sensitising and drying the tissue, although it is used on the following day, it will not wash away in the warm water, and sometimes the tissue will not hold on to the support, but comes off directly it is put into the warm bath. The tissue is sensitised in a bath of one ounce of bichromate of potash and twenty minims of ammonia in thirty ounces of water for three minutes, then hung up in a dark room, where it dries in about six hours. A friend suggested that a piece of the unexposed tissue should be tried in warm water, but it would not dissolve."—It is clear that the tissue is insoluble, though if it be sensitised and dried under the conditions stated the difficulty is not easily accounted for. We should advise that the tissue be tested for solubility in warm water before sensitising, and if it is all right, then the trouble may be assumed to arise from the after operations, though this does not necessarily follow.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, June 25, at eight p.m., at the Gallery, 5A, Pall Mall East.

PHOTO-MICROGRAPHS.—Among those who are engaged in this fascinating department of our art is Mr. George H. Slight, who has sent us several examples, showing his progress in this direction. These include scales from the wings of moths of the less-known variety of these pretty pests, skin of human scalp, a section of *Dendrobium*, transverse section of ovary of poppy, and anchors and plates of *Synapta digitata*. We have to compliment Mr. Slight upon the excellence of his work.

NEW STYLE OF MOUNT.—Messrs. Percy Lund & Co., Bradford, have sent us a new style of mount introduced by them. The board is extra thick, and in the back layer of which it is composed is cut a slip which may either lie down flat, sunk as it is in the mount, or be bent out to serve as a supporting strut when it is desired to place the picture erect. The pretty photograph which adorns this really excellent mount is by Mr. Harold Baker, "Photographer to the Archaeological Section of the Birmingham Institute," and the "Archaeology" here depicted is—a handsome young lady! O Mr. Baker, how can you be so ungallant? It is termed the Antos mount, and has burnished gold bevelled edges.

PHOTOPEL.—When we wrote concerning these useful pellets last week we did so on the assumption that they were composed of pyrogallic acid with which had been compressed some of the other ingredients which go towards forming a perfect developing compound. We are reminded by Messrs. Wyleys & Co. (although we had previously made the discovery ourselves) that the pellets have hydroquinone as a base, associated with restrainers and other substances. Pyrogallol, they tell us, has been supplied in tablet form before now, a fact of which we are well aware from having been the first to publish elsewhere this useful application by Dr. George Sindair of the compressed pellet idea to photographic purposes. This, as Messrs. Wyleys & Co. say, is the first time two or more substances have been compressed in pellet form for photographic use as a developer, and we learn that the idea forms the subject of a patent by Mr. H. W. Jones, F.C.S.

FIRE IN DERBY.—A STUDIO BURNED DOWN.—About half-past eight on Tuesday morning a fire broke out at the photographic studio of Mr. William Ethelbert Henry, St. Peter's-street, formerly in the occupation of Mr. W. E. Swift. About an hour's hard work by the fire brigade sufficed to subdue the flames, but not before the studio was completely gutted. The building, which stands at the rear of a number of shops in St. Peter's-street facing the spot, was glass-roofed, and its contents proved to be of a very inflammable nature. The cause of the outbreak is at present unknown, but, from a statement made by Mr. Henry's assistant, it would appear that he was on the premises at eight o'clock for the purpose of taking the photographs of two ladies, and whilst in the dark room he struck a match. He afterwards left the premises for a short time, and returned to find them in flames. Mr. Henry was at the time in Torquay, and it is, therefore, not known whether the stock was insured, but in any case the damage is sure to be very considerable, a large number of negatives being destroyed or spoilt by the water. The exact amount of the damage done, however, has not yet been ascertained.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1521. VOL. XXXVI.—JUNE 28, 1889.

TONING BY A BRUSH.

SOME, if not all, of those who have become photographers since the introduction of gelatine plates may not be aware that the development of a negative used to be effected, not in a dish, as now practised, but by holding the plate between finger and thumb and pouring over the surface enough of the developing solution to wet the surface and form a layer over the film; and with wet collodion plates such is still by preference the method adopted.

The toning of paper prints, too, is invariably carried on in a dish, and for many reasons it is undoubtedly the best way by which to effect the desired end.

Still there are circumstances easily enough conceivable under which it might prove desirable not to waste upon the toning of, perhaps, a single print any more gold or platinum solution than can be avoided. To such the method of applying the toning solution to the print by means of a brush will prove acceptable, and it is here only recommended as an expedient for him who, having only one or two prints to tone, hesitates upon the desirableness of making up for that special requirement enough toning bath to serve for a dozen more.

While writing, we have before us a cabinet photograph, well toned to the edges, which was treated in the following manner: After being removed from the printing frame it was placed in water and subjected to three changes in order to remove most of the nitrate of silver. A clean piece of paper about the size of the print was then made wet and spread out upon a glass plate, and upon this the print was laid, face up. A watch glass having been nearly filled with water, previously rendered slightly alkaline with sodium carbonate, one drop of a rather attenuated solution of chloride of gold was added, and by means of a camel's hair brush this was applied to the print, care being taken to apply it uniformly.

The toning action quickly commenced and was allowed to proceed to a dark purple, after which the proof was rinsed and transferred to the hypo fixing bath. There being still some of the gold solution left in the watch glass, a second print and the only other one prepared for the experiment was treated in like manner and with similar results. Although this trial was made with a camel's hair brush, there is little doubt that a Buckle's brush or a Blanchard's brush would answer the purpose as well, if not better. The former of these was in the early days of photography much used for spreading solutions on paper on which negatives were then taken.

It consists of a piece of thin glass tube of a diameter somewhat exceeding that of a common pencil. Measuring two in our possession, we find one to be one centimetre and the other two centimetres, or three-eighths and six-eighths of an inch respec-

tively. Into one end of this is drawn, by means of a bit of string, a tuft of cotton wool, a moderately large head or bunch of the cotton being allowed to remain outside the end of this extemporised brush. Instead of a string for drawing the wool a sufficient distance up the tubular handle, one of ours has a silver wire with a hook at the lower end and a loop at the upper end.

The Blanchard brush consists of a simple strip of glass cut to any width desirable for the special purpose to which it is to be applied, one or more thicknesses of Canton flannel or swansdown being then bent over the end and secured in its place by an indiarubber band.

PHOTOGRAPHS AND THE POST OFFICE.

A CORRESPONDENT in another portion of our columns raises a question of very considerable importance which we are surprised not to have had brought forward before. It is the question of responsibility for pictures damaged in transit through or while in the hands of the Post-office officials. Is the sender to suffer the loss, the receiver, or the Post Office itself? It is not our purpose to act as consulting solicitors in the matter, but a few points that have on previous occasions been brought before us may with advantage be here alluded to. Our present purpose is less to settle a question that is in a lawyer's province to deal with than to show how a photographer may help himself. It may be taken as an axiom that in all cases where professional photography comes in question it is always better to suffer a little loss than to raise a discussion that will tend to personal discomfiture: so that, though it might be well to know how the "law of the land" would treat such questions, the less frequently it is appealed to the better.

As regards the Post Office itself, its responsibility is clearly defined in the *Post-office Guide*, published quarterly, and also, sufficiently for all practical purposes, in the little penny book purchasable at any post office in the kingdom. For anything sent by letter post the Office does not hold itself responsible at all. By registered letter it does now to a limited extent, though a short time ago, quite contrary to the prevailing idea, the registration of a letter gave no power to gain damages for its loss, it only insured extra care being taken of it during all its journeys from sender to receiver. Registration now in effect insures a packet so sent in addition to this insuring of special care being taken. Next we have the Parcel Post, by which, at what is practically a booking charge of three halfpence, in addition to three halfpence per pound weight as a

carriage rate, parcels can be sent anywhere in the country; and, further, by paying one penny extra, can be insured for five pounds, or ten pounds when twopence is paid. Here, again, error is often made; when the parcel is not over the value of two pounds the money paid to the Office for the carriage acts as an insurance premium also. This is not sufficiently borne in mind either by the public in general or the photographer in particular. When we turn to the question as to who is to pay when the Post Office cannot be brought in as liable, we come at once to the solicitor's province, and we are face to face with technicalities. It is, however, certain that the more obliging a photographer is in packing up and sending off all his pictures post free, the greater is the probability of his having to pay if damage is done. If no one, for instance, sent photographs by post unless when he was specifically requested so to despatch them, the person who orders the pictures is incontestably liable. When, on the contrary, it is the custom of the establishment to send out post free all *cartes*, cabinets, &c., we are of opinion that the question who had to pay for damages would be settled, not broadly on its apparent merits, but by some technical point turning almost upon a quibble of words as to what was said about the matter at the time the pictures were ordered.

Dwellers in the metropolis will feel little concern about the matter, but when it comes to photographs sent out of town to the country, or from any studio in the kingdom to another point reached by rail being irretrievably damaged, every one would be on the alert. In some directions, to our positive knowledge, there is more danger than others; in those neighbourhoods, in fact, where the mail train does not stop to pick up or drop the letter bag, but does it all by means of a mechanical contrivance, which causes the bags to be received into a network attached to the train or to throw them out in a similar manner, damaged pictures are certain to follow. If a packet containing, say, a dozen cabinets—strong stout card—enclosed in a bag or case should happen to be in a prominent position when the letter bag drops upon the netting, a force of many hundredweights is applied, and the cardboards will give way. Large numbers of pictures damaged in this manner have been brought before us, and the senders have been unable to obtain any reparation for their loss from the Office. We strongly recommend every photographer who has to send pictures in such directions either to take care to have responsibility repudiated, or better to send by Parcels Post, the postal fee for which, as we have said, is an insurance of itself.

We would draw special attention to negatives. We have been informed by a Post-office official that the demands for compensation have been so great for loss of negatives that the office will decline to make good the loss if the parcel bear no outward mark or marks suggestive of misuse. We would specially call attention to the clause that the making good of a loss is not a right, but a special "act of grace."

Finally, let us caution our readers when they are sending pictures to see that they are properly protected and secured. No single photograph should be sent in a letter, for the stamp of the sorter comes down with such weight that a sheet or two of paper is no protection whatever. We should think that annually there must be tens of thousands of pictures so injured. To sum up. If photographs be carefully packed and protected, and sent by Parcels Post, when travelling along a line on which the special apparatus is used, or in any case where special care is wished for, we believe that the losses would be so few that there would never be a chance of a discussion being initiated.

PYROGALLIC AND HYDROQUINONE DEVELOPMENT

THE steady everyday experience of the past few months with hydroquinone seems to be gradually tending in all directions to a better and truer recognition of the respective merits of the old and new systems than previously existed. On the one hand, we were formerly met with statements amounting to utter condemnation of hydroquinone; on the other, to such fulsome praise of its good qualities that one was inclined to wonder why or how the world generally had tolerated pyro for so many years, after the first mention of hydroquinone as a rival.

There is certainly at the present time every evidence of a disposition to view the relative merits of pyro and hydroquinone from a more judicial standpoint than was the case twelve months back. This is due no doubt to the fact that the newer agent has been carefully studied by itself, as well as in comparison with pyro; or, in other words, its action has been investigated in conjunction with different alkalies and under all circumstances with a view of obtaining the best possible result from it, instead of, as was at first the practice, pitting it against pyro under identical conditions. It has thus come to be recognised that the two substances require to be handled quite differently in order to secure the best results, and that when so employed each has its good points—points which for some purpose or purposes render it preferable to its rival—while neither can be said absolutely to be the better for all purposes. In fact, pyro will retain its place in the photographic laboratory, while hydroquinone, which has already obtained a good footing, will, undoubtedly, continue to improve its position.

Perhaps the most important variation in the mode of using the new agent has been the substitution of the fixed caustic alkalies for the carbonates originally employed in conjunction with it. This is the keynote of the whole matter, and recognises in the most unmistakable form its difference from pyro, since the latter has been proved to be practically unusable with caustic alkalies except ammonia. So far as the carbonates are concerned it has long been recognised that they are perfectly available for use with pyro, though it has been only in recent years that they have secured any great degree of popularity. Ammonia solution, on the contrary, which has been from the earliest days of alkaline development the favourite, if not the only form of alkali in practical use, was from the introduction of hydroquinone recognised as producing with the new agent results inferior to those obtainable with the carbonates, and without doubt it was due to the persistent ignoring of this fact, pointed out by some of the earlier observers, that hydroquinone for a long time obtained such scant recognition.

But even after the adoption of the carbonates of soda and potash, the slowness of development of hydroquinone caused it to be held at a distance by many workers, who, so far as quality is concerned, preferred its results to those obtained with pyro. The addition of bromide, too, though in a great measure superfluous, was persisted in, and added still further to the slowing of development, so that from one cause or another the general adoption of hydroquinone appeared, to say the least, improbable.

By the introduction of caustic soda or potash in place of the carbonates, however, an entire change was effected. Not only was the initial energy of the developer increased, but the employment of bromide by those who prefer or insist on it was rendered possible without increasing the time occupied in development any more than would be the case in using

pyro. And add to this, the character of the image produced and the control over the action of the solution were in every way improved. As a matter of fact, indeed, the substitution of the caustic alkalis placed hydroquinone very nearly on the same footing as pyro so far as energy is concerned, with the advantage of greater cleanliness in working. But pyro, without doubt, remains the more vigorous agent, is more plastic, if we may use the term, in its action, or more under control, especially in cases of under exposure, and certainly offers far greater facilities for modifying the colour and general character of the image than is possible with hydroquinone.

The latter, however, possesses one feature which is of the greatest value under some circumstances, namely, its latitude in the matter of the quantity of alkali that may be added without producing fog. This would at first sight appear to be a recommendation in favour of hydroquinone in cases of under exposure, but such is not so; "thus far and no farther" appears to be the motto of hydroquinone with a given exposure, no matter how the alkali may be increased. But when it is a question of producing density or vigour of image on a film ordinarily deficient in that respect, hydroquinone possesses distinct advantages over pyro, in that it permits an almost unlimited quantity of alkali to be used. But the treatment must not be applied in the same manner as with pyro, that is, in a gradual manner, or by successive additions of alkali. Curiously enough, this style of procedure, after a certain point is reached, ceases to have any effect whatever with hydroquinone, though with pyro it is the only effective mode of working, unless the exposure and every circumstance have been accurately gauged. The only plan to follow is to commence development with the full or almost the full strength of alkali intended to be used, and this may be accompanied where special density is required by an increase in the proportion of hydroquinone. Though restraining bromide is entirely unnecessary under normal circumstances when employing ordinary proportions of caustic alkali, and actually detrimental in conjunction with the carbonates, it should never be omitted when the proportion of alkali is pushed to the extreme. As already stated, the marked "slowing" action produced when the carbonates are used does not occur when the alkaline hydrates are substituted, and the restrainer can—may, must—be used without disadvantage.

In summing up the respective advantages of the rival developers, so far as negative work is concerned, the balance is difficult to strike, but, perhaps, is in favour of pyro. This, without doubt, offers greater power in bringing up detail in an under-exposed picture than hydroquinone, which, however long applied, appears incapable of passing a certain point, no matter what quantity of alkali may be used. So far as mere cleanliness of working and freedom from stain are concerned, there is now fortunately little really to choose between the two if properly used, so that in striking the balance, the leaning towards latitude in development seems to turn the scale in favour of pyro.

It has been stated—but with a marvellous want of thought or of knowledge, it seems to us—that hydroquinone is the developer for transparencies, but not for negatives. So far as transparencies are concerned it is certainly capable of producing beautifully clean and in every way satisfactory images, of practically only one tone however, namely, black, or shades thereof. Pyro, on the other hand, is capable of producing the same cleanliness and quality with the additional advantage of variety of tone, and this, coupled with the extra control in development, turns the scale again, we think, in its favour.

If the statement quoted in the preceding paragraph had been applied to hydroquinone in conjunction with paper positives we should have been prepared to fully endorse it, for here, we think, it cannot be denied that a decided advantage, and no small one, exists. In colour, in cleanliness of working, in gradation, and, in fact, in every essential to the production of a good print hydroquinone is far and away superior to pyro, and it is a serious question whether it will not, with a little more study of its application to the particular purpose, completely displace ferrous oxalate.

In fact, to conclude, we may express the opinion that while hydroquinone grows in favour pyro retains as good a position as it formerly did, and the only developer that appears to be doomed for practical purposes is ferrous oxalate, which may have for positive work to give way to hydroquinone, as it has already done to pyro for negative purposes.

An interesting question, in the minds of those who devote attention to the subject of permanence, has always been the relative proportion of the noble metals in the gold-toned picture. The same question has again cropped up with reference to Mr. Blanchard's new process. Now, the toning of a silver print is simply the substitution of the silver in the image, wholly, or in part, by gold or platinum, as the case may be. Of course, if the substitution were complete, the image would be composed entirely of the gold or the platinum. However, in gold toning, the action, in practice, is never carried on to this stage, on account of the resulting colour of the picture. But in the case of platinum it may be, under certain conditions.

THE relative proportion of the metals of which a photograph is composed can, of course, be ascertained by quantitative analysis, but this is a thing beyond the scope of the average photographer, particularly when dealing with a single point or so. Even in the hands of an expert, when working on so limited a scale, absolute accuracy is always somewhat dubious. But if a large number of prints can be dealt with the thing becomes simple enough and the result reliable. Here is a case by way of illustration. Some few years back Mr. William Bedford took a large quantity of toned and finished prints—a hundredweight, if we remember rightly—and burnt them. The ashes were then reduced in the furnace in the ordinary way, and the resulting nugget of metal proved, on assay, to consist of 175 parts of gold to 435 of silver. Hence, in this instance, the image was composed, as nearly as possible, of one part of gold to two and a half parts of silver. It must not be assumed that this is always the composition of the gold-toned image, as it must necessarily always be dependent upon the depth of toning. Mr. Bedford's work, as all are aware, is toned to a rich purple colour; consequently a much larger proportion of gold is reduced than would be the case with brown tones. In prints toned only to the red-brown stage, the proportion of gold must necessarily be very small.

THE composition of the platinum-toned image, as in Mr. Blanchard's process, can, of course, be accurately arrived at in a similar manner to that just referred to, and the larger the scale worked upon the more reliable and conclusive will be the result. Furthermore, in dealing with a large number of prints at a time a more correct general average is obtained.

On several occasions we have directed attention to the yellowing of gelatino-bromide pictures, the result of imperfect fixation. We once more recur to the subject, as we are frequently seeing fresh examples of this defect. It is scarcely necessary again to remind our readers that the deterioration is not due to the process, but to gross carelessness, or, perhaps, ignorance, on the part of those who do the work, though in the end the process itself may suffer in reputation. Many workers who are unacquainted with the chemistry of the subject imagine that when the visible bromide of silver disappears that the picture is

sufficiently fixed: no greater fallacy exists, for in this time the bromide is only converted into the hyposulphite of silver, and not the soluble double salt of hyposulphite of silver and soda, which alone can be removed by washing. The hyposulphite of silver is practically insoluble in water, and therefore remains in the picture to ultimately produce yellowness.

SOME time ago we published, on the authority of Dr. Vogel (whose communication appeared in *Anthony's Bulletin*), an account of a new lens by Herr Miethe, of Potsdam, which was thought to be calculated to almost revolutionise one's ideas concerning photographic lenses. On another page, and this time from the pen of Herr Miethe himself, we give a second instalment of its properties, from a perusal of which we are led to inquire whether there may not exist a similarity between the foreign production and that of Dr. Schroeder, of which we gave a drawing and description a few weeks back.

THE longest day of the year 1889 is past, and from this time the days will gradually shorten. Those amateurs whose principal work is confined to Saturday afternoons should now arrange their outings, so that the longest excursions are taken while the days are longest. Those districts which are situated nearest home may well be left for the shorter days. Frequently, societies which organize afternoon excursions use up the nearest localities when the days are at their longest, and, as a consequence, have to go farther afield as autumn approaches. Hence time which might be profitably expended in taking pictures is often spent in travelling, frequently to find, when the destination is reached, that the best of the light has departed.

LAST week we alluded to fire insurance and professional photographers. A hint may well be added with reference to those who follow the art as an amusement. Many amateurs have quite as much valuable apparatus, indeed, often more, than is possessed by some professionals, and for which, we venture to say, nothing could be recovered in the event of its destruction by fire. Although the owner's household furniture may be fully covered by insurance, photographic apparatus is not household furniture, and, according to the case quoted last week, the premium upon it is widely different. Therefore, those who may have a quantity of valuable apparatus will do well to act upon the hint, and either obtain a separate policy upon it or, at least, have it added to the existing one.

CORRESPONDENTS have been writing very frequently of late inquiring whether dry plates are made which are suitable for the production of positive pictures, like the glass positive of old or the ferrotype. This is a subject that might be worth the consideration of some of our plate makers. There is very little doubt, if good positive plates were put upon the market, that they would meet with a certain amount of commercial success.

GLASS positives in England were always looked upon as being somewhat plebeian, possibly from the low price at which they were produced in some quarters: yet there is no gainsaying the fact that a really good glass positive, such as some few photographers used to produce, is by no means to be despised. If it was the low price, as some assert, that killed the glass picture, it is to be hoped that paper ones will not share a similar fate. Fairly presentable *carte de visite* portraits are now to be had for half-a-crown a dozen, and we do not remember glass positives of similar dimensions being done so cheaply as this.

ON THINGS IN GENERAL.

THE remarks in a leading article in these pages upon Fire Insurance are well worthy of perusal by every one possessing an insurable interest in matters photographic. A policy holder is usually told in print to read his policy: a policy holder, as a matter of fact, does this in perhaps one case out of a hundred. It is astonishing with what *laissez aller* this most vitally important subject is treated by the majority of clever men of business even. How many know that

they are prohibited from employing workmen to alter premises, for example, without due notice that the presence of a lath and plaster partition between themselves and a neighbour with a risky business, if not declared, might lead to the claim being contested in the event of a fire from the neighbour? Above all, how many are aware of the common introduction of an "average clause?" This clause, sometimes gummied on the edge of a policy along the side, as I have seen it done, acts thus, "If the premises contain at the time of a fire a larger amount of goods than the policy covers, the insurer will only get a portion of the amount insured if the fire is not wholly destructive." Thus, if 500*l.* is insured for and the stock is 1000*l.*, then if, say, 400*l.* damage is done the insurer gets only 200*l.*, and so on. I advise every one who reads this to look at his policy, and object to renew it without the clause in question is expunged. With regard to the risks of photographers' premises, I was not long ago assured by a gentleman who held an important position in a Fire Insurance Company that the existing average rates now charged are not at all out of proportion to the risks. I am inclined to believe one cause to be the facility with which fires can be brought about by dishonest occupiers without leaving a trace behind of the means employed. Of course there still is danger where spirit or ether, or both, are employed. I have heard, for instance, of one photographer who has received compensation from insurance companies on six or seven different occasions, and has received considerable sums; he is very unfortunate, and the rest have to pay for it.

I usually read with interest Professor Stebbing's letters (he had a painful experience of how French insurance offices carry on their businesses) and therefore notice his description of M. Guilleminot's system of obtaining large images of distant objects without the use of a telescope. He uses a lens, say, of forty-five centimetres focus, and at its focus for a particular object places another of, say, five centimetres focus, and this latter enlarges the image to a great extent. Now I have to remark upon this that the same plan was described in this JOURNAL very many years ago with application to astronomical objects; next, to insure anything like a good amount of sharpness, picked lenses will be needed; and, lastly, that to expect to take a photograph of an object five hundred metres distant, and of the same size as that object, is simply ridiculous. There are the germs of real usefulness in this resuscitated plan, but for Mons. G. to make such extravagant claims is calculated to throw the whole plan into disrepute.

This rejuvenescence of old ideas seems to be quite in vogue at the present time. Thus, in the list of patents given in this JOURNAL on May 24 I find one for a method of mounting two prints, such as opposite sides of a document, back to back, without the intervention of a sheet of paper or card. Certainly twenty years ago, and, I believe, more, I saw a series of copies of letters of introduction from eminent men of science in this country to others in America photographed and pasted together in this manner by the gentleman who was to present them, and who adopted this plan either for safety or as advertisement I do not remember which.

Another patent described interested me very much, and was not open to the same charge. It was that of Messrs. Thorns, for rendering foul-smelling albumenised paper pure and sweet. It is to be a great boon to the unfortunate sensitizers who, as is too often the case, work in a confined space at this particular employment, and who rarely get used to the vile odour; but at the same time it is a question whether it would be wise to avail oneself of any such plan, seeing that the honest maker of pure paper would be handicapped by the producer of the nauseous kinds being able to introduce his inferior article as though of the same class.

Then again, June 7, we have a patent for binding the edges of magic lantern slides with thin brass instead of fragile paper. My first practical connexion with photography dates more than thirty years ago, and even then these brass bindings were in use. They were called "preservers," and were sold so much each. In a few years time the price per gross was not much greater than the unit price.

Many photographers will demur to the conclusions of Mr. V. C. Driffild as presented at the Liverpool amateurs' meeting the other day. He said, "It is popularly supposed that a great deal can be done in development to modify the effect of faulty exposure. Careful experiments made to decide the question, however, show that

this control during development is, to say the least of it, greatly exaggerated. A technically perfect negative can only be produced by a correct exposure." In the main I entirely agree with this dictum.

FREE LANCE.

ECHOES.

I THINK I have on a previous occasion commented on the—to use the mildest term—somewhat misleading impression created by the reports of society meetings as they appear in print. It is perhaps difficult, *in a hurry*, to condense into a small space the meaning or sense of a speaker who is not over-well able to express himself with brevity; but an apt *precis*-writer would never find a great amount of trouble in the matter. Diffuseness in reporting is no way out of the difficulty, nor would the publication of *verbatim* reports improve matters much, for I venture to think and to express the opinion openly that the so-called "*verbatim*" reports in the poor old "parent" JOURNAL—especially when improved and prepared for the press by the speakers themselves, under the existing system of submitting to them "proofs" of their speeches for correction—are among the most unintelligible of the published records of photography. It is generally difficult enough to carry away anything of an instructive nature from the Pall Mall meeting, but it is hopeless to expect to derive any valuable information from the official report.

But there are ways and ways of not expressing the sense of a question, a remark, or a speech, and sometimes the very obviousness of the intent of the speaker, while leading the reporter to only half record what was actually said, at the same time renders quite clear to the reader what has been the extent and character of the omission. I was led to commence these remarks by reading in a report of the North London Photographic Society that a member "asked what difference there is between bromide of potassium and bromide of ammonium." Now the only answer to the puzzle as it stands is, to put it in chemical terms, that one is KBr and the other NH₄Br; but I imagine this information would scarcely have satisfied the querist. If the report had said that the question was one of difference of action either generally or for a specific purpose, it would have been better. I judge from the context that the inquiry related to the difference of effect produced by the two salts when employed as restrainers in development, but the information elicited in reply was meagre, and, at the best, open to proof.

For instance, Mr. Valentine Blanchard is reported to have laid it down as an established fact that bromide of ammonium produces a yellow stain with hydroquinone, while bromide of potassium does not. Now, so far as I am aware, the only evidence in that direction consists of the published experience of Mr. Alexander Cowan, to the effect that under certain circumstances the yellow stain had been produced when bromide of ammonium was used, and not otherwise. But whether the effect was really due to NH₄Br, *as such*, requires, as I have already had occasion to suggest in previous "Echoes," absolute proof. Perhaps Mr. Blanchard—and this I think is most likely—merely mentioned Mr. Cowan's experiments and conclusions.

Professor Stebbing frequently gives us some amusing information from the meetings of the French Photographic Society, but his description of M. Guilleminot's method of photographing an object—a bird for instance—life size, at a distance of 600 yards, in an ordinary camera, is more than ordinarily entertaining. We are told of the difficulties surrounding the operation, when a "large telescope" has to be carried about for the purpose, but it strikes me that the alternative arrangement of a "simple camera," with its attachment, does not shine very conspicuously as an improvement so far as portability is concerned. For instance, we will say we wish to photograph the homely sparrow life size, for which purpose a half-plate would probably be large enough. Upon this camera we fix an eighteen-inch focus lens, and focus "as sharply as possible." I say nothing about the question as to whether the half-plate camera has a sufficient extension for the purpose. Some of them have, but I wonder how, with the "simple camera," mind, we are to replace the focussing glass by a second lens of about two inches focus, and enlarge up to "the life." Further, I greatly wonder what sort of definition would pervade the resulting picture.

I can quite agree with the Professor in thinking that a very con-

siderable amount of "noise and excitement" will be caused when it becomes known that "the portrait of a battery can be taken" (life size) "some miles away from the operator," but we have to arrive at that stage yet. It may be that the French are in advance of the Germans in military photography, if not in other respects.

Then, again, M. Thouroude's test for "safety" in red glass seems to me rather useful than scientific, that is, if it be reliable. After laying down the proposition that an ordinary spectroscope is of no use as a test, M. Thouroude goes on to say that if a piece of glass known to be "safe" is laid down upon an engraving side by side with a piece of the glass to be tested, and the colour and intensity of the lines are the same through both glasses, all is right. But if the lines appear paler or grey through the doubtful sample of glass it is to be condemned. It strikes me very forcibly that it must be a very bad sample of glass that would respond to this test, and a far worse spectroscope that would not reveal its badness!

The same gentleman, M. Thouroude, next exhibited a *new* hand camera, the invention of an amateur, by means of which "sixty shots could be got per minute." After reading the description, I can only conclude that the "novelty" consists in the claim of sixty exposures in a minute—that is new to me; but the camera was patented in this country six years ago, and has been constantly exhibited ever since. Whether the inventor is an amateur or not I do not know; the French "discoverer" of the ancient invention may be.

Adapters for lens flanges appear to be entirely unknown in France, or surely the cumbrous method "presented" at the same meeting by M. Molteni would scarcely have received serious attention. Fancy having to attach to the camera front a double disc of ebonite with an aperture large enough for the largest lens to be used, and then fitting each lens itself with an ebonite flange, the outer dimensions of which equal those of the largest lens! Fancy a portable symmetrical so "adapted" to fit a whole-plate portrait flange!

M. de Villecholle's method, which is stated to be simpler, is, I am sorry to say, quite unintelligible to me as described, so I cannot say anything either for or against it.

After reading Professor Morize's suggested plan for the detection of irradiation, or rather for proving that reflection from the back surface of the glass is the cause, or one of the causes, of distortion in stellar photographs, I cannot help wondering at the curious manner in which similar ideas crop up applied to very different purposes. Professor Morize's suggestion is to silver the back surface of the glass with the object of *eraggrating* the irradiation, and so making it recognisable as such. Just about fourteen years ago precisely the same method was proposed by Canon Beechey for *preventing* halation, and specimens to illustrate the success of his method are stated to have been left at the editorial office of the JOURNAL. Here is an illustration of "blowing hot and cold" with a vengeance.

But while Professor Morize's view of the probable result is undoubtedly the correct one, it does not follow that Canon Beechey's application of the same method for a diametrically opposite purpose is entirely without favourable result. I had the privilege of examining his specimens at the time they were made, and they certainly bore out his contention. But I think, speaking from memory, it was pointed out editorially at the time that the result was rather due to the minimising of reflected *diffused* light from the back of the glass than, as Canon Beechey seemed to think, to the rays being reflected back to strike the sensitive film at the same points through which they first passed. A glance at Professor Morize's diagrams will show the impossibility of that.

The description of the liquid prism, quoted from the *Scientific American*, in a leaderette last week reads very smoothly, and the whole operations involved in the construction seem perfectly easy. But I am afraid that nine out of ten of the readers of the "BRITISH" and of the *Scientific American*, who may attempt to follow out the instructions, will find matters not quite so straightforward as they look, and the final result, even when moderately successful, not such as to justify the trouble, at least where accurate results are required in photography. For mere demonstration purposes such a *cheap* prism may be easily made: but where extreme accuracy is necessary, the advantage of the built-up prism does not at all lie in the direction of economy, for, *ceteris paribus*, it becomes practically as expensive as a solid one. But where great dispersion or large size is necessary the

liquid prism is useful; but it must be very carefully constructed, and when constructed very carefully treated.

Mr. C. Brangwin Barnes is surely "playing to a rather low-class audience" in preaching the resurrection of the long-defunct "binary" pictures, once so called, as "good business." I am quite certain that no photographer of repute would adopt such "catch-penny" means of improving (?) his business, and if he did I am equally certain he would find the attempt a failure.

JUNUS.

A METROPOLITAN PHOTOGRAPHIC SHOW ROOM.

A FEW days ago we visited the new show rooms of Messrs. Marion & Co., the eminent photographic manufacturers and merchants, of Soho-square. It appears that the premises there, extensive as they are, have been found inadequate to the displaying, not of stock, but of even samples of stock. Nor is this to be wondered at when one considers the multifarious additions to the requirements of the photographer which, in this epoch of rapid and fertile invention, have to be made almost daily.

The new show rooms of this firm are situated in that portion of Rathbone-place, Oxford-street, so long sacred to art and its belongings, viz., large firms devoted to the supplying of artists' and painters' requirements. Indeed, the very premises in question as now occupied by the great Soho-square firm formed at one time the show rooms of the Autotype Company, in those days when it was in a large measure the property of, and was controlled by, the senior partner of Winsor & Newton.

Messrs. Marion have arranged their large display in an admirable manner. The counters are at such a distance apart as to permit of easy passage between them. The classification of goods is systematically effected, there being two or more articles of each kind placed contiguously, facilitating a thorough examination of any one class. Is it cameras? Well, on one bench is found arranged so many of all makes and sizes as well-nigh to induce a feeling of embarrassment from the plentitude and variety of the display, there being here every member of the camera family, from the mammoth down to the little pocket instrument.

This choice is assisted by the best of all guides—*i.e.*, comparison. The same holds good throughout in this show room. Here are samples of everything required for the dark room—for instance, a customer has the choice of ten or a dozen sorts of developing dishes, a large variety of lamps, and formulæ for development already made up for use; and for printing or finishing prints there are a large variety of burnishers and rolling presses, a variety of paper for all the different processes, and for backgrounds and accessories tables and chairs. The choice is large and varied. The customer can see the very thing he may want to purchase, and have the very article that he sees delivered to him.

In fact, everything a photographer may want he will find here sampled. If about to start a business he can see samples of all his possible requirements.

ON EXPOSURES.

[A Communication to the University College Photographic Society.]

IN introducing the subject chosen for this evening's discussion, namely, "Exposures," I shall confine the few remarks I am about to make to exposures in the use of the camera, leaving exposures in contact-printing, enlarging, &c., for other members to deal with. In this limited sense, then, what is meant by exposure is simply submitting a sensitive surface to the action of light thrown upon it by a lens, and emanating from or reflected by the object to be photographed, and this for a sufficiently long time to obtain a developable image. But a developed image is not all that we require; developed images vary very much in quality and character—we call one an under-exposed negative, and another an over-exposed negative. What we require is the best obtainable image or negative, and in obtaining this the beginner finds considerable difficulty. He finds it will not do to under expose or over expose, but that he must aim at "correct exposure." By this I mean an exposure which will give the best negative with a "normal developer."

I have somewhere seen it stated that the briefest possible impact of light (strong or weak) is sufficient to bring about that molecular

condition, which, on development, we find to obtain. If this be the case, it is to the developer that we are to look for the quality of the negative; that is to say, the developer must suit the exposure, and this is found to be the case to a certain extent, for we continually find it necessary to vary the developer when in the dark room—in one case keeping down the accelerator and increasing the proportion of the restrainer, and in another just the opposite. But we sometimes have plates to develop which have received perhaps a brief exposure, and with the developing agents we have, use them how we will, we cannot get a satisfactory negative, *i.e.*, we find that, in practice, there is such a thing as under exposure. What we have to aim at, then, is an exposure that can, by the ordinary reagents used, be developed into a good printing negative, in contradistinction to an interesting chemical effect.

Plates vary much in their sensitiveness and in their ability to withstand prolonged action of the developer (an unsafe light in the dark room may sometimes be the real culprit in the latter cases, consequently it is a good plan to adopt a well-known brand of plates, and to stick to that brand; the knowledge of the correct amount of exposure will then, after a little practice, come as a kind of instinct. Unfortunately, this does not always work to one's complete satisfaction, for in the same brand of plates the different batches sometimes vary, but to nothing like the extent they used to vary a few years ago.

If one works with several different lenses, one must get used to these, for the illuminating power of various lenses varies considerably. In judging the necessary exposure, one must take into consideration, not only the *quantity* of light on the focussing screen, but also the *quality* of that light. Don't focus with full aperture or a large stop, then insert a small stop and expose, without looking at the effect on the screen with the small stop in; if you do, you will be very liable to misjudge the amount of exposure necessary.

Having given a "correct exposure," how far shall we push the development? For my own part, I do not like a negative with absolutely clear glass in the deepest shadows, this may answer for a lantern slide, but a negative with a slight deposit in the shadows generally gives a better print. But the subject of development will be a very good one for some future discussion, and no doubt will soon receive attention from us.

To-night, we must confine ourselves more exclusively to "exposure," though, as I have pointed out, the two things hang together very much. We often see in the various photographic publications elaborate "exposure tables" drawn up, but as the light we have to deal with is a continually varying quantity, I do not see how these can be an unfailing guide to us, unless used with a perfect actinometer, and this I believe has still to be invented. But even with this we are still at the mercy of the varying sensitiveness of plates. With developer and plates constant, the latitude of exposure increases with the blackness of the shadow, because the darker the shadow in the object, the longer the exposure that can be given to the subject before the diffused light caused in the camera by reflection from the image of the highest lights causes reduction in the image of the shadow.

With subject and developer constant, the latitude seems generally to increase the slower the plate, for this reason, that a proportionate increase of light generally produces greater increase of density in a *slow* than in a *rapid* plate. Therefore, in still subjects, where length of exposure does not matter, the slower the plate the better, or the smaller will be the loss through wrong exposure. The more rapid the plates, the less the latitude of exposures. The greater the illumination of the shadows in proportion to the high lights, the less the latitude of exposure. Also, I may add (for I can't leave development out of it), the greater the amount of pyro or bromide, or both, in the developer, the greater the latitude of exposure; and the more ammonia, the less the latitude of exposure.

"Correct exposure," then, is to be ascertained by observation and experience. Make trial exposures, and let your plates be your actinometer. Tables are useless unless they deal with constant conditions and quantities. In exposing gelatine plates, the only constant is the aperture of the lens, and this we vary by introducing various stops, but here the variation is of known extent. The rapidity of plates, the character of the subject, the character of the light, the distance of the lens from the focussing screen, are all continually varying, as also the method of development used. How then are we to arrive at correct exposure? I can give no definite rules the following of which would always lead us to "correct exposure."

It seems to me that experience (alone) does it, and to gain this experience I would recommend the beginner, in the first place, to pay great attention to the effect on the focussing screen, with the stop to be used inserted every time he is going to expose a plate; also to provide himself with a book (for memory is treacherous) in which to note date, time of day, plate, lens, and aperture used,

condition of sky, exact composition of developer used, and the like. In this way he will soon acquire that *instinct* which alone tells us what exposure to give.

E. S. WADSWORTH.

PHOTOGRAPHIC USES OF URANIUM.

III.

Of a printing process in which metallic uranium was deposited to form the image there has not appeared to my notice during the last decade any description. I select this span of time, as it probably covers the period at about which, according to a remark on page 67 of this volume, the details of an uranium process there attributed to an esteemed worker might have been made public. I have not been able to find mention of such an adaptation of uranium, and am led to state so much for fear of being charged with treading a beaten track. If the latter is the case it will have been in pure innocence. Moreover, I do not remember reading in the published memoirs of the principal photographic experimentalists of the last thirty years any similar reference, although it is not improbable that allusion may have been made to the theoretical aspect of the subject.

Previously, when touching upon the reaction between ferrous oxalate formed by light from the higher or ferric compound and solution of uranic nitrate and gold chloride, the effect being a positive image chiefly of the first mentioned metal, I submitted the proposition that, although the protoxalate of iron appeared incapable of depositing the uranium without the presence of a small quantity of gold, over which it freely exercises the power named, it might, nevertheless, be found practicable to dispense with the assistance of the gold, and by means to be ascertained to effect deposition of uranium alone, and so secure an image wholly composed of that metal. Furthermore, I left the precise behaviour of the unchanged ferric salt towards the uranium in a state of doubt, as there seemed grounds as tenable for supposing that it was nugatory as for concluding that it was not inactive. I will now venture briefly to deal with these points.

A comparison of uranic nitrate with ferric oxalate as temporary image-forming agents has already been made, and the resemblance one to another of their properties duly noted. There is also a close likeness between the first-named substance and the platinum salt in applying one or the other to an iron image, as ferrous oxalate will not solely deposit either metal. This being understood, it is natural to argue that since the platinum may be thrown down by conjoining to the ferrous oxalate a developing agent such as potassium oxalate, the uranium salt is capable of being similarly influenced, and experiment proves the correctness of the deduction. If, therefore, a solution of ferric oxalate be brushed upon paper, and the latter dried in the dark and printed behind a negative, metallic uranium may be deposited upon the parts that have been affected by light by floating the picture upon a solution of uranic nitrate and potassium oxalate. At the same time, it will be remarked that the unexposed portions—the ferric oxalate—will not attack the uranium, but by the combined action of that and the potassium salt will be displaced from its support, leaving clear paper, and requiring nothing more than a final passage through plain water to remove minute deposits. Thus, setting aside the photographic qualifications of the method, which are not, in the present regard, of first consideration, the effect of the reaction between these three bodies is to confirm the proposition that the metal uranium may be deposited to form the image of a positive impression upon paper.

In the attempts made to determine the exact quantities and proportions of the uranium and potassium salts necessary to insure the proper depth, some not uninteresting experiences were met with. Occasionally the deposit would be coarse and granular; at other times one might conclude, from the perfectly homogeneous appearance of the picture, that the uranium was very finely subdivided. Extensive variation in the colour of the several deposits was to be noticed, coarseness being coincident with brown blacks. The prevailing appearances of the uranium image are entirely dissimilar to those in platinum and silver, and do not easily admit of written description, but I think they are sufficiently pleasing to support the belief that a perfected uranium process would be capable of yielding pictures having quite distinctive features, and perhaps possessing value as a photographic printing method.

Although meeting with success in the endeavour to obtain an uranium positive image, it is the bare truth to admit that so far as I have proceeded the quality and strength of this kind of picture is not fairly comparable to that which may be had by making to the uranium solution an addition of a little gold, which, while largely assisting in the effective reduction of the uranium, imparts depth to the image and a pleasing moderation of the colour to heavy purple black. Still, I fancy that if the exact quantities of uranic and developing salts can

be ascertained, and various other details decided—a matter of some difficulty, of course—the nature of the results would justify the absence of gold or other coadjutants.

I prefer to avoid the large questions of the stability or permanency of deposited uranium on paper, but before quitting the subject it is permissible to suggest another way in which the properties of the uranium salt might be utilised, namely, in its conjunction with either ammonia- or sodium-ferric-oxalate, and its application to a support, when, as in the parallel instance of a platinum process now in vogue, its probable reduction and development, under the influence of light and moisture in the printing frame, might lead to the provision of a highly simple method of obtaining uranium pictures. The fact that the principal reducing agent, the iron, and the substance to be reduced, the uranium, are both sensitive to light points to the inference that great rapidity would characterise such a process if it were found practicable.

THOMAS BEDDING.

THE EMPLOYMENT OF THE OPTICAL GLASSES RECENTLY MANUFACTURED IN JENA FOR PHOTOGRAPHIC LENSES.

As is generally known, an undertaking has within the last few years been set on foot in Jena under the direction of Professor Abbé, which has for its object the scientific manufacture of optical glasses with regard to the advancement of practical optics.

The chief object to be attained was the removal or diminution of the secondary colour aberration; at the same time, the successful attempt was made to vary the optical qualities of the glass fluids by introducing into them new elements. The relation between the refraction index and the dispersion, which previously in almost all cases had been a linear function of the first constant, was principally kept in mind, and glasses were produced which showed with almost the same refraction index very different dispersions. By this means it is possible to correct spherical aberration in the construction of telescopic and microscopic objectives, in large measure independently by chromatic errors, and in general to satisfy one more condition than formerly in the construction of optical lenses.

It is evident that great advantage may be taken of this fact in the case of photographic lenses, and I have endeavoured to follow this out mathematically. I had first to decide what new condition needed most carefully to be fulfilled. The secondary spectrum and the remains of spherical aberration on the axis seemed to me to require no more correction than the distortion of the field, therefore I made the attempt to fulfil a wholly new and hitherto only occasionally mentioned condition—the diminution of the astigmatism of the heteronomic pencils.

Astigmatism Heteronomic.—It is well known that the diminution in sharpness from the middle of the picture towards the edges is essentially due to astigmatism, and this defect has heretofore been supposed to be irremediable. I will not describe the process—more tedious than difficult—by which I found the analytical conditions of astigmatism. Suffice to say that I succeeded in thoroughly removing the serious defect by the use of suitable glasses, and in giving the formula of an objective which, resembling a symmetrical lens, is wholly anastigmatic.

Anastigmatic Distortion.—Apart from the last traces of distortion which cannot be removed, the lens—as was to be expected—showed the edge and centre of the field with equal sharpness, even with full aperture. I may also add, that in the case of the new lenses the flint has a smaller index of refraction than the crown, and that the lenses have the merit of being especially thin—a fact which secures an unusually great rapidity.

Two forms of lenses have been up to now made according to this method. The first is a symmetrical lens of $\frac{1}{65}$ equivalent aperture, which gives a correct image of 50° without a diaphragm, and with the smallest stop a field of 90° . These lenses are specially adapted for portraits, groups, and instantaneous work, and can be used with great advantage in detective cameras, where rapidity and sharpness at the edges of the field are necessary. In this respect they are vastly superior to all other forms of lens. A lens of three inches focus covers a plate $2\frac{1}{2} \times 3$ inches.

The second form consists of a simple landscape lens. It has an equivalent aperture of one-thirteenth, and gives, when sufficiently stopped down, a sharply defined field of 100° . This construction is particularly suitable for landscapes, and works very clearly and sharply.

So far both forms have been manufactured only in small dimensions and focal lengths, since the production and melting of suitable crown glasses of more than two inches diameter have been attended with

difficulties. It is to be hoped, however, that these difficulties will be removed and instruments be produced of any desired dimension.

The largest symmetrical lenses have a diameter of two inches, and a focal length of 6.5 inches, and work a plate of 5 x 7 inches. The largest rectilinear landscape lenses have fourteen inches focal length and work a plate of thirty inches; they are thus adapted in landscapes for the largest plates.

"*Anastigmat*."—It may be added that the symmetrical lenses which have received the name "*Anastigmat*" are not essentially dearer than ordinary glasses of equal size, while the landscape lenses are very cheap.

Hartnack.—The optical manufactory of Professor Dr. Hartnack, in Potsdam, 309, Waisenstrasse, has undertaken the construction and delivery of the new lenses.

A. MIETHE.

—*Anthony's International Annual*.

COPYING PAINTINGS AND WORKS OF ART.

III.—IN THE STUDIO.

SUFFICIENT has been said in the previous articles to show how old pictures may be treated, but one practical note more may be added to show how pictures, if painted on canvas, can be made to have the best appearance photographically. If the stretcher on which all cloth pictures are strained be a keyed one—i.e., one made with wedges for distending it—these should be lightly driven up with a hammer until the canvas is strained, but not unduly; and while doing this, or before doing so, all the dust and dirt which invariably accumulates between picture and strainer should be carefully removed. (I took a two and a half inch nail out of this receptacle last week from a valuable picture by Claude Lorraine.) If the strainer should be found, as many of the old stretchers are, and modern ones as well, to be made without keys, then a very slight damping of the cloth generally causes the picture to become tauter on the strainer, caused generally by two facts. The cloth is generally prepared with a coat of size or glue to smooth the surface before the preparing priming is used to prevent this from passing through, and this being damped along with the cloth, which shrinks in damping, the size shrinking and drying along with it tightens the picture on the straining frame without doing much, if any, injury to the picture.

Pictures which have not been so prepared are not so amenable to this treatment, and many painters of the highest repute have had the strongest objection to use the ordinary prepared cloth, preferring to have this preparation done on the cloth directly and under their own personal supervision, without the use of size or glue. When I mention the late Sir John Watson Gordon, President of the Royal Scottish Academy, as one, and Norman Macbeth, R.S.A., who was also President of the Edinburgh Photographic Society, as another, who practised this method of preparing their grounds, I will have said enough on that subject.

In reference to the studio itself, no matter what may be thought of it for portraiture, there cannot be a doubt that the "tunnel" shape, as it was called, suggested by Mr. Sutton in the "*Notes*" many years ago, is, for copying pictures and works of art, the best form that has yet been devised, having qualities of its own for lighting up the work that no other that I have used attains to, while it is as suitable for the use of all artificial illuminants as any other.

With ordinary light this form of studio gives a very equal illumination of the subject if it be a picture; but this is not its highest recommendation for copying of paintings, plans, and other works of a like nature, for the light passing to the object at pretty nearly equal angles all reflections are destroyed, and with the assistance of a black cloth of an absorbent quality spread on the floor, the camera and lens in the dark shade of the tunnel sees nothing but the subject of the picture. One precaution is invariably taken, however, and that is to place the head in front of and in contact with the lens, and if the picture does not show truly dead, then it is so altered in or out, upwards or down, on the easel until it is absolutely right; if it is not then truly parallel, which it must be, the necessary adjustments are made on the camera with its slide, which swings in all directions. With the judicious use of the blinds, the most perfect light and shade can be got, not only on pictures, but on statuary or other objects in the round or high or low relief. There is a command in the worker's hand of everything—from perfect light to perfect shadow—such as is seldom got in any other form of studio; and there are few forms which I have not tried and done fair work in.

In copying oil or water-colour pictures for engraving, photogravure, or other reproductive process, there are to the ordinary operator or amateur a great many new and difficult problems to be faced, that of knowing

and feeling the artistic handling of the work being of the first necessity in the reproduction, there being great differences in the style and character of the painting, which must be kept up and represented truly in the copy—one artist's work being solid and vigorous, another's being refined even to the verge of weak prettiness. These various effects of the artist's manner to be conveyed in another medium must never be overlooked, but carefully studied and reproduced for in a true or perfect copy. It is not alone the mere drawing which must be rendered into black and white, but the entire character and artistic quality and feeling of the work which has to be translated.

These remarks apply quite as closely to the reproduction of photographs by the gravure or any of the other process methods as they have been called; it is the spirit of the work as well as its mere *mechanique* which should guide in making the negative for reproduction.

In carrying out this idea every one must use his own judgment, but it will be found that the best results have always been got by long and full exposures. In the collodion days—which, by-the-by, for this purpose have not yet departed, work being produced by that medium which the gelatine has not yet approached—in the collodion days, as stated, these exposures sometimes extended in time to what many now will consider fabulous, occasionally amounting to between three and four hours, and the subjects not then over exposed.

The collodion and baths were specially made for the purpose, being heavily salted with deliquescent bromide and chloride in addition to the iodide, and the resulting negatives up to thirty-six inches high being without a flaw or a stain. With peculiarly difficult subjects, the interposition of colour screens was often resorted to with considerable success, but at that period they had not yet acquired their present names, and there is much in a name. The results, however, were similar.

In exposing then and now for such large plates experience has led to having the camera removed as much as possible from all vibration. In the present writer's experience this has been most successfully accomplished by having a suitable camera stand suspended from the roof of the studio, the camera sliding on rails and having all the necessary adjustments on both camera and stand. On a ground floor, of course, there would be no such precaution required, but in copying, especially for engraving and such-like methods of reproduction, no effort should be spared, or that foresight can effect, to secure rigidity, rectangularity, and absolute sharpness to the extreme corners of the picture.

This, it need hardly be mentioned, can only be got by using a lens which will fully cover the entire field. No amount of trying to make it do will ever satisfy the requirements, they must be there.

Much, of course, could be said about the ways of securing rectangularity in the copy, but that may safely be left to the practice of the worker, most people knowing that if the lens is placed in the middle of the camera and pointed to the centre of the picture—truly levelled—that a very slight but careful measurement from corner to corner of object and camera will insure that portion of the truth of the copy; but as this has extended sufficiently far already, anything further that may be actually necessary will be stated in the next and concluding article.

W. H. DAVIES.

JACK AND I IN NORWAY.

No. II.—BERGEN AND SURROUNDINGS.

WHEN on his first visit to Norway Jack had put up at the "Bergen" hotel when in Bergen, and on that occasion was very comfortable, so we decided to put up at the same house on our present visit. A good house and a very heavy landlady; had she possessed her weight in gold, she would have had over twenty stones of it.

Having seen to our baggage, that it was carefully stowed away, we started to photograph at once. The weather was beautiful, and if general report is to be believed, that is an exceptional thing for Bergen, which is credited with continuous rain. It is stated that every girl in the place is presented with an umbrella when she is born, as a thing quite indispensable to her future well-being. We saw them faithfully carrying about these "*Sarah Gamps*" everywhere, but they proved more ornamental than useful during the time that we were in the city.

Arranging our apparatus, we started picture taking, but had got scarcely ten yards from the hotel door when we were accosted by a young good-looking fellow, who exclaimed, when he saw our traps, "Oh, you are going to photograph! Then you should have come to our house," pointing to another hotel exactly opposite the "Bergen." "It is the best house in the town for photography. We have a flat roof on top—splendid for views. Won't you come?" We explained to him that we were staying at the "Bergen." "But you might come when you return again," he said. And replying that we might do so, he went away quite pleased. That's what I call looking after business. "*Smebys*" was the name of the

house, and the lady and gentleman who were going on the tricycling tour had put up at it, and they told us after that it was a very comfortable place. To those who desired panoramic views of the town that house might be an advantage. I have never found pictures taken from house-tops or church steeples very satisfactory or effective—all ridges, roofs, and little else, as a rule.

The principal street stretched from end to end of the business part of the town, the intersecting streets to the left inclined down to the harbour, at the bottom of which were jetties built out for loading and unloading boats and larger vessels. The quaint formation of these narrow side streets and the towering buildings—all of wood, mended and patched over—produced subjects of peculiar interest to photographers, artistic bits peeping out at every corner. There was no lack of subjects, and we wasted no time in starting to make pictures while the sun shone.

We worked all open subjects with a Ross' rapid symmetrical 10 x 8, so that the whole plate got well covered to the edges with a large stop, but in confined situations this lens was useless. We had with us for such emergencies a set of wide-angle lenses, respectively five-inch, seven-inch, and ten-inch focus, all fitting into the same tube. This was all we required for taking buildings, churches, and like subjects situated at very near distances. To get some of the most interesting subjects in Bergen we found this little set of lenses quite indispensable to us.

The crowds that gathered round when we were arranging and focussing for exposure were enormous, but very quiet and orderly. The policemen were the most polite of officials. With some little force and steady perseverance they pressed the crowd back beyond the angle of view, and with this kindly assistance we got some pictures that it would have been impossible to get otherwise.

Our tricycle friends had taken advantage of the propitious weather, and we came across them at different points as busy as ourselves. Jack put them up to a rather good dodge at one place where they were rather bothered with the crowd. He got them to focus the view they really wanted quite sharp, then turned the camera right round, pretending to be very busy taking a picture the other way. Naturally the crowd veered round right in front of the lens, then the camera was turned back to the view wanted and the exposure made. This was done successfully, and the crowd looking on from the back.

The shipping, the harbour, the market-place, and the new park and its surroundings were the spots that took up most of our time. The narrow short streets running from the main thoroughfare to the bay being the most picturesque subjects of any.

We took a picture of the market-place where the fish is sold, and a very animated scene it was, where the crowd of housewives came to badger the crowd of fish sellers. There was the same amount of talking, and wrangling, and priggish down, and chattering that is to be found in like circumstances all over the world I suppose. Lots of fish here are to be found swimming in tubs and other receptacles, so that you can buy them all alive and carry them away after their *quies*.

There is no covering to this market-place; it is an open square space close to a quay, the vendors selling from deal tables and other temporary erections of the commonest description; also the boats at the jetty run in close to the stairs, and sell the fish from their boats just as they have brought them from the sea. Here and there in the crowd would be found a stall of very questionable sweets, and others of hardware and small wares of a very common order.

In the main thoroughfare of the town the shops are good, and in most cases the articles are beautifully displayed. The general class of merchandise shown is naturally that which would commend itself to the tourists who must, during the season, visit Bergen by the thousand. Silver jewellery shops are a feature of the place—large windows filled with silver, and silver and gold ornaments in wire and filagree work, brooches, bracelets, bangles, ear-drops, and all kinds of ornaments likely to commend themselves to the ladies. These little articles are exposed in thousands and thousands, and this very display proves that there must be a large manufacture, and the large number of people who trade in it would convey that it is a profitable business.

In very old silver also, such as would delight the hearts of collectors (if genuine), there are large quantities shown, but this trade is done in a different way, usually a shabby case at the entrance to a narrow lane, with some six or eight pieces tacked on to the back of the case, which is glazed, and hanging on the wall. Apostles' spoons, old rings, ladies, &c., with a rather worn and dirty business card, giving the name and address of vendor residing in the lane, everything in keeping—very old and very dusty; but it repeated itself so often at different corners that I began to doubt if it were genuine or only a manufacture like the rest. It put me in remembrance of the artist, who, seeing an old suit of mail of the fifteenth century exposed for sale at the door of a curiosity dealer in Paris, was attracted by it, and inquired the price. When that was stated he said he would buy it now. "Oh, we cannot sell you that one," said the Jew in attendance. "I have just sold it this morning; but," and with the blandest and most innocent of smiles he continued, "I will have another one ready for you in three weeks if you like." The artist couldn't wait. So that, as I looked at these very venerable pieces of silver plate, I wondered if the stains and wear of age were all put on to deceive the unwary.

The next emporium of importance is the fur warehouse; then the general fancy ware and toy shops. White carved wood in spoons and

forks, figures, &c., are also manufactured here. Most of the goods shown are manufactured, or represent in some way the produce or peculiarities of the country got up specially to tempt the stranger. And, judging by ourselves, they are rather successful in their temptation.

The better class of people here dress much as we do ourselves, but when we come down to the workman or the peasant (who seems to be always trudging or sailing out and in to town) their get up is very unpretentious and home made. The men look hard-headed, steady, slow-but-sure sort of specimens; but when you come to their clothing it is huge and unshapely, fitting the body evidently never having been thought of, hanging in straight lines all round the figure like clothes from pegs. The women are of a plump, low-of-stature, quiet, simple type, uniformly dressed in a rough woollen material, kill-pleated or quite plain short skirts, with a little dark shoulder shawl, coloured stockings, and heavy shoes.

The women, however, who come into town from the surrounding districts look resplendent in their varied costumes of red and yellow and gold, the tight-fitting bodice and fancy head-gear looking extremely smart; and the children, decked out exactly like the matrons, look pocket editions of the same. The women, when they come in from the country, invariably carry a small oblong box or trunk, painted in colours gorgeous as their many-coloured dresses, so that it is very noticeable. It seems that they bring the eggs, butter, and any other produce from their small farms in this *Gladstone bag* of a previous age, and carry back in it the necessities required for home.

When in Bergen I observed one performance that was peculiar but cleanly. On Saturdays all the shop people combine to clean the streets. Each tenant cleans his place right to the centre of the street in front of his own door, so that, each doing his own part, the town is left spick and span for the Sunday at any rate.

MARK OUTE.

THE DISCOVERY OF THE DAGUERREOTYPE PROCESS.

[A Communication to the Society of Amateur Photographers of New York.]

I AM conscious of my own unworthiness for the honour you have conferred upon me at this important occasion, knowing of others that have a superior claim for this distinction—those that have given the subject more careful study and would be better qualified to address you this evening; and it is to be hoped that we may hear from others on this subject. I am sensible of the greatness of the field, and, that others may have an opportunity to address you, my remarks must necessarily be slight and imperfect. I hope you will understand my position, and I will trust to you for an equitable consideration. Mankind little reflect what a privilege we enjoy living in the nineteenth century, for included in this are all the great discoveries. Truly this is the age of progress and invention. We are better prepared to-day to accept the announcement of any great discovery, and to look upon it with less incredulity, to encourage, and possibly capitalise it, than were the people when the announcement was made of actually impressing the image so often seen in the camera obscura, and producing in all its detail the reflected image, and making a permanent impression upon a sensitive surface. This paved the way for other discoveries, and to-day we have many important inventions that contribute to our welfare and happiness.

We have the best and cheapest farm implements, fire engines, firearms, fastest steamers and best railroads, telegraph, photography, anaesthesia, sewing machines, electric light, telephone, phonograph, and, last, flexible films. If any nation during the same time has done more, or as much, the fact is not generally known.

We are assembled here to-night to celebrate the fiftieth year of one of these many inventions, the greatest of all discoveries—photography, and to pay homage to the illustrious names of Niepce, Daguerre, and Talbot, not forgetting our own countryman, Dr. Draper. The name of each is associated with precisely that which he accomplished—names that will for ever shine forth as fixed planets in the shrine of invention. They will be everlasting on the tablets of memory, monuments in themselves, the best that can be erected to everlasting fame, and will never cease to be heralded to all the world. We need not write the history of these great men; it is too well known, for their noble gifts to science will ever share the same position that follows with their fame, and to-day we reap the golden harvest of their genius and invention.

You may wonder why I have added the name of Dr. Draper to the list. My reason in so doing is because Daguerre never succeeded in taking likenesses; when the French government purchased his process it was only adapted to statuary and architecture. The first successful Daguerreotype portraits were made in the New York University, 1840, by Dr. Draper, who overcame the optical difficulty which had defeated all the previous attempts. When the news of the discovery reached Europe, it was ascribed to the peculiar brilliancy of the American sun; but this theory was hard to reconcile with the success which attended the American artists, who soon prosecuted the business in London and Paris. Opinions may differ as to the real date of this important celebration; whether it should be chosen from the date of the discovery or the public announcement before the Chamber of Deputies by M. Arago, are matters of minor importance. Each progressive step in photography is worthy of special recognition, and it is to be hoped that steps will be taken to celebrate the occasion of that important date upon which M. Arago read the paper before

the French Academy of Science. The ultimate movement in all cases establishes the fact that this is the most wonderful invention of the nineteenth century, and it reflects great credit upon the Society in taking the initial steps to make this year one of celebration and commemoration to these great discoveries.

On January 31, 1839, the results of Daguerre's labours came forth fully finished for use. To France alone for the Daguerreotype is all honour due, and the liberality with which it was purchased and given for the benefit of universal science will secure to France the gratitude of all nations. This wise and generous step was at the suggestion of her most eminent philosopher, M. Arago, to whom Daguerre had confided the secret of his art. Struck with the splendour of the discovery, and foreseeing the advantages which science and art would receive from its application, he induced the French government to offer an unusual pension of six thousand francs to Daguerre, and to Niepce a pension of four thousand francs, for surrendering to the public the use of their inventions. When the secret was made known and the pensions granted, the seals which retained the secret were broken and the Daguerreotype became the property of the world. The genius of men like this comes like an incantation of science, and descends upon the world but once in a series of years, and the peculiar assemblage of faculties requisite to produce these wonderful results are seldom found together, each possessing that persistent will, and all claiming to share in the great discovery; some giving the result of their labours to science, others pensioned by a government, and to one must be added the desire for a patent granted by the English laws. This does not detract from their fame. They have accomplished enough to crown them all founders of our beautiful art. And while the invention has afforded employment to thousands, it may be safely said that it has given to art the greatest stimulus it has received in modern times. The colours of genius are determined by the ray incident on the first prism, and the light once decomposed by refraction no further refraction can again decompose. It is thus with photography, for to-day it remains the same incident ray (the camera lens and silver salts are in principle the same that were used by the early investigators), and no further change has taken place, and it is doubtful if any ever will. Many topics are important enough to deserve a separate consideration. All that can be alluded to in this short space of time will be to point out objects best deserving our attention; while, if time permitted, we could present a diorama of men all more or less connected with this history. To mention a few of the many may not be out of place—Niepce, Daguerre, Talbot, Draper, Fyfe, Claudet, Tizeau, Biot, Arago, Hunt, Ponton, Lassargne, Netts, Herschel, Moser, and Lerebours.

Horace Vernet, and Goupil made Daguerreotypes in Spain; Friedrichstal travelled in Central America for the Prussian Government; Davidson made first camera (optician of Edinburgh); Adamson first made pictures in New York.

If time were at my disposal, I should like to inquire into the various benefits that result from photography, and to show that it has had as great an effect upon civilisation as the telegraph, telephone, and steam engine. It stands alone, occupying a distinct position, and furnishing to mankind a new vision that can penetrate into distance or the past, a retina as faithful as the human eye, but whose impressions do not perish with the wave of light that gave them birth. It has had a birth and a growth among the people; it has, like many other discoveries, been singularly successful in interpreting the wants of the day and serving popular welfare. The noble works of the great masters are no longer the exclusive property of a single individual; they are now reproduced by the aid of photography and given to the world or published for the benefit of society. The whole world is brought to our view by the aid of photography, and to-day we find it occupying an important position in science, art, and all industries. To me it has always been a pleasure to look over the history of these great men, and to ramble through the literature of the important event has offered many pleasant hours of study. To-night I yield the field to others, for my mission is rather to describe the process than to describe the men. I

am inclined to think that I shall best meet your wishes if, instead of dwelling on the history of these great men, we include them all in one great class of inventors and benefactors to mankind, and in as brief a manner as possible outline the Daguerreotype process and describe the use of the apparatus that has been loaned from the photographic collection of the School of Mines Museum.

[Professor Laudy here went through the operation of buffing a silvered plate; then illustrated the use of the iodine sensitising box, and the funnel-shaped mercury developing bath. He also showed several old specimen Daguerreotypes.]

The Daguerreotype process is wonderful for its extreme simplicity, and when once explained it seems strange that it was not thought of before. The crowning wonder of all is that it was made at a time when materials were not only difficult to procure but far from being pure. Iodine was discovered in 1812 by Courtois, and bromine by Ballard in 1826. Little did they dream that their discoveries would lay the foundation of the science of photography, and it is surprising to think that no other compounds have ever been used with success, and it is not likely that others will.

L. H. LAUDY.

FIGURES IN LANDSCAPES AND GENRE.*

II. It is very hard to give any really simple definitions, of Vulgarly, for it is one of those things of which it has been said, "I know perfectly well what it means, so long as you do not ask me to define it." If you

press me, I cannot think of any better definition than a base and material ideal, and to that I might add, mostly due to ignorance or sloth. Mr. Quiller is not polite, but he goes to the point when he says Mr. Frith paints life as if it were a Sunday-school treat. Vulgarly and its antidote can only be so generally and vaguely described that it is hard to get any practical good from the description. Here, moreover, it is hardly necessary for me to caution you against the grosser forms of vulgarity, and the distinctions thus become all the more fine-drawn, diverse, and theoretical. The general remedy prescribed by Mr. Matthew Arnold for his vulgarised middle-class Philistines was culture, the knowledge of the best that had been thought and said. In art, at any rate, this prescription will be very effectual, if we take it in the form of knowledge of the best that has been painted and drawn and carved. I forget who the great modern painter is who always keeps in his studio a fragment of Greek sculpture. "When I am in doubt about any of my work, I always try it beside this, and if it will not go with this I know it is wrong."

Any one who has studied Classic Art and the Old Masters, and has taken the lesson to art, is not likely to be vulgar, into whatever faults he may fall. The study may not be of much direct use to him, except in draperies, but it cannot fail indirectly to influence his style, as Mr. Lambert showed in his excellent lecture on Phidias. Of course, it is very possible to be pedantic, and priggish, and dull, and unpractical, but there is a vital principle at stake; the right and the wrong are worlds apart, and you can see the distance in a moment by two examples, each the best of its kind. You remember Focardi's statues at the Italian Exhibition—*You Dirty Boy!* and the two street Arabs selling newspapers, *I was First, Sir!* Take those gamins, place them beside the Parthenon frieze, and gauge your taste by the result.

Unfortunately our remedy of drawing fresh inspirations from the old masterpieces rather fails us as one large and wholesome source of pleasure. The ancients are of very little account in Humour, and healthy laughter is rather apt to be improved out of the world by modern culture. Greek wit is to us in its original form, with one exception, deplorable stuff; perhaps it is that jokes require re-entring for each generation. And now in these days from laughing at Leech we have come to smile at Du Maurier, and probably our ultra-refined grandsons will read their *Punch* with muscles and sense of humour unmoved. The most vigorous humour of to-day proceeds from America, and not from—well, not from Boston. Such hearty laughter as is felt proceeds too often from the strongholds of vulgarity, and if that were to have the monopoly of laughter, I fear the future would belong to it. But surely that is not necessary; there is plenty of good fun in art which is not vulgar. Mr. Charles Keene, Mr. Harry Furniss, and the late Randolph Caldecott, all within the last few years, have caused laughter neither faint nor unworthy.

To take a single instance among photographs. Mr. Sutcliffe's variously-named picture of "Excitement"—the rear view of boys looking over a wall. That is admirable art, very good fun, and excellent taste. The limits must in each case be found by individual refinement, and I can think of no single definite restriction other than that of sympathy: no joke should ever be an undeserved scoff. Focardi in a durable statue degrades humanity into apedom, and asks us to admire the cleverness displayed. There is not a particle of love or tenderness in it, and I do not believe that any man ever did great work without love in his heart.

Before I leave Vulgarly, there are just two points which I would like to mention.

The first is to protest against the humorous misapplication of quotations, debasing the poetical currency, to adapt a phrase from George Eliot. A burlesque of a paltry thing may reveal its worthlessness, but to ridicule what is really noble or beautiful, so as to depreciate its worth, is an outrage. There is a great temptation to raise a laugh in order to enliven an exhibition, and I am far from saying that there are no exceptions. Let us only be sure about each instance. There is nothing to be gained by pretending that everything is sacred, but even that humbug is better than holding nothing as unfit for jest.

In the second place, of animals I shall have more to say by-and-by; here I would only protest against treating them in a vulgar spirit, for they have a character, a dignity, and a nature of their own. Landseer was a great animal painter, but his failing lay on the side of investing animals with too human an expression; in Ruskin's words, "Looking for sentiment or jest primarily, and reaching both by a feebly romantic taint of fallacy" (Mod. P., v. 263). As often happens, his shortcomings are more easily imitated than his merits, and that ultra humanising and degradation of animals are to be condemned which reach, I hope, the lowest depth in publishing a photograph of a dog with a pipe in his mouth or a cat in an old maid's cap.

III. Now, after these strictures on Unreality and Vulgarly, it may be asked, What are we to do, then, to make pictures by photography?

As I have said, my whole aim is to cry up originality, and to put down thoughtless and uneducated work. Now that I have explained these prohibitions of mine, I had much rather insist on their positive side, and couch them in an affirmative form—Be Real and Be Refined. To these I will now add a third—Be Expressive.

The more we use the camera, not merely to record whatever is in the way where it happens to be set up, but to work out and give embodiment to an idea, or to render some chosen incident or phase of life, the more

* Continued from page 415.

art shall we get from it. By selection and adaptation the mind of the photographer is visibly expressed, and in this personal utterance alone lie the springs of interest and vigour in art. Therefore, to cultivate our power of expression, to be able first to make up a story and then to depict it intelligibly, is the best way of developing the artistic capabilities of photography.

It is true that this story telling is a born gift, but it generally exists in germ, and may be developed by practice and cultivation. In the right surroundings a very slight incident will go far, and the true artist, who always has his eyes open, is not above helping his memory by a notebook.

A pennyworth of example is worth a pound of precept. I will not refer you to any photographs, or distress the modesty of some here, whose names I might mention, and whose blanches I should raise, but I will take the painter, Frederick Walker, as the best and most immediately profitable example. He died, you know, quite young, to the great loss of English art, before he was enough at home in oil painting to allow his fancy free scope, so that for our purposes I would refer you more especially to his water colours. Here is a photographure of his picture of geese at Cookham: it is a liberal education in figure treatment. There are more figures in it than a photographer could well introduce, at any rate in one exposure, but there is not one which is not full of life and suggestion. I can only fall back on quotation, and in the words of an eulogy, which was perhaps misprinted by one of our most esteemed journals, declare that "it makes a picture to water the teeth of any photographer." Look at the man on the left carrying the oar which makes so useful a line, and telling of the river close by, calls up such a host of fancies and associations: the other man, again, probably a keeper from the Hall, sent on a message, puts his head in at the door for a gossip, but cannot stay; and, above all, observe the perfect family group on our right—the infant poised on the mother's arm, while she talks to some one out of sight, and the two children, the younger losing interest first and beginning to play, while the elder, throwing back her hair, still listens to the talk. These are all mere accessories to the main subject—the girl and the geese—and only in the elder child is the face seen at all; in the others the expression is produced simply by gesture. Take all these figures in, and then turn and consider what the picture would have lost if they had been omitted and the girl had driven her geese through a village lifeless and deserted, as if stricken by the plague.

Walker's chief fault was over idealising his young ploughmen and snows into Greek gods, but that danger need not frighten you: it will be well if the camera does not exaggerate the clumsiness and heaviness of the rustic. But in story telling I think he is pre-eminent; for that reason I have begun with him as an example. Among the old masters Caraccio had much the same gift, but unfortunately his work is hardly to be seen out of Venice, and I dare say you would prefer something more recent. Hogarth, of course, is full of such sketches of character, but he is rather too tremendous and too much in earnest for our easier and kinder art, and in pastorals it is really only in the latter half of this century that there has been realism enough to render these pictures serviceable to us even as suggestions. But in Randolph Caldecott, again, and many of our recent English illustrators, there are excellent examples, and easily accessible. These men did each bit of their work with love, as if they had tried what fresh and charming conception they could give to each detail of it without detracting from the effect of the whole.

No incident, if appropriate, can well be too slight. A child stopping behind its companions to tie a lace, a pair of old women meeting or parting, a waggon leaving a village with children a-swing at its tail; these and the like incidents will make all the difference to a photograph: people will care to dwell over it, and looking at albums will no longer be the last resort of the bored or tedious guest.

There is an excellent hint for finding figures which was given by an old artist to Constable; he remembered it and acted upon it all his life, and I will now repeat it to you: "Do not set about inventing figures in a landscape taken from nature; for you cannot remain an hour in any spot, however solitary, without the appearance of some living thing that will in all probability accord better with the scene and time of day than will any invention of your own."

When all the world is before us, suggestions are much less likely to occur than when we see the right man, woman, child, or animal in the right place; then it is easier to find for our subject the appropriate and becoming attitude and action.

There is also a lesson to learn from it, although it may be a hard saying to those who have little time to spare—that the first requisite for landscapes is to spend much time in the country, always observing and treasuring up for future use occurrences and phenomena as well as localities suitable for our work. To painters, of course, this is a truism, but I do not believe that landscape photographers study nature half enough. They know they can turn on the machine and take a landscape, and between whiles they neither open their eyes nor occupy their minds with what they have seen.

In story telling, however, it is evident that to evoke any human sympathy some human emotion, however faint, must be portrayed. And this brings me to my next point, that all emotions are not suitable for photography. For instance, there are griefs which are sacred against all art. And some subjects are too revolting or too harrowing for the painter's use.

But for photography the limits are even more narrow than for painting, and all strong emotions are unsuited to it, for the following reason. The painter can paint a picture from reminiscences of a scene which he has witnessed, using models for the purely mechanical part, and rendering the actual expression from memory, if not from imagination. The photographer, as I have insisted, can only photograph a subject actually present before him. If he were to photograph the originals in their sufferings, he would be a heartless and intruding brute; if he were to photograph the seen with models, so far as it failed, the result would be theatrical and empty—revolting to our humanity so far as it succeeded.

I have made these remarks here already on Mr. Bramley's Academy picture, *A Hopeless Dawn*, which I had already thought of in this connection before it was mentioned by Mr. Lake Price. There are numerous instances among Mr. Frank Holl's subject pictures now at Burlington House. His love of harrowing subjects was made a reproach to the painter; but conceive a photographer who should be accused of illustrating every sentence of the Burial Service!

Perhaps I might take the Coventry legend as a sort of example. If the purity of Godiva herself could have been photographed, I fear the photographer would have been a degree worse than Peeping Tom. (Would his lens have gone blind, or got a flare-spot, or what?) If we were now to photograph the sham Lady Godiva, I think we should deservedly get a vulgar picture, artistically, for our pains.

The rule may be laid down in relation to our sympathy. If we should be so carried away at the time as to be unable or unwilling to photograph the scene, then equally we ought not to reproduce it afterwards. Thus, soldiers under fire, when the war correspondent could give them no help, or a lifeboat putting out to sea, would be good subjects enough; a broken-hearted widow or a dog drowning would not.

How far the snap shots of detective cameras are decent, or how far they have the taint of the interviewer about them, I hardly like to say. I think that much depends on the extent and degree of publication. For instance, there was a photograph widely circulated of the Queen laughing, evidently an enlargement from a snap shot. I am not a believer in the divine right of kings, but that did seem to me to be taking an unfair advantage, and publishing a libel calculated to bring into contempt. There is just a touch of eavesdropping about it (I have a detective camera myself), but to overhear a thing and keep it oneself is very different from shouting out one's discoveries to the world at large.

Since writing these remarks I have seen the decision of Mr. Justice North, in Pollard *versus* The Photographic Company. Time will, I hope, show that this is good law; the analogy between photographs and letters which belong to the recipient, but may not be published without leave of the writer, who, nevertheless, has no property in them, seems to me to be, at any rate, very good natural justice. It is very doubtful, however, whether this principle could ever be strained to cover cases where the original photograph had not been taken for payment.

A cat may look at a king, and so may a detective camera; but I do not see why this natural right should entitle a photographer to publish ugly libels of an innocent individual, solely for the photographer's own profit or glory.

But to return to subjects taken with consent of the sitter, and the emotions which make good pictures. What about love making? Is that too tender, too intimate, altogether too sacred a process, so that to publish any even of its lighter passages, not to say the fraudulent version of flirtation, is a sin and a shame? That is too hard a problem for me; I will leave it to experts, merely noticing that, as a matter of fact, lovers have, time out of mind, been regarded as fair game—if you can catch them.

In photography, the actual exposure of the plate is so short, and it is so wise a precaution to take a second version, with very slight changes, that there is some danger of repetition. If both copies are of nearly equal merit, of course each might be exhibited in its turn. Most of us, too, are badly off enough for models, and these must be so very far superior to the ordinary model of the painters, that they are very hard to get; consequently, the same person has a tendency to appear in all our pictures. It is true that I never heard of such blind persistence in the same models as was shown by Cignani, a Bolognese painter in the seventeenth century. Sir W. Stirling Maxwell tells us that there are two pictures of his extant in the palace at Copenhagen, in each of which the same two models—a man and a woman—have been painted. The first picture represents Joseph and Potiphar's wife, the second the Rape of Lucrece.

But in getting models to express our ideas, the great obstacle, and one which increases proportionately to the definite aim and heightened interest of our effort, is self-consciousness. As soon as a sitter knows what you are doing, however willing she or he may be, on comes self-consciousness, and unless you can dodge it or banish it there is an end of all naturalness. It is, no doubt, mere nervousness, and some people have a dramatic power of putting it away and successfully assuming some desired expression at will. But these are rare birds indeed. Sometimes the attention may be diverted, but unluckily for our purposes one set attitude is generally required, and there can be no free movement or action, or assertion of power, such as generally dissipates stage fright. But to acquire by rule the art of being at one's ease is like learning liveliness by jumping over chairs.

GRAHAM BALFOUR, M.A.

(To be concluded.)

PHOTOGRAVURE PROCESSES.

[A Communication to the Society of Amateur Photographers of New York.]

In general terms all practical photographic methods and processes depend on the action of light on one or the other of two substances. Light, under certain conditions, blackens certain salts of silver, and hardens certain organic substances, such as gelatine.

By the first action we produce our negatives and print our silver photographs; by the second action we produce printing plates from which we print with ordinary printing ink. The application of this second action is the foundation of the various processes of photo-mechanical printing. All of these depend of course on both actions of light—first, in the production of the negative; second, in the production of the printing plate.

There are four leading lines of photo-mechanical printing methods—photo-engraving, photo-lithography, photo-gelatine, and photogravure. Photo-engraving is understood in this country to mean "cuts to print with type." Photo-lithography is the process by which a stone is prepared for ordinary lithographic printing by photography instead of by hand. In both photo-engraving and photo-lithography the prints must be made in dots or lines, but by an ingenious device the half tone of the photograph is closely imitated. This is effected by breaking up the half tone into a series of very fine dots or lines.

The methods mostly in use by us are those which give a true photographic half tone. These are the photo-gelatine and the photogravure methods. The photo-gelatine process is known under a multitude of names: Albertype, heliotype, artotype, Lichtdruck, Indo-tint, collotype, are some of them, but they all mean the same thing, that is, printing from the surface of a layer of gelatine variously supported, and on which a printing image has been produced by light.

The *modus operandi* of obtaining such an image is, in its broad principles, simple enough. An ounce of gelatine is dissolved in, say, ten ounces of water, at a temperature of 100° Fahr. To this solution is added forty to fifty grains of bichromate of potash and sufficient alcohol to make an easy-flowing liquid. This is flowed over a plate of glass or metal and dried in an oven at a temperature of 120° to 140° Fahr. on a level plate, so that when dry a very thin, even solution of bichromatised gelatine remains on the plate. The gelatine-coated plate is exposed to light under a negative, and now comes in the second action of light. The light passing through the negative hardens the gelatine in the shadows, partly hardens it in the half tones, and produces no effect where it is prevented from penetrating by the opaque parts of the negative.

The gelatine-coated plate, which now has the printing image produced on it, has only to be washed in water to prevent the further action of light when it is ready for the press. It is inked up in the same general method that a lithographic stone is inked. But the sun has been the artist and has drawn the half tone of the photograph as no hand could have done it.

Photo-gelatine printing, to the reader and onlooker, seems to be the simplest thing in the world. On account of the "contrary" character of gelatine, it is in truth the most difficult, as those who have been longest at the work best realise. It will be seen that the reproductions by this process have a character all their own, and for a certain delicacy of result and true photographic effect they are unapproachable.

In the photo-gelatine process it will be seen that a new printing surface or material (gelatine) has been brought into use.

In photogravure, the oldest printing material (copper) and the oldest method of printing is employed, but the action of light takes the place of the engraver's tool. There is not time at my disposal to do more than briefly sketch the processes employed. The result desired to be obtained is an intaglio plate to be engraved by photography and to be used for printing on a copperplate press. In the photo-gelatine process we have described how a plate is coated with a thin, even layer of bichromatised gelatine made sensitive to light. If we prepare this gelatine on a copperplate and after the action of light place the plate with its light-produced image in an etching bath, it is evident that the etching fluid will penetrate the gelatine where the light has not acted, and where, therefore, the gelatine is not hardened. It will penetrate less where the light has hardened the gelatine slightly, and it will not penetrate at all where the gelatine is altogether hardened by light. In this way we have a plate etched more or less deeply according to the gradations of the photograph, and therefore reproducing all the gradations of the photograph. This, very broadly, is the underlying principle of our process of photogravure.

Two essential conditions must be observed, however, in order to make the process practical. In the first place, in using a negative to print on the gelatinised copperplate, it is apparent that the picture would be a negative. Therefore a positive or transparency must be made from the original negative to print on the gelatinised plate, in order that the final picture may be a positive. The other necessity is that there must be a "grain" on the copperplate in order to give it an ink-holding capacity. This is effected by "laying a ground," as in the aquatint method, or by dusting the surface with resin or asphalt which is melted by heat—in both cases, of course, before the application of the gelatinous surface.

The etching fluid does not penetrate these fine points of resin, and the underlying copper is protected and remains in the shape of a number of minute pyramids, which prevent the ink being wiped out. The rest of the process of reproducing photogravure pictures is the ordinary method of copperplate printing, requiring, however, greater skill and care in its execution.

Whilst photo-gelatine printing is marked by the delicacy of its results, the characteristic feature of photogravure is its strength and richness, which may be further heightened in the various steps of the process as well as subsequently by the hand of the graver.

ERNEST EDWARDS.

Foreign Notes and News.

M. A. STREOLITZ gives the following formula for toning platinum paper:—

A.	
Neutral oxalate of potash	2 parts.
Phosphate of potash	1 part.
Water	1 litre.
B.	
Platinum potassium chloride	1 part.
Water	20 parts.

Just before using it, six parts of A are mixed with one part of B, the proofs are washed as usual and then toned. If one wishes to obtain black tints the proofs are placed for from twenty-five to forty minutes in the solution, which should not be shaken, when they will acquire a blue-violet tone which will turn black in the fixing bath. The proofs thus toned keep better than those toned with gold, as they are not affected by sulphuretted hydrogen or other gases. Fixing and washing takes place in the usual manner.

DR. COHN, of Breslau, has succeeded in taking a number of photographs of the eye by means of the magnesium flash light, among others of the eyes of a lady whose pupils had attracted attention by their difference in size. Dr. Cohn concludes that the phenomenon in question is due to softening of the spinal marrow, causing paralysis of the nerve controlling the expansion and contraction of the pupil.

At a recent meeting of the Berlin *Photographischer Verein* Captain Himly (a translation of whose article on *Hydroquinone* was published in a recent number of the JOURNAL) explained and exhibited Stirn's patent chronoscope. This newest form of camera shutter seems, according to his account, likely to be very generally adopted in the near future, especially as it can be employed for ordinary and instantaneous work. For ordinary work the time of exposure, from one to fifty seconds, is regulated automatically by clockwork, which sets the mechanism connected with the shutter in motion at any time desired, by an arrangement familiar to all acquainted with alarm clocks. All counting of seconds or other trouble is thus rendered unnecessary by the chronoscope; and the shaking of the floor, on approaching to put on the cap, which often gives rise to unsatisfactory results, is avoided. Amongst other advantages which were pointed out by those taking part in the discussion must be mentioned the fact, that in cases where long exposures are necessary the camera may be left by itself and some other operation proceeded with.

CAPTAIN HIMLY also read the report of the Testing Committee of Vienna on Lechner's universal hydroquinone developer, from which it appeared that this developer possesses no advantages and contains nothing new.

An article in the *Revue Photographique* discusses the means employed to make hydroquinone solutions "keep." According thereto a mixture of hydroquinone and sulphite is not very permanent. If compounds of soda be employed for developing Eastman's bromide paper, a very disagreeable yellow colouration is produced. The meta-bisulphite of potash is chemically more stable, but difficult to procure. Bisulphite of calcium, however, which is in more general use, and can be procured sufficiently pure and cheap, has been tried as a preserver of hydroquinone with much success. M. de Soehr, who is responsible for the above facts, further states that he added a 20 c.c. of a saturated solution to 180 c.c. of water, and dissolved therein one gramme of hydroquinone. This solution, he declares, proved absolutely permanent. All the ordinary precautions required by hydroquinone must of course be taken when using the above solution, namely, absolute cleanliness and an absence of hypo or iron salts.

Our Editorial Table.

THE CHEMISTRY OF PHOTOGRAPHY.

By PROFESSOR R. MELDOLA, F.R.S. London: Macmillan & Co.

A TREAT of no ordinary nature is in store for the careful reader of this truly excellent volume, which comprises a series of nine lectures, delivered as a special course at the Finsbury Technical College, and

addressed to a mixed audience, composed of chemical students and practical photographers.

Professor Meldola discusses his subject in a manner unlike that of most other writers on photographic chemistry, entering fully and deeply into the principles which underlie photographic action. Each lecture is followed by an appendix indicating experiments to be performed in substantiation of the doctrines enunciated in the text.

In one of his lectures (the sixth) the talented author explains why our modern emulsion processes have such an enormous advantage in the way of rapidity over the old wet plate methods. While the sensitiveness of the emulsion has much to do with it, a certain share is also credited to the developer, which, while it was necessarily acid in the wet process, in which free nitrate of silver was present as a sensitiser, becomes in the gelatine emulsion plate alkaline, and may also be used of greater strength. Some of our older readers may remember that the late Thomas Sutton strongly advocated a bromised wet collodion process, in which all free nitrate of silver was removed by washing, the plate being then exposed for a much briefer period than usual, and developed with an alkaline developer. In giving his reasons why it is safer to employ sodium thiosulphate (hypo) than potassium cyanide as a fixing agent for gelatine plates, the author says that the latter, being always alkaline, has a tendency to soften the film, and, moreover, has a slightly solvent action upon metallic silver, thus tending to reduce the intensity of the image in the medium tones.

The work is one of the "Nature Series;" it contains 370 pages, price 6s.

PRACTICAL AMATEUR PHOTOGRAPHY.

By C. C. VETTER, Leeds.

This is a pamphlet of sixty pages which sells at sixpence. It contains sound information, with formulæ for developing, toning, and the other solutions required in photographic practice. There are also hints on retouching, stripping films, copying, pinhole, orthochromatic and instantaneous photography. It will prove very useful for the beginner.

Fry's Film Slides.

Messrs. SAMUEL FRY & Co., Limited, have brought out a camera slide specially adapted for films, of which each holds two. There is a septum or division which is inserted through an aperture left at one end of the slide, and on each side of this division there is a recess capable of receiving a film and holding it flat. Although the sample sent to us is designated by Messrs. Fry as "only a rough model," and is made of some hard, light-coloured wood, we see no reason why it should not answer as well as mahogany. This one is well designed and well constructed, and from an accompanying price list we notice that it is also cheap.

VOIGTLANDER'S NEW RAPID WIDE-ANGLE EURYSCOPE.

MARION & Co., London, Sole Agents.

Is there any reason why a lens cannot in itself be at once a rapid, a group, and a wide-angle? Most emphatically it cannot—we would have said some time ago, and when optical flint and crown glass formed the materials of which our lenses were constructed. But *tempora mutantur*. We well recollect a conversation with Herr Voigtlander at the Crystal Palace Photographic Exhibition in the early spring of 1888, in course of which he told us of certain valuable, although at that time scarcely recognised, properties inherent in some of the stable samples of Jena glass, and which he had taken advantage of in the construction of certain lenses then being exhibited for the first time, and to which reference has been subsequently made in these pages.

This able optician has now made another departure from the beaten track in optical construction, and one which must prove of exceptional value, more especially to photographers whose studios are short, or those who desire to take a group without possessing the facilities for getting their cameras removed to such a desirable distance, as with an ordinary lens, will insure all the figures being introduced. The definition is unexceptionable. The new lens is one which possesses the property of working with an aperture slightly larger than the general run of the rapid doublet series, it being $f.7.5$; it is, therefore, well suited for portraits. But on slightly moving a lever, which projects through a slot in the side of the tube, an iris diaphragm comes into action, and the aperture may be diminished to a minimum whenever desired. Its large aperture and short focus render possible the including of an angle unusually large ($\approx 90^\circ$), and this with a very brief exposure, hence its utility for groups in studios of limited exten-

sion. Comparing one lens with another, this new rapid wide-angle euryscope includes 10° more of angle than the usual rapid euryscope of the same maker.

This new addition to the optical resources of the photographer will not fail to secure a warm place in the affections of the brotherhood. Messrs. Marion & Co., Soho-square, W., are the agents for this and the other productions of Herr Voigtlander.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,131.—"Taking Photographs Automatically in a Rapid Series with a Single Camera and Lens." F. GREENE and M. EVANS.—*Dated June 21, 1889.*

No. 10,133.—"An Improved Instantaneous Shutter for Photographic Purposes." W. P. O'REILLY.—*Dated June 21, 1889.*

No. 10,145.—"An Improved Photographic Detective Camera and Plate-changing Box." C. M. NEWTON.—*Dated June 21, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN AND CONNECTED WITH PHOTOGRAPHIC CAMERAS.

No. 10,823. WALTER O'REILLY, Edgware-road, Middlesex.—*July 26, 1888.*

This invention has for its objects to provide a cheap, diminutive, simple, and easy means of producing instantaneous photographs (to be taken in the open when necessary) and to dispense with a dark room or changing box.

Also a novel and simple instantaneous shutter.

In carrying out my invention I use for the ordinary dark back a metal receptacle of a suitable size and shape to receive the sensitive plate, and I attach thereto a tube or hollow projection made of some suitable material, in which, in a proper position, I place a simple or compound lens of glass or other transparent material so as to form a sharp image of the object to be photographed on the sensitive film.

I use for my combined cap and exposing shutter a disc closely fitting on to the end of the tube containing the lens.

This has a motion of opening and shutting imparted to it by the combination of two springs and a catch, i.e., the hinge of said shutter I preferably make of indiarubber strip, so that the tendency is to keep the disc shut.

The disc has attached to its edge near to the hinge a pin or projection on to which is engaged another spring, which may be spiral, loop, or other form, which tends to open the shutter, and it is stronger in its pull than the spring which keeps the shutter closed.

There is a catch placed in a suitable position, which prevents the stronger spring from opening the shutter, but which may be released by any of the well-known methods.

The result is that on releasing the retaining catch the shutter is pulled open by the stronger spring, but in this act the stronger spring disengages itself from the pin and the weaker spring pulls the shutter back again.

Another feature in my invention is the mode of introducing and abstracting the sensitive films, and consists in slipping a small light-proof bag containing the film on to the mouth of the dark slide, exposing it, and re-slipping the film bag into the bag, there being thus no chance of spoiling the said film by undue exposure.

While the picture is being taken the bag is held in position by two side springs or other contrivance.

I provide for showing which is the sensitive side of the film or plate by a mark or projection or indent on one side of the bag.

AN IMPROVED COMBINATION RECEIVING, DELIVERING, AND DISTRIBUTING APPARATUS FOR PHOTOGRAPHIC COATING MACHINES.

No. 5650. JAMES WILLIAM THOMAS CADRETT, Greville Works, Ashstead, Surrey.—*April 2, 1889.*

This invention has for its object to facilitate and insure the even and regular delivery and distribution of photographic emulsion on to and over glass or other surfaces to be coated therewith, thus obtaining thereon a film of uniform consistency.

To effect this I fit a coating machine with a combination receiving, delivering, and distributing apparatus, consisting of a combined trough and roller. The roller is formed on or fixed to the front of the trough, so as to form a cylindrical or curved lip thereto. Such cylindrical or curved lip may be either tubular or solid, while the line of its upper surface is preferably at a somewhat lower level than the line of the back of the trough. Suitable grooves or guides are formed or fixed on the inside of the trough at each end. Into these grooves or guides a division plate is fitted, thus dividing the trough into two longitudinal compartments. This division plate has suitable apertures formed therein, so that when the emulsion is fed into the trough it first enters the back compartment and then flows through such apertures into the front compartment, and gradually rises therein until it wells over the cylindrical or curved lip on to the glass or other surface to be coated with the emulsion. Or such lip may be fitted with a plate or other suitable equivalent, which is so placed as to form an inclined plane on to which the emulsion may flow, and thus be delivered in a sheet on to the surface or surfaces to be coated therewith.

Or the division plate may, if preferred, be made solid, and so fitted that a narrow opening is left between its lower edge and the bottom of the trough to allow the emulsion to flow under and into the front compartment, and gradually rise therein until it overflows the cylindrical or curved lip of the trough in the manner already described. I would here observe that I take care so to arrange the opening or openings in or under the division plate, that the emulsion shall

pass through or under such division plate at a level below the level of the emulsion in the back compartment, so as to avoid the generation of air-bells or bubbles.

In order to confine the overflow within proper limits, I paint the exterior surface of the cylindrical or curved lip either wholly or partially with emulsion, the portion so painted corresponding in width with that of the plate or other surface to be coated. By this means I cause the emulsion to rise and flow over the cylindrical or curved lip on to the surface to be coated therewith, at the same time that such overflow is limited in extent to the width of such painted surface.

When the division plate is perforated, I prefer to cover the same with a strainer of muslin, gauze, or other like fabric, through which the emulsion percolates as it passes into the front compartment of the trough, thus regulating its flow.

Either the division plate or strainer or both may be dispensed with and only the trough with a cylindrical or curved lip employed, but it will be found in practice that more accurate results are obtained by employing the apparatus complete.

The apparatus is mounted in suitable bearings, and is so arranged and fitted that its relative position to the surface or surfaces to be coated can be regulated and adjusted as desired. If desired, the cylindrical or curved lip may be covered with muslin or gauze or other like fabric.

My improved apparatus may be fitted to any photographic coating machine, provided that it be placed transversely to the plane of travel of the plates.

The claims are:—1. The combination receiving, delivering, and distributing apparatus, for coating glass and other surfaces with photographic emulsion, consisting of a trough provided with a cylindrical or curved lip, and fitted with a division plate and strainer, all substantially as hereinbefore described and shown. 2. As a secondary form of such combination receiving, delivering, and distributing apparatus, a trough furnished with a cylindrical or curved lip, and fitted either with a division plate or a strainer, substantially as hereinbefore described and shown. 3. As a primary form of such combination receiving, delivering, and distributing apparatus, a trough furnished with a cylindrical or curved lip, substantially as hereinbefore described and shown. 4. Fitting such combination receiving, delivering, and distributing apparatus, with a plate or other equivalent device, so as to form an inclined plane for the delivery of the photographic emulsion on to the surface or surfaces to be coated therewith, substantially as hereinbefore described and shown.

AN IMPROVEMENT IN REVOLVING PHOTOGRAPHIC CAMERAS.

No. 6886. CARL PAUL STIRN, 20 Park-place, New York, United States of America.—April 25, 1889.

My invention relates to that class of photographic instruments in which the camera is made to revolve during exposure, so as to obtain a panoramic view of the entire scene encircling the camera or of any desired portion thereof.

It consists in improved devices for moving the camera, and in a novel construction and arrangement of its parts, as hereinafter described and claimed, and has for its object to simplify the apparatus and render it more compact and efficient.

[Probably the precise nature of this revolving camera will be ascertained with sufficient fulness from the claims, which are as follows:—1. The combination with a photographic camera revolving upon a pivotal axis of a motor mounted upon the instrument to produce its revolution, substantially in the manner and for the purpose herein set forth. 2. The combination with a photographic camera, revolving upon a pivotal axis and motive mechanism actuating the same to produce its revolution, of an automatic stop to arrest its movement at each complete revolution thereof, substantially in the manner and for the purpose herein set forth. 3. The combination with a photographic camera, revolving upon a pivotal axis and motive mechanism actuating the same to produce its revolution, of an auxiliary adjustable stop to arrest it when it has made a partial revolution after being released from the first stop, substantially in the manner and for the purpose herein set forth. 4. The combination with a photographic camera, revolving upon a pivotal axis and motive mechanism actuating the same to produce its revolution, of the film-supply spool and the film-winding reel mounted within said camera, an intermediate guide roller geared to revolve in unison with the instrument, and over which the film is carried in passing from the spool to the reel for exposure, and pins on said roller made to engage the film to prevent its independent movement over the same, whereby the film is moved in synchronism with the movement of the camera, substantially in the manner and for the purpose herein set forth. 5. The combination with a photographic camera, revolving upon a pivotal axis, and with a film-supply spool and a film-winding reel mounted therein, an intermediate guide roller over which the film is carried and by which it is engaged, and a wheel fixed upon the pivotal axis of the camera and geared to said guide roller, of a motor geared to the film-winding reel to turn it, whereby the movement of the film, automatically produced by the motor, will cause a simultaneous revolution of the camera, substantially in the manner and for the purpose herein set forth. 6. The combination of the winding spindle, the coiled spring attached thereto at one end and to a fixed support at the other, a ratchet fixed upon said spindle, a toothed wheel revolving loosely thereon, a pawl carried by said wheel and engaging said ratchet, a stop to lock the wheel, the reel spindle mounted parallel with the winding spindle, the pinion upon said reel spindle gearing with the toothed wheel on the winding spindle, the head carried by said reel spindle, the detachable film-winding reel adapted at one end to be coupled to said head in alignment with the spindle, and the longitudinally adjustable pivot pin engaging the opposite end of the reel to serve as a prolongation of its axis, all substantially in the manner and for the purpose herein set forth. 7. The combination with the head of a camera stand or tripod, and with a toothed wheel fixed thereon, of a plate mounted to revolve upon the axis of said fixed wheel, a camera mounted upon said plate with the optical centre or transverse axis of the lens directly in line with the pivotal axis of the plate, a film-carrying roller mounted in the camera having devices for engaging the film led over it, a pinion fixed to the shaft of said

roller to gear with the fixed wheel on the stand, a film-supply spool on one side of said roller, and a film-winding reel on the other side thereof, whereby, as the film is moved by the action of the winding reel, the camera will be simultaneously revolved upon its axis, substantially in the manner and for the purpose herein set forth. 8. The combination with the head of a camera stand or tripod, the toothed wheel fixed thereon, the revolving plate pivoted to turn upon the axis of said wheel in proximity thereto, the camera secured upon said plate, a pinion mounted upon the camera and meshing with said toothed wheel, and a motor carried by said camera and geared medially to said pinion, of the elastic radial arms pivoted to turn independently upon the axis of the toothed wheel beneath the same, and the pins projecting from said arms to pass severally through either of a series of holes in the rim of said toothed wheel and into engagement with a single hole in the face of the overlying revolving plate, substantially in the manner and for the purpose herein set forth. 9. The combination in a photographic camera, with the exposing slit and the film-guiding rollers by which a sensitised film is held taut over said slit, of a perforating bar mounted to reciprocate transversely to and from the line of movement of the film and having perforating points projecting therefrom to penetrate the film when the bar is pressed towards it, substantially in the manner and for the purpose herein set forth.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 1	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 2	North London	Myddelton Hall, Upper-st., Islington
" 2	Holmfirth	
" 2	Sutton	Society's Rooms, Sutton, Surrey.
" 2	Sheffield Photo. Society	Masonic Hall.
" 2	Bolton Club	The Studio, Chancery-lane, Bolton.
" 3	Coventry and Midland	The Dispensary, Coventry.
" 3	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 4	Leeds	Philosophical Hall, Leeds.
" 4	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 4	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 5	Sheffield Camera Club	

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

A MONTHLY technical meeting was held in the small room attached to the Gallery, 5A, Pall Mall East, on Tuesday last, the 25th instant,—Mr. John Spiller, F.C.S., in the chair.

The CHAIRMAN, in making reference to the paper recently shown by Mr. Warnerke, and which only requires treatment with water after exposure in the printing frame, pointed out that iron was present, and a salt of this metal is apparently the sensitive material. The paper does not contain uranium, mercury, platinum, gold, or silver. All his efforts to tone the reddish image and to thereby obtain anything more agreeable than the rust-coloured image had been fruitless. The unexposed paper is instantly blackened all over by treatment with sulphide of ammonium. Mr. Spiller said his experiments had been far less complete than might have been desired, but he only had a piece of the paper about two inches square.

There was a good deal of conversational discussion as to the prints obtained by iron methods by Robert Hunt in the early days of photography.

Mr. FRIESE GREENE said that a simple solution of hydroquinone will serve well to clear yellow gelatino-bromide negatives or prints on gelatino-bromide paper. After fixing and washing, an immersion for a few seconds in a solution of hydroquinone—one part of a ten per cent. solution in sixteen parts of water—will clear away all yellowness. A moderate washing serves to remove the hydroquinone.

The next meeting will be the monthly technical meeting of July 23, an interval of four weeks.

After the formal meeting had terminated the desirability of organizing an outdoor meeting on the afternoon of the second Tuesday in July was discussed and generally approved of.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JUNE 18.—Mr. A. Mackie (Vice-President) in the chair.

Messrs. G. A. Powell, M. P. Powell, and F. W. Teversham were elected members of the Society.

Mr. B. B. FULLER showed some negatives taken at the excursion to Waltham Cross which were stained a uniform yellow-brown colour, which he wished to know the cause of. They had been put into an alum and acid bath without being washed after taking them from the hypo fixing bath.

The CHAIRMAN replied that this would probably be the cause of the stain, sulphur being deposited in the film.

Mr. G. J. Clarke showed an enlargement on the Ilford slow bromide paper, and also some very fine lantern slides from prints in an old book.

The CHAIRMAN stated that he had made some lantern slides from 10×8 prints, the method he adopted being to wet the prints and squeegee them on to glass; they were then copied through the glass and, being reduced to lantern size, were very sharp.

In answer to a question about lenses for copying, the CHAIRMAN said that he used a portrait lens, the focussing being much more easily effected with the full aperture of such a lens than with a slow one.

Mr. W. BISHOP showed a dropping bottle from Maw, the chemist, which he found very useful, the bottle being held upside down in the hand, the heat of which caused the air inside the bottle to expand and drive the solution out drop by drop.

Mr. W. Few showed a Thornton-Pickard instantaneous and time shutter which worked with a flexible blind.

Mr. W. Bishop showed a print by Mr. V. Blanchard's platinum toning process, and also some prints on albumenised paper toned by the same means.

Mr. CLARK having referred to the uranium plates, the CHAIRMAN stated that he had used them some years back and found them give very fine negatives, the colour of the image quite distinguishing them from ordinary plates.

During a short discussion on halation, the CHAIRMAN said that, in his opinion, the extent to which this was present in plates depended in a great measure on the development, it being possible to get any amount of halation from some subjects if the development were not suitable. For special subjects he recommended backing plates with burnt sienna ground in water, procurable at any oil shop, and mixed with gum-water to prevent its powdering off; a little methylated spirit added would make it dry quicker. This could be applied with a brush, or an indiarubber roller could be used.

Mr. J. Groundwater showed a Voigtlander's orthographic lens, the small back lens used lengthening the marginal rays, thus making the field very flat. The diaphragm in this case was behind the lens.

The CHAIRMAN remarked that this was a very good form of lens, and was much used formerly, when rectilinear lenses were very expensive.

On Saturday, June 29, there will be an excursion to Enfield, meeting at the Great Northern Railway Station. Train, first arriving after three p.m.

The next meeting will be on July 2, when there will be a discussion on *Defects in Plates*.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

JUNE 18.—Mr. VALENTINE BLANCHARD gave a demonstration of his new platinum process, which was greatly admired by the members present; questions were freely asked and some discussion entered into.

The HON. SECRETARY announced the subjects of five prizes for competition during the next session, beginning October 8, to which date the Society adjourns its formal meetings; informal conversational meetings will be, however, held fortnightly during this recess.

The meeting then joined heartily in wishing one of its members, Mr. Bell-Smith, a pleasant journey home to America, where he is returning after a nine months' sojourn in this country.

Mr. BELL-SMITH replied as follows:—As this is the last opportunity I shall have of attending a meeting of any photographic society in England before my departure for America, I cannot let it pass without giving expression to the appreciation which I feel for the many courtesies which I have received at the hands of the various photographic organizations which it has been my good fortune to visit. When I came to England, nine months ago, and began my series of public demonstrations it was not without some feeling of trepidation. I had heard, and have since had ample chance to verify, that the English amateur photographer was an extremely intelligent and well-informed man, and well posted in the art of picture making, and, therefore, if any one had anything to show them it must be genuine and of first-class merit in order to command their consideration. I had not long to wait to find that the subject of my demonstrations was one in which a great deal of interest was taken, and it has been a source of great pleasure to me to find that my efforts have been appreciated. Everywhere I have visited I have been treated with the utmost kindness and attention, in many cases I have been entertained in a manner that was exceedingly flattering; and I assure you that in returning home to America I carry with me recollections of a very pleasant and agreeable character that will not soon be forgotten.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JUNE 20.—Mr. B. Karleese (Vice-President) in the chair. There was a large attendance.

The HON. SECRETARY announced that excursions would be taken on July 13 (half day), to Tamworth; July 22 (whole day), to Shrewsbury; July 27 (half day), to Worcester; and that pictures for the Whit-Monday competition must be sent in to the Hon. Secretary (Mr. J. H. Pickard) not later than July 4, for transmission to the special Judges selected by the Council.

Dr. J. C. HUXLEY then gave his paper on *Platinotype*. He commenced with a short description of the chemistry of the process and a recapitulation of the various failures which might beset the tyro at starting, explaining the reason why, and how they may be avoided, &c.; then proceeded with a practical demonstration of the hot process, giving minute details and producing very fine pictures. The cold process was then gone into; and, lastly, the Pizzighelli paper. On comparing the results, the hot process received the most favour. In conclusion, he offered help to any member wanting further information in the manipulation of these processes.

In the discussion which followed, Mr. A. W. Wills, J.P., asked what sort of negatives were required for this platinotype process. He had tried it, and, to his idea, had failed with it. He considered his attempts produced flat, stale, and unprofitable pictures. He had been informed that his negatives wanted more "pluck," and had a want of contrasts of light and shade. Now he always endeavoured to obtain delicate negatives (without violent contrasts), and these gave him excellent silver prints.

Dr. HUXLEY, in reply, said Mr. Wills's negatives would give good platinotypes; in fact, a negative from which it was difficult to obtain a silver print would yield, by proper treatment, a good platinotype. He always sensitised his own paper (hot process), and when using a thin negative or one void of great contrast of light and shade he sensitised with a weak solution, and for a negative with great contrast a strong sensitising solution. (He here demonstrated the sensitising of the paper.) The full instruction, with paper and solutions, can be obtained from the Platinotype Company.

The fine results of these beautiful processes and the practical instruction given by Dr. Huxley was much commented upon by those present.

After the discussion, Mr. W. J. HARRISON, F.G.S., moved, as a recommendation to the Council, "That this Society endeavour to organize a photo-

graphic survey of the county or parts of the county of Warwickshire." Mr. GEORGE A. THOMASON seconded, and it was carried *nem. con.*

Portrait Painting as applied to Photography is the subject of Mr. G. J. Serchall's paper on July 18.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

JUNE 20.—Several members and friends, to the number of thirty, having chartered a saloon carriage on the Midland Railway, journeyed to Rowsley and from thence by carriage to Haddon Hall, being joined at Loughborough by a few members and friends connected with that Society. The weather was fine, and the party soon commenced work. Several good negatives were secured, and the return to Rowsley was commenced, where the party had tea. On the return journey they were met at Derby by several members of the Derby Photographic Society, inviting their attendance to an art exhibition in connexion with their Society. Time, however, not permitting, it was, with many regrets, resolved to postpone the pleasure, and to appoint a special evening for a visit to our Derby friends. One hundred and ten plates were exposed by the members, ranging from 10×8 to half-plate, with, as far as has been ascertained, excellent results.

Correspondence.

Our Correspondents should never write on both sides of the paper.

DAMAGED IN POST.

To the EDITOR.

SIR,—I sent some photographs through the post the other day and they are returned to me damaged. Will you, please, tell me who will have to pay?—I am, yours, &c.,
W. C.

[See leading article in present issue.—Ed.]

RENDERING GELATINE SURFACES ELECTRICALLY CONDUCTIVE.

To the EDITOR.

SIR,—The letter of Mr. Henry E. Davis, in last number, prompts me to say that it would be very desirable if some one would give us a practical disquisition on the best means of giving gelatine reliefs a conducting surface.

I used, several years ago, to have a fondness for making engraved copper plates from raised (or sunk) gelatine *clichés*, and for some time I was a good deal troubled in imparting to the gelatine a surface which should prove a conductor so good as to insure an almost instantaneous primary deposit of copper before the solution in the depositing cell should exercise any action upon the delicate image on the gelatine. Among the methods tried, some of them with entire success, was brushing over the surface with a mixed aqueous and alcoholic solution of nitrate of silver, and immediately reducing this to the metallic form by sulphuretted hydrogen. Phosphoric fumes were also utilised for this purpose.

Some of the bronze powders made by Bessemer also form good conductors, any or all of them being superior, in my estimation, to plumbago.

I once prepared, from pen-and-ink drawings, the whole of the cuts by which one of our medical works is illustrated, but in this case I took plaster casts from the raised gelatine (which was spread upon glass plates to receive the exposure), and prepared the printing surface alone by electrolysis. Paul Pretsch or Duncan C. Dallas, I am uncertain which, prepared gutta-percha with pitch in such a manner as to be useful for taking clean, sharp impressions from moist gelatine. Does any one know this method now?—I am, yours &c.,
ST. OLA.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, light portable whole-plate camera and lens in exchange for tricycle.—Address, E. F. USKESWOOD, Dorking.

Wanted, whole-plate camera with dark slide in exchange for a large camera in good condition, size 14×14, brass bound, leather bellows.—Address, A. SMITH, 233, Usbridge-road, Shepherd's Bush.

Tourist camera, 7½×4½, with leather bellows, all movements, and extending front, also Dallmeijer's rapid rectilinear lens with diaphragms; will exchange for a good quarter-plate set and difference adjusted.—Address, C. HARRISON, 13, Neal-street, Bradford.

- Half-plate camera (Menger's), three double backs, whole-plate lens, stand, &c.; exchange, tricycle.—Address, C. GIMMONS, 2, Avenell-road, Highbury, N.
- Wanted to exchange, a Lancaster's quarter-plate 1889 Instantograph, with two extra slides and Lancaster's Universal stand, for half-plate camera as above (must be 1889); will give a little cash.—Address, GEORGE J. WOODWARD, 17, Palmerston-street, Moss Side, Manchester.
- Will exchange rolling platform, six feet by three feet, for half-plate wide-angle lens; also Voigtlander's ten and a half inch focus orthoscopic lens and quarter-plate portrait lens for half-plate rapid rectilinear lens.—Address, R. S. JOHNSON, Photographer, Saxon-street, Dover.
- Will exchange a six-inch compound condenser in brass cell (new), two backgrounds (one interior and one exterior), also tree eight feet high, for a dissolving view apparatus or whole or half-plate landscape camera.—Address, COOPER & Co., Market-entry, Church-street, Inverness.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

P. Godfray, Jersey.—Two photographs of the Harbour and one photograph of the Esplanade, Jersey.

E. Brightman, Bristol.—Photograph of a sailor, entitled "An Old Salt."

J. H. LONDON.—So far as we are aware, dry plates specially adapted for positive pictures are not at the present time made commercially.

POET.—A series of articles on retouching, from the pen of Mr. Redmond Barrett, appeared in our volume for 1887; you cannot do better than study them.

A. W. A.—the crystals of hyposulphite of soda are discoloured, wet, and have an unpleasant smell, you may be sure that the salt is quite unfit for photographic purposes.

STILL.—It is quite correct that a licence is required even to distil water. The licence to use a still is ten shillings a year, but it must not be used for distilling or rectifying spirit.

W. B. S.—From an announcement in "Our Editorial Table" last week you will perceive that yellow-tinted screens for use with orthochromatic plates can be obtained from Mr. J. R. Gotz.

OPERATOR asks if the "dusting-on" process is a really good process for making reversed negatives, and, if so, where working details are published. The process is well suited to the work, and full working details will be found on page 466 of our volume for 1885.

R. R. R.—So far as we are aware, the Stannotype patent is still in existence. If this be the case, of course the process cannot be worked except by a licence from the holder of the patent. The Woodburytype patent has expired, and that process is open to all.

A. R. W. inquires which is the best for rendering paper prints transparent for colouring from the back, ordinary paraffin wax or bleached beeswax (virgin wax).—Of the two the paraffin is preferable, inasmuch as it is not so prone to turn yellow with age. The method of application is the same in each case.

ROSE.—As a rule, better photographs of flowers can be obtained with orthochromatised plates and a tinted glass screen, as you suggest, than on ordinary plates. The major portion of Mr. Henry Stevens's pictures were on ordinary plates, and the greater number of Mr. and Mrs. Payne's works were by the wet collodion process.

D. MILLER (Chicago).—Several articles have from time to time appeared on the subject, but they have been more or less suggestive. The most successful "workers in the production of typographic blocks in half-tone" keep the details of their processes as strict trade secrets. Possibly some of them might give you instruction for a suitable consideration.

AN AMATEUR OF TWO YEARS' EXPERIENCE.—The pictures are all very good as photographs, but, in many instances, they are defective as pictures owing to the composition. The chief fault in all is the foregrounds, which are blank and barren. If in the majority of the examples sent, an inch or an inch and a half of the foreground were trimmed off, the pictures would be much improved.

A. N. Z. says that he recently tried the back of a portrait lens for views in the same manner as he has been using the back lens of a "rapid symmetrical," but he could not get a sharp image.—This is not surprising. It is the front lens of a portrait combination that must be employed as a view lens, and with the convex side next the ground glass. Thus arranged it forms a good landscape lens.

CAUSTIC.—No definite proportion has been determined in which to add carbonate of ammonia to the hypo fixing bath. Very little suffices to remove the organic silver compound from the albumenised paper. In your case too much was probably added.

RUSTY.—So far as we can judge from the appearance of the prints, they should tone to a good colour. We strongly suspect you are over-toning for this sample of paper. From your description, we should surmise the sensitising bath is more acid than is desirable. Why not try another brand of paper, if you cannot get the tones you desire with this? We do not understand your meaning—"a trace of hypo in bath."

A. C. SINCLAIR inquires what is the heliotype process which was worked extensively some years ago, but has now, apparently, fallen into oblivion. He adds that "some of the very best photo-mechanical pictures I have ever seen were by this process."—The heliotype process is simply another name for collotype. As it was practised under this name many years ago, it differed somewhat in detail from the usual method of working, inasmuch as the printing film was stripped from the glass plate on which it was prepared and mounted on to one of metal. Now the prints are, as a rule, taken from the gelatine film when it is on the glass.

F. E. inquires: "1. Does the method of dividing the equivalent focus of lens by the diameter of stop give the ratio of speed of stop near enough for practical purposes with a rapid doublet lens of short focus (about four-inch)? I have a lens sent me in which the diameters of stops are smaller than they should be (according to the above rule), as marked by the makers; for instance, the lens is four and one-eighth inches equivalent focus, the stop marked $f/8$ measures only five-twelfths of an inch in diameter, which, according to rule, is about $f/10$; the other stops are in the same proportion. —2. Are they wrongly marked?"—1. Yes.—2. Wrongly marked.

A YORKSHIRE PHOTOGRAPHER writes as follows: "Some two years ago a clergyman in this neighbourhood sat to me for his portrait in his robes, the first and only time he had ever had his portrait taken. You were kind enough to make it copyright for me and I have sold a good number. Recently he has sat to a London firm, also in his gown, and a stationer here is selling copies. Can I not prevent him, as the portraits are in nearly the same position as mine and in the same costume?"—Certainly not. The gentleman can give sittings to as many photographers as he likes, and they can all make their work copyright if they choose. You cannot have a copyright in a man's face, though you may have in your photograph of it. If this be pirated the law will give you protection.

HACKNEY AMATEUR.—Yes, we did receive the lines written by Mr. Hubert. If or when the poetical gift is farther developed, and our friend becomes a Tennyson or a Longfellow, we imagine that he, looking back upon earlier efforts, will thank us for not crediting him with fourteen verses of which the following are average specimens:—

Printing takes only one-third the time	Results so fine which will last
Than the process of albumen fame;	In their kind quite unsurpassed
The advantage above all,	The Hackney Photo Club can't miss
Ease in working I should call.	In all its stages to discuss.

With a little more of the divine afflatus, and, possibly, the aid of a little calligraphic retouching, the author of the above will yet equal that of some high-toned verses which in bygone times used to adorn one of the American Western photographic journals.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Report received too late for insertion in this number.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, July 3, 1889, will be on *Copying*. Saturday outing at Hanwell.

MR. W. F. STANLEY has shown us an enlarging lantern he is manufacturing, or, to be more strict, that portion which serves to hold and illuminate the negative which is to be either enlarged or reduced. The body consists of a pyramid of a somewhat obtuse form standing on one of its sides, the inside of which is painted white. At the apex of the cone a magnesium ribbon is introduced, and this, when ignited, illuminates the sides of the cone, which forms thus a luminous white background for any negative placed in a suitable holder at its base. A metal shield interposed in front of the flame prevents any of the direct light from falling upon the negative. Any suitable camera may be employed in the enlarging or reducing of the image. The impression conveyed by the examination was favourable as to its serving the purpose intended in an efficient manner.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1522. VOL. XXXVI.—JULY 5, 1889.

PHOTOGRAPHIC LENSES AS TELESCOPE OBJECTIVES.

SPECIAL attention was directed by Mr. A. Mackie at the meeting of the North London Photographic Society on Tuesday last to an article of a somewhat extraordinary nature which appeared among the general contributions to one of the American photographic annuals for 1889, and in which the writer gravely recommends the utilisation of the back lens of a portrait objective as an object glass for a telescope, and an astronomical one at that. Well might Mr. Mackie have designated the suggestion as absurd, and well might the President have said that it was impossible the writer could have known anything about telescope object glasses, or even of the properties of the very lens he was recommending, else would he have foregone the pleasure of seeing himself in print in connexion with such a recommendation.

To imagine that the back combination of a portrait objective will serve as an object glass for a telescope is simply nonsense. Such a lens is an uncemented compound with a considerable air space between its component parts, and must of necessity have a large excess of negative spherical aberration to compensate the opposite kind of aberration of the front lens and flatten the field. It is, in fact, a correcting lens, and as to making the object glass of a telescope of it, much better to have borrowed the glass of a cast-off pair of his grandmother's spectacles, which would much better answer the desired purpose.

On referring to the article in question, we find that the author (whose name we suppress out of kindness) starts by saying that "Most photographers do not know that an excellent telescope can be constructed out of the lenses in common use in their galleries, but such is the case. The back lens of an ordinary portrait combination makes a very good objective, while a useful eyepiece can be made of an ordinary short-focussed plano-convex lens, costing but a few cents." He proceeds—"A well-finished objective, three inches in diameter, is worth at least fifty dollars;" and then goes on to say that the simplest way to construct a telescope is to unscrew the back lens of any good portrait combination and mount it in a tin tube blackened inside to prevent reflection. A diaphragm one inch in diameter is placed eight inches behind the lens, of which no diameter or focus is mentioned. An eyepiece is then placed at the further end of the tube and the telescope is complete.

This is just about as loose a way by which to construct a telescope out of a photographic lens as any of which we have ever been made aware, and it is one which will yield the worst results that one could well desire. With a whole-plate Darlot

back lens (about three and a quarter inches diameter) the writer says he has distinctly seen the four moons of Jupiter. Will it surprise him to be informed that the same phenomenon can be observed by one of the cheap opera glasses, and in a clear night by a sharp-sighted observer without any extraneous optical aid at all? Certainly there is no stereoscopic lens employed at the present day which will not with a suitable eyepiece show the Jovian satellites.

But the writer in question has just missed making a species of discovery. He employs the *back* lens of a French portrait combination. Let him remove the back lens altogether, and use the front lens convex side out, or next to the stars, and let him then employ a stop or diaphragm placed moderately near to the lens, so as to cut off some of the positive spherical aberration, and he will thus have a decent makeshift for an astronomical object glass. The *front* lens of a portrait combination, which is approximately of a plano-convex form, may be employed most usefully in other directions than that primarily intended; but the *back* lens when used alone in its combined form is, as our American friends tersely abbreviate it, "*n. g.*" What we have here said applies only to the portrait lens.

NEGLECTED PROCESSES—STANNOTYPE.

It is not a little surprising that the above process has, up to the present time, received so little attention on the part of photographers, seeing the excellent results it is capable of yielding. However this is not the only process, as most of our older readers are aware, from which great things were expected at the time of its introduction that has shared a similar fate. Other processes capable of producing, by mechanical and other means, prints which are equally as good as those in silver, have, like the stannotype, passed practically into oblivion. But for the necessity of the powerful and costly hydraulic press, and that the process was hampered by a patent, it used to be said that the Woodburytype would be largely worked by the profession generally. However, the patent has long since expired, and this beautiful process is now only worked by a few large firms.

When the stannotype—which is analogous in principle to the Woodbury process and capable of giving as good results, and which dispenses with the expensive hydraulic press—was first introduced, many were sanguine enough to predict that it would be extensively adopted by professional photographers, especially by those who required large numbers of prints for publication. As a matter of fact however, notwithstanding all that was predicted for it, and the excellence of the results

obtainable by it, we venture to say that at the present time the process is not being worked commercially by half a dozen people throughout the kingdom.

For the benefit of our younger readers who are not familiar with the two processes, it may be as well to explain wherein they differ, particularly as we have had several inquiries about the stannotype process of late. In the Woodburytype process a gelatine relief—essentially a carbon print in high relief—is made from a negative, and from this an impression is taken, in lead, in a powerful hydraulic press, a pressure of several tons per square inch being necessary. This lead impression, or mould, forms the printing plate. The printing process is this: The leaden mould is fixed in a press made for the purpose, a little ink composed of a warm solution of gelatine and pigment is poured on the mould, a piece of paper is laid on, and the lid of the press closed. This forces away all the ink, except that in the intaglio portions, so that when the ink has gelatinised, a perfect cast in the pigmented gelatine is obtained.

The printing in the stannotype process is conducted in precisely the same manner as in the Woodburytype, but the mould is different. Instead of a metal mould being made from the gelatine relief, the latter itself is employed as the printing mould after it has been protected by tinfoil. For durability the tinfoil is previously faced with nickel, steel, or other hard metal. Of course, as the gelatine relief itself forms the printing matrix, it must be made from a transparency instead of a negative, as in the Woodbury process.

Theoretically this method of procedure possesses some advantages over the Woodburytype, inasmuch as one is more independent of the character of the negative. In the latter process a vigorous negative is essential to the obtaining of sufficient relief in the gelatine. Hence a feeble negative may often have to be reproduced before it can be employed successfully. But when the gelatine relief is made from a transparency, the latter can, in its production, be made to any required density. From the above brief outline of the two processes it will be seen that in the stannotype the only things necessary for its working, which are not possessed by every photographer, are the printing presses, and these are by no means expensive, half a dozen or so being obtainable for a few pounds.

Some of the finest lantern slides produced are those by the Woodburytype, and, of course, equally as good ones may be made by the stannotype process. The great beauty of Woodbury slides is the extreme transparency of the shadows. Added to this the colour may be modified at will by the use of different pigments, and the density can be varied to any extent, according to the amount of colouring matter added to the ink. In making lantern slides no press is required in the printing. It suffices to simply press the piece of glass on to the inked mould for a few seconds, and then allow it to remain *in situ* until the ink has set. The same method of printing is pursued in making lantern slides by the stannotype process.

It will now be seen that in working the stannotype process for making lantern slides no other appliances are necessary beyond what are already in the possession of every photographer, be he amateur or professional. It goes without saying, if only one or two lantern slides were required from a negative, that either the Woodburytype or the stannotype would be a troublesome method of making them. But when a number are required the case is different; for when once the printing mould is obtained any number of slides can be quickly produced, with the certainty of their being all exactly alike. Furthermore, with

the same mould any variety may be obtained at will, simply by changing the pigment or varying its proportion.

Full working details of the stannotype process will be found in a series of practical articles in our volume for 1884, to which those interested in the subject are referred.

IN *Nature* last week is to be found an excellent engraving from a photograph of Professor Mendeleef, the eminent savant who recently paid a visit to this country. But the picture possesses some remarkable and objectionable points that may here be referred to, namely, in the manner in which the texture of hair is rendered. Almost the whole of the hair on the upper portion of the head is engraved so as to represent nothing so much as thin macaroni. The beard and moustache are excellent representations of the effect produced in a photograph when a sitter has moved his lips during the exposure, and so interfered with definition. Very likely the learned Professor moved while being taken, and so presented a problem to the engraver, the solution of which offers still another proof, if such were wanted, of the validity of our objections to the use of engravings from photographs, instead of mechanical photo-prints from the negatives themselves, for illustrating scientific phenomena. If it were possible to go so far from veracious representation of a familiar object, as happens in this portrait, to what extent are the pretty engravings trustworthy in regard to unfamiliar sights and material evidences?

THE material composing the sizing used for the papers employed in photography—silver printing especially—has always been understood to exercise an important influence on the character of the print and the mode in which the paper can be worked. Thus, a portion of the reputation enjoyed by Rives paper has been put down to the use of "resin size." It is clear then that a handy method of detecting the presence of resin in the size of a paper would aid in indicating its photographic value. Recently such a method has been described by Herr T. Morawski, and, as it necessitates the employment of no material of unlikely occurrence in a photographer's laboratory, we may here describe it. The paper is warmed gently with about a drachm of glacial acetic acid in a dry test tube, and, after cooling, a drop of concentrated sulphuric acid is allowed to flow down the sides of the tube; as the liquids mix, a colouration varying from bright red to violet indicates the presence of pine resin—the ordinary resin of commerce—in the sizing.

ONE of the strange turns in the wheel is shown in the employment of Rives so largely as is now the case. A quarter of a century or less ago we imagine that for one ream of Rives put on the market there were a score or more of Saxe sold, but at the present time the latter would seem almost to have died out of use. We are speaking of albumenised paper, and we are led to the belief through having observed the brands in use at many studios, and in no instance did we come across a single sheet of Saxe.

SPEAKING of scientific photographs, we should recommend as a capital subject for a popular *carte* at the present time a series of photo-micrographs of the British mosquitoes, several of which are permanent residents in this country. A short time ago a lively discussion was being carried on in the London papers upon this subject, the originating cause being a letter from an experienced traveller that he had seen and been bitten by real genuine mosquitoes on the banks of the Thames. After a series of letters had appeared the discussion was ended by the assertion of the common existence of English mosquitoes for many years back.

AT the last meeting of the Meteorological Society a large number of photographs of lightning flashes, taken during the storm of June 6, were exhibited, and excited much interest. They were over forty in number, and comprised a most varied series: there were the more ordinary, sinuous, meandering, and ribbon flashes, and, in addition,

pictures of knotted, multiple, and dark flashes. It is evident that photography will play an important part in elucidating the still abstruse mysteries surrounding the birth, life, and death of a "stroke of lightning."

A VERY interesting paper upon the effect of the absorption of ozone and of oxygen upon the solar rays was read at the last meeting of the Royal Society by Professors Liveing and Dewar, and in it they showed, under the effect of pressure, the presence of absorption bands in what used to be considered the specially photographic part of the spectrum. These bands had never before been observed the authors believed, and record was secured by means of photography. In another direction, on the Continent, M. Janssen had also been observing the absorption upon the luminous rays, but his chief difficulty was the supply of a sufficiently strong light through a long distance of air. Fortunately this difficulty has been overcome by the erection of the Eiffel Tower, which is about seven thousand seven hundred metres away from Meudon, and this in thickness represents approximately the thickness of an atmosphere having the same weight as the air surrounding our earth, and of density uniform and equal to that of the atmospheric stratum between sun and observer. By using a collecting lens, M. Janssen is able to obtain an intensity of illumination comparable to the sun's, and we may expect some very interesting results from the experiments and investigations he will make upon the absorption of the rays from the Eiffel lights in passing through six or seven miles of air.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

The following official circular has been issued:—

"LONDON MEETING, 1889, ST. JAMES'S GREAT HALL,
"PICCADILLY, W.

"DEAR SIR,—The Fourth Annual Convention of Professional and Amateur Photographers will be held in London, at the above hall, on August 19th to 24th inclusive. The proceedings, which will be opened by a conversazione, will include papers by eminent authorities, excursions, and lantern displays. An exhibition will be held daily of the latest and most improved apparatus, materials, and accessories; also photographs by eminent workers, as well as a separate exhibition of coloured pictures, on or from photographic bases, a new feature calculated to be of much interest. Large and influential local committees have charge of the Exhibition, Entertainment, and Excursions Departments. There will also be a collection of articles and works illustrating the history of photography. Programmes of excursions, with full details, and a list of convenient hotels, with their tariffs, will be forwarded to each member. The annual subscription is 5s.; a ticket of membership passes the holder to all meetings in the hall during Convention week. Members who desire to read papers or give demonstrations are requested to forward their names at once. Those who desire to exhibit apparatus or pictures will find conditions, regulations, and application forms accompanying this circular. The notable yearly increase in the number of members since the first Convention was held, the amount of good work done, the pleasure experienced by members, and the evident advantages arising from friendly intercourse between photographers from every quarter of the kingdom, lead to the conclusion that there is a vast future for the Convention. City and country, professional and amateur, art and science, dealer and customer, have here an unique opportunity of meeting and exchanging ideas, and the advantages of these Conventions have been not only theoretically argued, but practically felt and acknowledged. On account of the size, situation, and suitability of the hall acquired for this year, and as a commemoration of the JUBILEE YEAR OF PHOTOGRAPHY, the Convention of 1889 will, it is confidently expected, be a memorable event in the annals of photography. I trust, therefore, that you will support the Convention, and enhance its utility by your presence as a member. The names of those renowned in their various fields who have expressed their interest by becoming patrons of this year's Convention are a guarantee of the position the Convention now occupies in the worlds of science and art.—I am, yours faithfully, J. J. BRIGNSHAW, Hon. Sec."

The local Committee is a powerful and representative one, and with the London members of the Council are at present holding weekly

meetings to further the work in hand. The "Patrons" embrace the names of the highest dignitaries in the Church, the world of science and the world of art.

THE WHOLE ART OF PHOTOGRAPHY IN A SERIES OF EASY PROGRESSIVE LESSONS.

CHAP. VI.—THE INTENSIFICATION OF THIN NEGATIVES.

WHEN a beginner first tries his hand at developing a negative it is rarely, if ever, that he makes it right at the first, or even the second attempt. The most common fault is giving too long an exposure in the camera, and this is discoverable from the following symptoms: When the developer is poured over the plate, now lying on the bottom of a tray of suitable size, and is made to flow in an undulating fashion over the surface, *something* soon appears. Let us assume the subject to have been a house with trees and a sky. First of all, the portion representing the sky will begin to darken and show the outlines of the trees and house. But these quickly get merged into the sky, and all hope of making anything good of that negative must depart. It is over exposed, and, if washed and fixed, would only show a faint, ghostly image.

It is a characteristic of all over exposures that the images are thin and poor, but there are degrees in this fault, and when it is present to only a slight extent it is possible to render the negative sufficiently intense to yield a good print.

If the image is moderately bright, although thin, then is it possible to impart intensity to it; but if it be much veiled in the deep shadows, it is better to remove such veil previous to proceeding with the intensification. The principle on which this reduction of the image takes place is the application of a solvent, which acts slowly and uniformly, permitting of careful watching while the operation goes on, and of its action being immediately checked when once it is found to have proceeded sufficiently far. Of such reducing agents several could be enumerated, but of all these, a solution of iodine in cyanide of potassium for collodion, and a solution of ferridecyanide of potassium (red prussiate) with hyposulphite of soda for gelatine, possess special advantages. As we are at present speaking of the reduction of gelatine negatives, it is the latter that claims attention.

If a negative were placed into or had poured over it a solution of the ferridecyanide, the image would in a few seconds or minutes, according to strength of the solution, be converted into the ferro-cyanide of silver, which, being soluble in hyposulphite of soda, would ensure its total removal if plunged in a solution of that salt. But such a course would be attended with the disadvantage of the operator not being able to see how far to proceed with the prussiate. Hence it is desirable that the reducing bath consist of both of these agents, so that both actions proceed simultaneously, thus rendering the reducing action easy to be observed. The proportions first given by Mr. Howard Farmer for this purpose cannot be improved upon. The formula stands thus:—

A.	
Ferridecyanide of potassium	1 ounce.
Water	1 pint.
B.	
Hyposulphite of soda	1 ounce.
Water	1 pint.

To enough of B to cover the negative when laid in a dish add a few drops of A. Reduction commences immediately, and proceeds slowly. It is better to have but little of A present, else will reduction take place with too great a degree of rapidity. The action should be stopped when the deepest shadow in the picture begins to show as clear glass, after which the negative is subjected to a good washing. It will now be clear and bright, but too thin to yield a print. The mixed solutions should be thrown away, for although A and B will keep indefinitely when alone, they will not do so after having been mixed.

Next pour over the negative, or place it in a bath of a saturated solution of bichloride of mercury. This in a few minutes will cause a whitening of the image, the progress of which may be ascertained by raising the plate and examining the image through the glass. When the whitening has been effected, wash the plate so as to ensure

the total removal of the mercury, as any left in the film would cause stains in the next operation.

This white image can be converted into a dark one by several reagents, diluted ammonia being that most usually employed. Hypo-sulphite of soda, too, answers well, so does sulphite of soda. If the image be very thin, or it may be found desirable to impart more than the usual density to it, a solution of cyanide of silver dissolved in cyanide of potassium will be found most useful. To prepare this, pour into a twelve or fifteen-grain solution of nitrate of silver a rather weaker solution of cyanide of potassium, by which a dense precipitate will at first be thrown down, but which will be again dissolved by continuing the addition of cyanide.

The application of this to an image that has been whitened by mercury produces great intensity. There are other methods of imparting density to a feeble negative, but that just described will suffice for the present.

ECHOES.

THE idea of toning by a brush, spoken of in a leading article in last number of this JOURNAL, was, if I recollect aright, originally noticed publicly in 1862 by Mr. Heywood in the course of a communication to the Chorlton Photographic Society. It certainly is susceptible of being made useful by those who do not care to use expensive solutions in a lavish manner, and I think it would prove of exceptional value in such a process as that of Mr. Valentine Blanchard, in which a platinum salt is employed. But why not extend the idea? The localising of chemical action is a valuable adjunct to practice, and the application of a few drops of liquid here, there, or anywhere else on the surface of a negative, is undoubtedly conducive to effect, such being applied with a determinate aim. Is one portion of a negative weak? then apply by the brush the particular thing—call it intensifier, if you will—by which force is imparted, and so on, even to the application of local reduction.

Appropos of the imperfect fixing of the image by leaving in the substance of the gelatine or paper the double salt formed by the action of hyposulphite of soda on the haloid silver salts, the application of very hot water used to be considered a good test for the presence of such double salt. In prints, for example, if a stream of hot water were projected upon a print believed to be fixed and no change took place in its purity, except the slight lowering of tone almost inevitable upon the application of such a test, then was the print considered well fixed and its permanence might be relied upon. But if hyposulphite of silver were present—that intensely sweet-tasting compound with which experienced photographers are well acquainted—then does the hot water manifest the presence of the out-of-place compound by turning it yellow. Moral: Fix both negatives and prints well, so as to leave none of this compound in them.

Most willingly do I grant Herr Miethe the sole and uncontrolled use of such terms as "Anastigmatic Distortion," if he in return gives us the chance of obtaining his new lens, which he states embraces an angle more than most of us want, showing the edge and the centre of the field with equal sharpness, even with full aperture. If this equalisation of sharpness is on a flat plate, then results a positive gain over any other lens that I, at any rate, have yet seen. Think of an angle of 50° with an aperture of $f-6.5$, or of one of 90° with a small stop—and this with a non-distorting lens! or of a single landscape lens including a sharply defined field of 100° ! When, oh, when, are we to see in this country lenses possessing such capabilities?

Cock-a-doodle-doo! "We have," says L. H. Laudy to the amateur photographers of New York, "the best and cheapest farm implements, fire engines, firearms, fastest steamers, and best railroads, telegraph, photography, anaesthesia, sewing machines, electric light, telephone, phonograph, and, last, flexible films." We Americans, of course, were the discoverers or inventors of fire engines, firearms, steamers, anaesthesia, electric light, and photography. How long—how many years—does Mr. Laudy think was gelatine or collodion photography in daily use in this country before our good friends and brethren of the United States would even condescend to look at it? Is Mr. Laudy aware that the very man he eulogises as having made the first successful Daguerreotype portrait, and whom he calls "our

own countryman, Dr. Draper," was an Englishman, born near Liverpool, England? Is he aware that in firearms the superiority of the English is acknowledged so thoroughly in the United States at this very moment that nothing in this form is allowed to pass the Customs there without being mulcted in a heavy fine in shape of a protective tariff? Does he know how few are the years that have elapsed since the family that counts one of their number as the inventor of the telephone emigrated from this country to America? and lastly, is he aware that the inventor of the application of flexible films to photography, Mr. Carbutt, is an Englishman? For shame, to arouse national prejudices and antipathies among men who are, and who, with few exceptions, count themselves as brethren. There is, or ought to be, no nationality in science. How easily could I retort; but I won't follow Mr. Laudy's lead. JUNIUS.

LIGHTING THE SITTER.

III.

IN this article we propose to consider practically the effect of horizontal light upon the eyes of a sitter, with especial reference to reflections. We may assume, as an axiom, that a properly lighted portrait will show the pupil of each eye as a black spot, and that the cornea will be clearly defined in a considerable portion of its extent. The surroundings of a sitter, or the walls of a studio, may be divided into definite light and dark portions, which will be arranged in different ways, according to the direction in which the eyes are looking; thus the arrangement of blinds and reflectors adopted when the sitter is looking at the camera is different to that desirable when looking away from the camera.

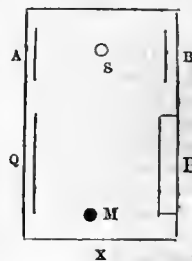
We are not at present considering the skylight, but simply the side-light, together with the walls of the studio, which are very important in connexion with the proper rendering of the eyes in a photograph. In order to reduce our theoretical reasoning to practical fact, we may apply to a modern type of studio the rules which are easily deducible from a consideration of the laws of reflection.

If we refer to our diagram, where *s* is the sitter and *m* the camera, we have, in the ordinary studio, the wall behind the sitter occupied by the background. There is a large side-light or casement at *p*, with a skylight above it; all the rest of the studio wall is usually built solid—i.e., without windows. In order to prevent the cast shadows being too harsh it is customary to paper the whole of the walls—*A*, *B*, *Q*, and *X*—with a white or very light material. The large window at *p* is generally furnished with blinds or curtains to alter or subdue the lighting, and there is usually in the studio a moveable frame, covered with white material, which acts as a reflector to give additional softness, when required, to the shadows on the face of the sitter.

Now in such a studio a person can undoubtedly be photographed after a fashion, and a recognisable portrait secured, but the eyes will be indistinct, especially in the case of blue eyes. The effect of light falling from all directions on the shiny eyeball is to have the whole area blurred by reflected light, precisely as if it were viewed through a bit of fog or mist which existed only over the eye. By having certain portions of the studio wall made dark we can remove this fog entirely.

We will commence with the wall behind the camera, which may be permanently covered with a dark material up to a height of about eight feet from the floor. In a double-ended studio this may be, and is, generally accomplished by having a background hung there. This background should preferably be a dark one if the studio is short. In the case of a long narrow studio, where the casement and skylight is some distance from the wall behind the camera, the necessity of a dark or non-actinic paper is less pronounced, as this wall will probably be in shadow deep enough to prevent an injurious quantity of light being reflected. But in a short studio the wall behind the camera should be of a decidedly dark or non-actinic character, it being a good rule that no light should proceed from the space near the camera.

With regard to the side walls, we may either have them wholly papered with a dark or non-actinic material, and have white blinds to draw down over them when reflected light is wanted, or we can adopt the plan of white-papered walls, having dark blinds of any suitable colour, green or brown for instance, to cut off injurious



light. Probably the first method is the best, as very often the white blinds will not be needed at all, the moveable reflector taking their place.

We will accordingly assume that the entire wall of the studio is repapered with a tint that will photograph dark, it may be a light yellow or orange, but a dark blue or grey would enable one better to judge of the lighting. With a paper of an orange tint, the shadowed side of the face would be lit with non-actinic light, and would appear much darker in the photograph than one might expect from the appearance of the sitter.

If our studio is narrow, a white blind may be hung on a roller to cover the wall at A. Another may also be put at n on the casement side; but this will be seldom required. As q is a wide space, it would require a very large blind to cover it, so it will be better sometimes to use the small moveable blind or reflector, which can be placed nearer to the sitter with its edge towards the camera. This reflector will answer quite as well as the large blind at q in the case of a single figure, though with a group the reflector would have to be larger and at a greater distance from the sitters in order to prevent it being in the way, so that with the group it might be convenient to have two white blinds to cover the q wall.

With a large studio, the q blind need not extend to the back corners of the studio. It may be hung at an angle with the wall and some distance in front of it, so that the edge is turned towards the place where the camera would be when photographing a group. Spring rollers are the handiest, fixed seven or eight feet above the floor, so that the white blinds can be drawn down to any extent by a pull with the hand. Two such blinds placed in a line would give a total white surface of seven or eight feet square, which would form a reflector large enough for any ordinary studio group. When single figures are being taken, these large blinds can be rolled or sprung up out of the way, and the smaller moveable reflector used instead at a shorter distance from the sitter.

If the studio is wide, say over ten feet, the blind at A may be similarly hung parallel to, and some distance in front of the wall, instead of being close to it; the advantage of this is that a smaller blind can be used. The efficiency of a reflector depends upon the distance; a white sheet, three feet square, placed a yard from the sitter will reflect as much light on his face as a sheet six feet square would if placed at two yards distance.

Thus we have now papered the inner walls of our ideal studio with dark paper; we have arranged a white blind at A, and a larger blind or pair of white blinds at q; we have also a moveable white reflector, which may be three or four feet square for use with small subjects—half-length figures, bust portraits, etc. Now for the adjustment of this apparatus.

If the sitter is looking at or near to the camera, which is assumed in all cases to be equidistant from the sides of the studio, we find that A, n, and x must be dark in order to preserve the pupil and the whites of the eye from reflections when viewed from the camera. As x has been made permanently dark, we need not consider this point; n being occupied by the casement, it is evident that the reflector must be at q, so either the large blinds at q can be drawn down to the desired extent or the small moveable reflector used instead, it being put in a position midway between the sitter and q, with its edge turned towards the camera. This general arrangement is to be followed with all sitters when the sight is directed to the camera.

Of course it is not necessary to use always the whole of the light coming through the ground or fluted glass of the casement, or to employ the full power of the reflectors by having them completely drawn down. These matters will vary with the individuality of the sitter and the artistic taste of the operator.

In the case of a group, it is desirable, in most cases, that the sitters should look in different directions; hence we cannot ask them all to look at the camera. We may direct one to look at the lens, another at a point two feet to the right of the camera, a third two feet to the left, a fourth may look out of the casement, a fifth at the middle of the reflector; in fact, when the blinds at q only are in use, the point of sight may be anywhere except near to the corners of the studio behind the camera, so that it must not be imagined that our rules admit of no variation of treatment.

Let us now consider another case. Probably the most popular position of the photographic face is the partial profile; the far cheek being in shadow serves as a dark background to the nose, while both eyes are visible. This position of the face naturally causes the eyes to look into the corner of the studio behind the camera. To avoid reflections, we find that this direction of the eyesight requires that q and x should be dark. It is now that the reflector at A is wanted; the blinds at q should be rolled up quite away. If the moveable reflector is placed

between the sitter and A it will answer the same purpose as the larger blind in the case of single figures, which will permit it to be placed at a comparatively short distance from the face.

In the case of a group, with merely the A reflector in use, we may direct the sitters to look at any point, except near to the camera and near to the middle of q. Thus one person may look at the corner of the studio behind the camera opposite the casement, another may look at the casement, others, with good profile features, may look at A or B.

When photographing a group it is unwise, to have both the reflectors, A and q, in use at the same time, as then we should be obliged to turn every face to A and n, or towards the casement, which would scarcely be desirable, except in a line of soldiers at drill, or some other unusual subject.

If circumstances—insufficient daylight, for example—demand such an amount of reflected light on a group that both A and q blinds must be used, we can make the best of the situation by directing the light or blue eyes to look out of the side window, while the darker eyes may look in other directions; but this device does not always give a satisfactory result, and should be regarded as a makeshift one.

ALBERT WM. SCOTT.

(To be continued.)

COLOURED PHOTOGRAPHS.—I.

It is usual for the artist of uncertain grade to look with contempt and scorn upon those products which form the subject of these papers. When they are asked by the ignorant to give an opinion upon some coloured works which may have photographic bases, they sum up with the simple remark, "They are after all" (however good) "*only coloured photographs*." Of course there are also artists, of whose grade or position there is no doubt or uncertainty, who appreciate the help and general usefulness of photography. The most I wish to express as my own opinion is, that I see no reason why a real artist should fail to produce a most meritorious and thoroughly artistic result upon a photographic base. In other words, to take portraiture, I see no reason why a photographic enlargement, painted, should not hang beside a painting pure and simple, and hold its own as regards style and treatment. Of course, to achieve such a result, knowledge must be the keystone of the work.

In these papers I will try to give the best means for acquiring a thorough knowledge of photographic colouring as practised by some of the most successful artists whom I have met during the past twenty years or so. And although I may not say distinctly whether the theories advanced are my own or those of friends, I of course shall not hesitate to take the responsibility that must naturally attach to my writings on the subject.

To many who have not the taste and perseverance necessary to acquire a thorough use of the brush, as well as a keen appreciation of the numerous, I might almost say inexhaustible, delicacies of colour, and who, at the same time, do not look down upon the common thing—a coloured photograph—photography may still be their friend. Every one has heard of photography in *natural colours*. Indeed, I think there are many who wish they never did hear of it; but this is purely a matter of taste, and may be traced more to the money lost, perhaps, than to any wear and tear to the brain in struggling to attain so desirable an object. To the votaries of *photography in natural colours* I can give one little advice—be patient. The more patient the reader is, and the longer he lives, the more likely he is to see the result so dear to him at last realised. He should pay greater attention to the latter condition than may appear at first necessary, but if things go on as they do at present, I think it will be more than a year or two before we can, with safety, consider photography in natural colours as an accomplished fact.

We are told, in some place or other, that we should be thankful for small mercies; but to photography the ordinary common or garden artist should be more thankful still. There are many who possess a keen appreciation for colour, and can apply the same with a delicacy and feeling truly artistic, but who are not at all worthy to be considered draughtsmen. To such as these what a boon photography must be! Photography supplies them not alone with an outline such as the most skilful draughtsman could scarcely hope to produce, but also all the delicate effects of light and shade are also secured. This being so, I maintain that a good man can produce a highly artistic work.

The basis of all art must necessarily be *form*; there are many cases, however, in portraiture where colour is almost as indispensable to render the likeness a striking one. There is not, in my mind, any class

of painting which gives such play to an artist's intelligence and sense of feeling as does portraiture. This may be readily seen by inspecting the works of our many great portrait painters. One will possess the gift that enables him to give life and expression (no matter what the style of work), while another will fail in these qualities, notwithstanding that his colouring may be good and his manipulation without any very particular fault. The power to impart life and vitality to a portrait I do not believe to be (if I may use the term) acquired. It must be born in the artist. There is something almost magic in the touch which can give life and intellect to a head. In a lesser degree an operator may possess this quality when photographing. I know photographers (good ones) who pose heads; they are good, so to say, and like the people, but they do not look *alive*, they lack "go," while others with the slightest turn of the head, be it up or down, more this side or that, it matters not, but they impart importance as a picture, and life-like resemblance as a portrait.

It is needless to say that when we try to get the very best effects in coloured photographs we should consider that all efforts, both on the part of the photographer as well as the painter, must be exerted to the fullest. They must work in union of sentiment, although they may not have the least connexion in business, and perhaps be even strangers to each other. If each be endowed with that artistic feeling which is so essential in the production of successful portraiture, when the photographer's work is placed upon the painter's easel there will be a kind of magnetism which the latter will feel, and which will enable him to carry out the portrait to a successful completion.

From the foregoing it may be gleaned that my remarks will be wholly applicable to portraiture. It will be well to bear this in mind, as many of the conditions laid down would not equally apply to the other branches of photographic colouring.

A portrait—to be worthy of a name, as well as to possess artistic merit—must have one great quality; it *must be natural*. By this I do not wish to infer that when it is *natural* it will necessarily be a portrait. Nature, in many of her aspects, is anything but beautiful, and it would be highly inartistic, not to say absolutely stupid, to depict the same on canvas, while we can, by a little care and study, select others that will show her to better advantage. The truth of this will be evident if we study some of the many examples of instantaneous photography. I have seen photographs of horses in positions, the most absurd positions, in fact, that it would be sheer madness to paint them in; yet they are *natural* all the same. As it is with horses so, too, is it with man. We have our stupid and absurd positions, and it would be folly to secure them in a portrait. There is a good deal of the brute about us men, and at times no small amount of the ugly. Would any of us like these qualities forced into prominence by an artist in a picture? I think I can safely say "we would not." I will also say that, putting aside our vanity (please excuse the pronoun), we are justified, on sound and artistic grounds, in objecting to such a treatment. Where beauty can be found it should be sought after, and where nothing but ugliness might exist its least repulsive form should be selected.

Man, under the many and ever-changing effects of light and shade, is by no means an easy subject to treat—artistically, I mean. All may be natural, but no artist would select them for a picture. Successful *portrait painting* (and the same refers to the photographer operating) is not accomplished by simply securing on canvas or paper a copy of what is undoubtedly natural. Intellect and beauty must receive the artist's best attention. It is this natural ability—in a painter or photographic operator to secure grace and beauty in the posing of his subjects—that gives its possessor an undoubted advantage over his less gifted fellow-workers. The point to be attained, then, by every true artist, or artistic photographer, is to portray nature under such favourable circumstances as will do justice to the intellectual character of the model, and at the same time invest it with the necessary amount of pleasing pictorial effect.

In this regard the painter has a very marked and appreciable advantage over the photographer, namely, *colour*. By judicious and skilful colouring a defective or offensive feature may be made to escape the eye of an ordinary observer, while the photographer, with his *monotint*, is more or less helpless, unless as far as the retoucher can aid him on the negative, and a further working up upon the print. But even all this may fail to hide the defect in the photograph, while, in the painting, *colour* will work like magic.

To obtain a really successful portrait is anything but easy to either the painter or the photographer. Indeed, it says much for the ability and artistic knowledge of many of our leading operators the rapidity with which they pose and despatch a sitter, yet secure a characteristic portrait. This, too, when some of our most illustrious artists seem to have needed as many as fifty sittings for a portrait. What a help a good and successful photographer would have been to such men,

The hours upon hours that might be saved both to artist and sitter!

Many times I have reflected upon the help that photography gives to an artist and the time it saves him. At the same time I believe it helps a really good artist comparatively more than it does the lesser lights. In this category I do not include artists who would be more correctly styled colourists.

In the question of *expression*, the artist has considerable advantage over the photographer. The sitter being absolutely free to do as he pleases, the painter may be able to catch the desired expression in the heat of conversation. He will catch that flash of intellectual expression which gives life to the picture and is the spirit, as it were, of the portrait. The photographer, on the contrary, when he is about to take the picture, whatever animation may have characterised the sitter before is subdued, if not altogether ruined, by the fatal "I am ready now—steady, please!" The mild suggestion to "look pleasant" seldom has the desired effect, and the sitter is as likely as not to put on an expression the like of which he may never before have displayed. This, needless to say, does not form a likely basis for a successful portrait. This, in many cases, the operator knows, and although he exposes the plate, feels sure it will be wasted.

There are many photographers who give no care to the study of the artistic bearings of a portrait, and leave chance to decide whether the portrait will succeed or not. A very usual cry, too, is, "Oh, the retoucher will put that right." Of course, this may or may not be so, and must necessarily depend upon the artistic training of the retoucher in question. I have known cases where a happy accident has been the means of gaining a successful picture; but this means of arriving at successful portraiture I cannot recommend as a good system to be followed.

I am glad to be able to state that many of our leading artists have done lately what they should have done years ago—taken up photography. I have not the least doubt but some sound good will come of it and an improvement be felt in photographic portraiture generally. Our efforts, therefore, must be directed with an eye on both sides, as our object must be to produce successful coloured photographs.

REMOND BARRETT.

THE ADAPTABILITY OF VARIOUS PRINTING PROCESSES, AND SOME REMARKS ON AN OLD PROCESS REVIVED.

[Camera Club.]

MANY amateur photographers seem to hold very decided views on the subject of printing, and we frequently hear condemnation of this or that particular method according as the tastes or fancies of individuals differ. I think, however, that if we take each process in turn and give it a fair trial we shall find that there are certain circumstances under which we shall do infinitely better and obtain more satisfactory results from negatives hitherto deemed incapable of printing artistic pictures than if we had adhered to our favourite method of procedure.

The means by which images from the negative can be produced are so many and various that it would be quite out of place to attempt to introduce them here, and I will, therefore, confine myself to those well-known methods more familiar to photographers of the present day. Foremost amongst these is, undoubtedly, the old silver albumen process, and, in spite of all that has been said against it, it seems yet to hold its own against them all. We sometimes hear that its days are numbered, and that silver albumen must sooner or later give place to one of its more modern competitors; but if we consider a moment I think we shall come to the conclusion that until the professional gives it the cold shoulder, or some less troublesome and cheaper printing-out process is discovered, silver printing has a long life before it. Certainly the mass of professional photographers, both in London and the provinces, although they occasionally have a platinotype or bromide print in their cases, show no inclination to abandon silver albumen. Much has been said about the want of permanence, but I have here over two hundred prints mounted with starch that have stood the test of twenty-five and thirty years in a London atmosphere without showing signs of deterioration, except in one or two cases where the hypo has not been effectually removed. For high-class portraiture on a large scale the palm must be yielded to one of the platinotype or mechanical processes: but the advantages of the old process are cheapness, softness, good detail, and variety of tone; the disadvantages—difficulty in keeping, owing to the decomposition of the albumen, want of latitude, and in many cases rapid fading of the image when continuously exposed to the light.

The next best known is probably the Eastman, and some very fine

effects have been obtained with this paper; opinions, however, vary so much with regard to the merits of the bromide and platinotype papers, and are in many cases so distinct and so decided, that it must be understood I am merely giving what experience I have gained on this head with due reserve. This paper I have found very reliable, giving fairly good results, but not suitable (in common with other bromide papers) for small work; its greatest charm is the large latitude which it allows, and it will give good results with the thinnest possible negatives, which would be useless with any other process. This consideration makes this paper very useful to that body of amateurs who are bold enough to admit that under certain conditions they have a sneaking liking for "rule of thumb;" and we have yet to learn that the "solution men," with all the paraphernalia of actinometers, view-finders, and algebraical formulae, are much ahead, or spoil less negatives, when quickness, skill, and judgment are necessary, as in instantaneous work. The objection to the bromide papers is, however, the development, which, from its troublesome nature and the length of time employed in the clearing, fixing, and washing, places it out of the race as the paper of the future.

A nearer approach to the great desideratum are the platinotype papers, especially the Pizzighelli, which in simplicity, and, presumably, in permanence, should leave nothing to be desired. It is, however, as yet on its trial, and it remains to be seen if any of the papers which require a medium—albumen, gelatine, or arrowroot—will be equal to those in which the image is incorporated in the fibre of the paper itself. The process of Mr. Blanchard seems in this particular (i.e., the direct deposition of the image in platinum or silver) to be a step in the right direction, the only objections being the necessity of fixing in the usual way and the addition of silver.

About 1840 Sir John Herschel invented what is now known as the cyanotype process; that abnormal salt, the ammonio-citrate of iron, probably owes its sensitiveness to the action of the organic acid. Kept in solution with ferri-cyanide of potassium, it in time throws down a Prussian-blue precipitate, even when kept in a dark place; but when exposed to direct daylight its action is almost as quick as the ordinary silver albumen. A nearly saturated solution is spread with a brush on damp paper and exposed in the ordinary printing frame, after drying, until the image appears. This is generally treated with a solution of ferri-cyanide of potassium, the result being a vigorous image of a bright blue colour. To obtain clear whites the paper must be used shortly after preparation or decomposition of the salt sets in. It must, for the same reason, be kept in a dry place. Treated with a neutral chloride of gold a brown or purple image results, growing gradually darker as the treatment is prolonged. Ferri-cyanide of potassium (yellow prussiate of potash) appears to give a positive picture. Nitrate of silver is also reduced in the usual way, and some of the baser metallic salts are also affected. Platinum I have not tried, but it seems to me that the ammonio-citrate of iron has been neglected in its capacity as a reducing agent for the higher metals, the preparation of the paper being so simple, the cost so small, and the field for experiment so wide.

I trust you will pardon the shortness of this paper, as my object has been more to raise discussion on this interesting subject, in the hope that some one may take it up with a view towards the discovery of a simple and direct printing-out process, than to call your attention to matters and methods of procedure so familiar to you.

ERNEST SEYD.

UNIVERSAL FORMULA FOR CALCULATING EXPOSURES FOR ENLARGING AND REDUCING.

(Camera Club.)

ANY formula which will reduce exposure to practical certainty is welcome. The author of this paper has worked out a formula for finding the correct exposure for enlarging and reducing which is simple to use. Necessity led to the calculation, for it appears that no such formula exists. The writer is indebted to Professor Fleming for suggesting a modification which simplifies the result:—

Let I = the area of image (i.e., the sensitised paper or plate).

O = the area of object (i.e., the negative).

F = focal length, or conjugate, measured from O to the optical centre of lens in inches.

f = solar focus of the lens in inches.

K = a constant multiplier, to make up for loss of light in passing through the medium (if any) placed between the light and negative, and in passing through the lens.

C = contact exposure in seconds, supposing that the medium (if any) placed between the light and negative is removed,

and the sensitised paper or plate is placed in contact with the negative, all other conditions remaining the same. (It is evident that, by regulating the quantity of light and varying its distance from the negative, C may be made any value, and can be easily determined by experiment.)

e = required exposure in seconds.

E = required exposure in minutes.

S = diameter of stop employed in inches.

n = number of diameters of I contained in diameter of O.

Now consider the following diagram, which speaks for itself:—

Let light fall on O, and confine our attention to a point of light at A; this ray, on passing, spreads out in all directions, and only a cone of these rays passes the lens limited by the size of S. The relation between the whole of the rays and this cone may be thus expressed: Suppose a hemisphere to exist on the lens side of O, with A as centre and F as radius, then it is evident that—

$$\frac{\text{Whole of light}}{\text{Light passing lens}} = \frac{\text{Surface of hemisphere}}{\text{Portion of surface of hemisphere bounded by stop aperture.}}$$

The numerator = $2\pi F^2$, and the denominator = $\pi(\frac{1}{2}S)^2$ (for the area of the stop aperture and the portion of the hemisphere limited by the aperture of the stop are virtually the same, the area being small).

Thus we may express the above relation by—

$$\frac{2\pi F^2}{\pi(\frac{1}{2}S)^2} = \frac{8F^2}{S^2}$$

This is one of the exposure factors, because the smaller is S the larger the fracture becomes, and consequently increased exposure.

The other factor is $\frac{I}{O}$, for the exposure will vary in this ratio; hence—

$$\text{Exposure factors} = \frac{8F^2 I}{S^2 O}$$

Taking K and c into account—

$$e = 8KC \frac{F^2 I}{S^2 O} \text{ and } E = \frac{2KC F^2 I}{15 S^2 O}$$

Since $\frac{O}{I} = n^2$, $\therefore \frac{I}{O} = \frac{1}{n^2}$; and, as well known, $F = (n+1)f$, $\therefore e = 8KC \left\{ \frac{n+1}{n} \cdot \frac{f}{S} \right\}^2$

Let c be made 1 second, and K = 2, that is loss = 50 per cent., made up thus: say 10 to 15 per cent. for absorption and reflection of light in passing through the lens, and 30 to 40 per cent. for loss of light due to the ground glass or other material interposed between light and negative.

$$\text{Then } e = 16 \left\{ \frac{n+1}{n} \cdot \frac{f}{S} \right\}^2 = \left\{ 4 \cdot \frac{n+1}{n} \cdot \frac{f}{S} \right\}^2$$

To find E let $\frac{1}{2}$ be taken as 4, which is near enough for practice.

$$\text{Then } E = \left\{ \frac{1}{2} \cdot \frac{n+1}{n} \cdot \frac{f}{S} \right\}^2$$

This formula gives results in minutes, and is easy to apply as well as to remember.

Example.

A lantern plate has to be made from a whole-plate negative. Arrange matters so that C = 1 second. Everything being properly adjusted, find exposure in minutes; n may be taken as 3.

Let f = 8 inches, and S = $\frac{3}{4}$ inch.

Then $E = \left(\frac{1}{2} \cdot \frac{3+1}{3} \cdot \frac{8}{\frac{3}{4}} \right)^2 = \left(\frac{2}{3} \cdot \frac{32}{3} \right)^2 = \frac{64^2}{9^2}$; $\frac{64}{9}$ may be taken as

7 for a practical result.

Then exposure is 49 minutes.—ANSWER.

If c = 2, 3, &c., then the result must be multiplied by 2, 3, &c.

Note.—When condensers are employed with a powerful source of light C becomes a small fraction, $\frac{1}{7}$ or even $\frac{1}{10}$. The best way to proceed in such cases is the following: Obtain the correct exposure in seconds, for one case, by experiment, and let this be called e';

$$\text{Then } e' = 8KC \left\{ \frac{n+1}{n} \cdot \frac{f}{S} \right\}^2$$

In this method of working the loss by absorption may be taken as 20 per cent.

Thus $K=1.2$,

$$\text{and } e' = C \cdot 9.6 \left\{ \frac{n+1}{n} \cdot \frac{f}{S} \right\}^2$$

$$\text{and } C = \frac{e'}{9.6 \left\{ \frac{n}{n+1} \cdot \frac{S}{f} \right\}^2}$$

Since the values for e' , n , S , and f are known, a known value is found for C . This once found, C becomes a constant for the condenser and lamp with which the experiment was made. The density of the negative has to be taken into account, but if a medium negative be used for this experiment, very little judgment is required to make the necessary allowance. Or the values for C may be obtained with two or three negatives of varying densities, so as to eliminate "judgment" altogether.

Note.—In accordance with Mr. Elder's suggestion the further simplifications of the formulæ are now given.

For general work—

$$e = 8 KC \left\{ \frac{n+1}{n} \cdot R \right\}^2 \quad (I)$$

and for condenser—

$$e = 9.6 C \left\{ \frac{n+1}{n} \cdot R \right\}^2 \quad (II)$$

Thus the usual ratio numbers on the stops may be employed, and if these are marked on the decimal system, then let S = number on stop; and since $R = \sqrt{10S}$, and $10 \times 9.6 = \text{approx. } 100$ and $\sqrt{80} = \text{approx. } 9$, we obtain—

$$e = KCS \left\{ 9 \cdot \frac{n+1}{n} \right\}^2 \quad (I)$$

$$e = CS \left\{ 10 \cdot \frac{n+1}{n} \right\}^2 \quad (II)$$

SIR DAVID SALOMONS.

THROUGH JAPAN WITH A CAMERA.

CHAPTER V.—AWAMORI—LECTURE IN THEATRE—JAPANESE FEAST—GAISHA.

On the night of Saturday, August 8, we were conducted by our entertainers of Hakodate, each armed with a coloured paper lantern, to a police boat, in which we were rowed to a steamer to take us to Awamori, the northern town of the mainland. The steamer started at about midnight, and we arrived in Awamori at about eight o'clock on Sunday morning. Of Awamori itself I have nothing to say that would interest readers. It is a fishing village, not very picturesque, and smelling very badly of decomposed fish. All the time of the day and a half that we stayed there was spent on business, including a lecture delivered in the theatre.

A Japanese theatre is not, in general structure, very different from an English theatre with only one gallery, the front of which, however, is not curved, but is rectangular. There are no seats, of course, but the eternal straw mats. A "front row box," in the place corresponding to the dress circle, is simply a portion of the floor partitioned off on the two sides and the front with boards about nine inches high, the back being formed by the step (about the same height) which makes the difference of level of two tiers. Such a box will accommodate six Japanese, but only about two Europeans, as these latter are continually in trouble as to how to dispose of their legs. The stage has a large circle in the centre arranged to revolve, so that one "set piece" may be arranged at the back, and may, when it is desired, replace that in front by simply revolving the platform. The performance begins in the morning, and lasts till about eight or nine at night. The acting is often very good; but still, some six or eight hours of a Japanese theatre is as large a dose as a European can stand, spite of the tea and bits of food which are served at intervals, apparently not at any fixed times, but just when the attendant thinks that the playgoer looks hungry. In the better theatres no actresses perform; but female parts are impersonated with wonderful correctness by men. I was rather surprised, after seeing all that I have described, to hear that it is considered here improper for young women to act on the stage. Perhaps the person who told me so was chafing.

In Awamori the theatre was crowded—to "see a foreigner speak," I was told. It was a strange sight to look down into the pit. It was filled with a mass of squatting and sprawling humanity. A number of the people had brought out very young children (rather, I suppose, than leave them at home alone), and most of them lay sound asleep on the straw mats quite naked. The people who were awake were mostly smoking. Not that the smoking was confined to the pit; we, who were on the stage, also relieved the monotony by cigarettes.

After we had left the theatre we went to an entertainment given to us by the chief officials of the town, and as this entertainment was in true

Japanese style, something quite new to me, or rather new for the first time at Hakodate, and as it was typical of various other entertainments that we had, I describe it here in some detail.

We assembled in a large room on the first floor of what was, I believe, a private house—a very large room, perhaps about forty feet by twenty feet. There were about twelve or thirteen of us, and we sat on the floor in a circle at one end of the room, or, more strictly speaking, in a sort of horseshoe form, open towards the unoccupied end of the room. I had the place facing the empty end of the room. I don't know whether it was the place of honour or not. A thing that was much more to the point I do know; there was a post at my back, which made sitting on the floor for several hours possible.

A never-ceasing succession of little lacquered wooden bowls with various kinds of food in them were brought in. In front of each eater is placed a small square wooden tray, supported a few inches above the floor level on four short legs; on this are placed the lacquer bowls. The food consisted of soup of various kinds, seaweed entering largely into the composition of this; of fish, raw and also cooked in different ways; and of various dishes, as to the composition of which I am unable to hazard even a guess. There is often chicken, but seldom any other kind of flesh meat. All have to be eaten with chopsticks, a thing not very difficult if one is once taught the right way, very difficult indeed if one is not. One stick is held quite rigidly between the fork of the thumb and first fingers. The other is held between the point of the thumb and those of the first and second finger. If the reader likes to try them—say with a couple of pencils—he will find that he can pick up small articles with greater ease than might be supposed. After a little practice it is easy to pick up anything, from a pin to an orange.

Shortly after our supper had begun a number of Gaisha appeared on the scene. Gaisha are singing and dancing girls, and take a prominent part in all purely Japanese entertainments, the Japanese holding the truly Eastern notion (with which I considerably sympathised) that it is very foolish for a man to dance and sing himself when he can pay girls to do it for him. Gaisha are, naturally, selected for their profession greatly on account of their beauty, and it is probable that many of the prettiest faces to be seen in Japan will be found amongst the professional singers.

At the entertainment that I am writing about the Gaishas sat in an inner horseshoe facing the guests, and began at once to make themselves agreeable, talking pleasantly, and helping the saké.

Saké, the national drink, is a sort of wine somewhat resembling very thin sherry. It is generally drunk hot, and is far from unpleasant. It is drunk out of very small cups or bowls, and the drinking of it, when several Japanese are together, is accompanied with some ceremony. Thus, when one of my entertainers thought fit to honour me by drinking with me, he washed his own saké bowl in a small basin of water which was in front of him and handed it over to me. It was filled by one of the Gaisha, and I, washing out my own bowl, handed it back to be also filled.

When the food was done, or nearly so, most of the Gaishas took themselves off to the clear part of the room, and there played, sang, and danced. The instrument used for playing is the samisen. It is more like a three-stringed banjo than any other instrument I know of, and the amount of noise that a skilful player is able to extract from a samisen is astonishing. I must confess that I have been unable as yet, at any rate, to cultivate a taste for either samisen playing or Japanese singing. The samisen makes a loud and harsh sound, and the singing appears like a sort of lamentable wailing in a minor key.

The dancing is a few degrees better, although it is not dancing at all as we understand the word, but is a mixture of posturing and a sort of acting. Every dance tells a tale, I believe, and I am told that when one understands the tale told by the dancing and singing combined, it is all very amusing. I can believe this, for once being given the thread of the story contained in a dance I followed it with considerable pleasure, a good deal of histrionic talent being exhibited. Moreover, some of the attitudes are very graceful. Still, whilst fully appreciating the charm- ingness of the Gaisha, I always felt that they would be still more charming if they were to leave their samisen at home and confine themselves to flirting, an art in which they are great adepts.

W. K. BURTON.

ON ALLOTROPIC FORMS OF SILVER.*

SILVER is capable of existing in allotropic forms possessing qualities differing greatly from those of normal silver. There are three such forms, or rather modifications of one form, differing from each other in many respects, but all more nearly related to each other than any one of them to normal silver. One of these forms is soluble in water, passing readily to an insoluble form; and this last may, by the simple presence of a neutral substance exercising no chemical action upon it, recover its solubility. Another form closely resembles gold in its colour and lustre.

Whether metallic silver shall be reduced from its compounds in its normal or in an allotropic form depends upon the reducing agent employed, so that it cannot be said with any certainty whether it exists

* From the American Journal of Arts and Sciences.

in its compounds in its ordinary or in an allotropic condition; the latter alternative seems at least equally probable.

These allotropic forms of silver are broadly distinguished from normal silver by colour, by properties, and by chemical reactions. They not improbably represent a more active condition of silver, of which common or normal silver may be a polymerised form. Something analogous has already been observed with other metals—lead and copper.

Much having been written, especially within the last few years, on the products of reduction of silver compounds, a brief summary of what has appeared may be desirable before proceeding further. The study of this subject has led to remarkable divergencies of opinion on the part of the chemists engaged in it. Almost all the views advanced have been successively disproved by each subsequent publication. It follows that what has taken place in text-books is almost wholly incorrect.

The earliest experimental work was Faraday's, but his product has been proved to be a mixture. The next was the well-known paper of Wöhler published in 1839. It is not my purpose here to enter upon a criticism of this memoir. If this illustrious chemist succeeded in obtaining by the means employed a true citrate of silver hemioxide—as would appear from his analysis—no chemist since his time seems to have done so. The next publication to Wöhler's was that of Von Bibra, who used Wöhler's method, and whilst affirming that he obtained a similar citrate, found an entirely different constitution for the corresponding chloride; for instead of obtaining a hemichloride, Ag_2Cl , he gives, as the result of fifteen concordant analysis, the constitution of his product as Ag_2Cl_2 . A citrate to yield such a chloride (if such a chloride exists), by the simple action of hydrochloric acid, could scarcely have the constitution assigned to it by both Wöhler and Von Bibra.

In 1883 Pillitz published two papers. He commences by disputing the probability of the existence of Ag_2O , on grounds of valency; namely, as implying that oxygen may be quadrivalent. Although it is very doubtful that any one has up to the present time succeeded in obtaining Ag_2O , the argument seems futile, as are many arguments deduced from supposed laws of valency. Similar reasoning would make Ag_2Cl impossible, which substance undoubtedly exists, and it would also deny the existence of K_2Cl , which stands upon such authority as that of Rose, Kirchhoff, and Bunsen. Pillitz carefully examined the so-called hemioxide precipitated by alkaline solutions of antimony and tin and could find no trace of Ag_2O in any of them. He did not examine Wöhler's products.

The first person to deny categorically the existence of Wöhler's series of hemi-compounds appears to have been Dr. Spencer Newbury. In two interesting papers he describes a repetition of Wöhler's methods, and declares it to be impossible to obtain products of constant composition. The red solution taken by Wöhler to be argentous citrate Dr. Newbury concludes to be a suspension of finely divided silver. Muthmann, after a careful examination of Rantzenberg's products, concludes that that chemist was wholly in error in asserting the formation of compounds of chromic, molybdic, and tungstic acids with silver hemioxide. He next studies the red liquid obtained by Wöhler's process, and comes to the same conclusion as Newbury, that it consists of finely divided silver suspended in water. I shall not dispute the correctness of this opinion in the case of the liquid examined by these two chemists; at the same time I cannot accept the tests of solution employed by Muthmann. That a substance will not pass through a dialyser shows that it is colloidal, and is no proof whatever that it is not in solution. Animal charcoal takes up many substances from true solutions. Decolourisation by animal charcoal is no proof whatever that the colour removed was not in true solution. By freezing, the molecular condition of a substance may be changed. Muthmann found that when the red liquid was mixed with gum-water and precipitated with alcohol the precipitated gum carried down with it the red substance, thence deducing that it was only in suspension. A solution of litmus was mixed with gum-water and precipitated by alcohol, the mass of the litmus went down with the gum, a trace only appearing in the filtrate. With Hoffmann's violet the same result. Yet no one, I think, will assert that these two substances do not make true solutions in water. Even, however, if these arguments could be admitted, they would not apply to the solutions presently to be described, which can be proved by optical means to be true solutions. I propose presently to show that silver may exist in a perfectly soluble form, dissolving easily and abundantly in water. Starting from this, it may show all degrees of solubility down to absolute insolubility; still, however, existing in an allotropic form and quite distinct from normal or ordinary silver. The solutions formed are as perfect as those of any other soluble substance.

Wöhler's process was next repeated by G. H. Bailey and G. J. Foster, who came to the conclusion that no citrate of hemioxide was formed, and that Wöhler's results must be neglected.

Von der Pfordten endeavoured to obtain hemi-compounds of silver by acting on the nitrates with an alkaline solution of sodium tartrate, and also with phosphorous acid. His determinations were made volumetrically, based on an opinion that a permanganate solution acidified with sulphuric acid would dissolve silver hemioxide but not metallic silver. Previously to receiving his paper I had found that sulphuric acid, even when diluted with ten times its bulk of water, was capable of acting upon finely divided normal silver and of dissolving an easily recognisable quantity.

Von der Pfordten's conclusions were thus vitiated entirely. It should, however, be remarked that the difficulties of the subject are extremely

great. In his last paper this chemist abandons his views as to the existence of silver hemioxide, so that at present the formation of Ag_2O by Wöhler's method, or by any other known method, is admitted by no one. That such an oxide may exist appears by no means improbable. The existence of Ag_2Cl and K_2Cl seems almost to involve that of Ag_2O and K_2O . This latter product Davy believed that he had obtained. The black substance which Von der Pfordten formerly regarded as Ag_2O he now takes to be silver hydrate, $\text{Ag}_2\text{H}_2\text{O}$.

The reduction products described by Von der Pfordten are strongly distinguished from those which I shall presently describe by two decisive reactions:—

1. None of his products could be amalgamated with mercury; all of mine readily amalgamate.

2. None of my products give off the slightest trace of gas when treated with dilute sulphuric acid; all of his do so.

Moreover, the difference of appearance is extremely great.

Early in the year 1886 I took up the study of the reduction products of silver in connexion with that of the protosalts. I commenced with Wöhler's process, giving it up after a few trials as affording no satisfactory results, and sought for a more reliable means. This I found (in March, 1886) in a reaction which I still use, namely, the reduction of silver citrate by ferrous citrate. At first, however, the results obtained were most enigmatical, the products very unstable and impossible to purify. Much time was lost, and the matter was given up more than once as impracticable. Eventually, by great modifications in the proportions, stable products, and capable of a fair amount of purification, were got. Even the earlier and less pure forms were beautiful; the purer are hardly surpassed by any known chemical products.

The forms of allotropic silver which I have obtained may be classified as follows:—

A. Soluble, deep red in solution, mat-lilac, blue or green while moist; brilliant bluish-green metallic when dry.

B. Insoluble, derived from A, dark reddish-brown while moist; when dry, somewhat resembling A.

C. Gold-silver; dark bronze whilst wet; when dry exactly resembling metallic gold in burnished lumps.

Of this form there is a variety which is copper-coloured, insoluble in water, and appears to have no corresponding soluble form.

PROPERTIES POSSESSED BY ALL THE VARIETIES IN COMMON, AND DISTINGUISHING THEM ALL FROM NORMAL SILVER.

All these forms have several remarkable properties in common.

1. *That of drying with their particles in optical contact, and consequently forming a continuous film.*—If either is taken in a pasty condition and is spread evenly over paper with a fine brush it takes on spontaneously in drying a lustre as high as that of metallic leaf. C when so treated would be taken for gold leaf, but this property is much better seen by brushing the pasty substance over glass. When dry, an absolutely perfect mirror is obtained. The particles next the glass, seen through the glass, are as perfectly continuous as those of mercury amalgam, and the mirror is as good. A and B form bluish-green mirrors; C, gold or copper-coloured mirrors.

2. *The halogen reactions.*—When any of these allotropic forms of silver are brushed over paper, and the resulting metallic films are exposed to the action of any haloid in solution, very beautiful colourations are obtained. The experiment succeeds best with substances that easily give up the halogen, such as sodium hypochlorite, ferric chloride, iodine dissolved in potassium iodide, &c. But indications are also obtained with alkaline salts, such as ammonium chloride, &c., though more slowly and less brilliantly. With sodium hypochlorite the colours are often magnificent, intense shades with metallic reflections reminding one of the colours of a peacock's tail. Blue is the predominating tint. These are interference colours, caused by thin films; but whether of a normal silver haloid or a hemi-salt cannot be said. When silver leaf (normal silver) is fastened to paper and a trial made the contrast is very striking. This matter will be more particularly examined in the second part of this paper, and is mentioned here as one of the reactions distinguishing allotropic from ordinary silver.

3. *The action of Acids.*—The stronger acids, even when much diluted, instantly convert the allotropic forms of silver into normal gray silver; even acetic acid, not too much diluted, does this. It is important to remark that this change takes place absolutely without the separation of gas. I have more than once watched the whole operation with a lens, and have never seen the minutest bubble escape.

4. *Physical condition.*—All these allotropic forms of silver are easily reduced to an impalpable powder. One is surprised to see what is apparently solid burnished metal break easily to pieces, and by moderate trituration to yield a fine powder.

A.—SOLUBLE ALLOTROPIC SILVER.

A solution of ferrous citrate added to one of a silver salt produces instantly a deep red liquid (ferrous tartrate gives the same reaction, but is less advantageous). These red solutions may either exhibit tolerable permanency, or may decolourise, letting fall a black precipitate. It is not necessary to prepare the ferrous salt in an isolated form, a mixture of ferrous sulphate and sodic citrate answers perfectly.

When, however, concentrated solutions are used with a large excess of

ferrous sulphate and a still larger one of alkaline citrate, the liquid turns almost completely black. It should be stirred very thoroughly for several minutes, to make sure that the whole of the precipitated silver citrate is acted upon by the iron. After standing for ten or fifteen minutes the liquid may be decanted, and will leave a large quantity of a heavy precipitate of a fine lilac-blue colour. It is best to adhere closely to certain proportions. Of a ten per cent. solution of silver nitrate, 200 c.c. may be placed in a precipitating jar. In another vessel are mixed 200 c.c. of a thirty per cent. solution of pure ferrous sulphate, and 280 c.c. of a forty per cent. solution of sodic citrate. (The same quantity of ferrous sulphate or of sodic citrate in a larger quantity of water will occasion much loss of the silver product). I think some advantage is gained by neutralising the ferrous solution, which has a strong acid reaction, with solution of sodium hydroxide, as much may be added as will not cause a permanent precipitate. To the quantities already given add about 50 c.c. of a ten per cent. soda solution. The reaction takes place equally well without the soda, but I think the product is a little more stable with it. The mixed solution is to be added at once to the silver solution.

The beautiful lilac shade of the precipitate is rather ephemeral. It remains for some time if the precipitate is left under the mother water; but when thrown upon a filter it is scarcely uncovered before the lilac shade disappears, and the precipitate takes a deep blue colour without losing its solubility. It may be washed either on a filter or by decantation with any saline solution in which it is insoluble, and which does not affect it too much. On the whole, ammoniac nitrate does best, but sodic-nitrate, citrate, or sulphate may be used, or the corresponding ammonia salts. Although in pure water the precipitate instantly dissolves with an intense blood-red colour, the presence of five or ten per cent. of any of these salts renders it perfectly insoluble. I have usually proceeded by adding to the precipitate (after decanting the mother water as completely as may be, and removing as much more with a pipette) a moderate amount of water; for the above quantities about 150 c.c. Much less would dissolve the precipitate but for the salts present; this much will dissolve the greater part but not the whole, which is not necessary. A little of a saturated solution of ammoniac nitrate is added, just enough to effect complete precipitation. M. CAREY LEA.

(To be continued.)

FIGURES IN LANDSCAPE AND GENRE.*

LUCKILY, besides mechanical objects of human use, which may serve in landscapes as substitutes for the presence of man, there are two whole classes of models which are practically free, at any rate, from self-consciousness, if they compensate for it by other failings—I mean children and animals.

I know that a small child is often justly a natural bugbear to photographers: "It is far sharper than a serpent's fangs to have a toothless child;" and in proportion as the infant learns to obey directions it loses naturalness. But there is an intermediate stage, and we must sometimes risk a plate or two on the chance of a good thing. Children soon forget constraint, and are generally ready for play: their feelings and expressions are more on the surface and more self-evident; even if they are not beautiful, they have a grace and freshness wanting to plain middle age; there are larger possibilities and greater adaptability about them; and, lastly, they are the only subjects for nude studies possible to photography.

A great deal of abuse has been heaped on the Academy Baby which blossoms in such large numbers every May at Burlington House, and the execrations and scorn were not altogether undeserved. In every corner there seemed to be a pinky infant or two with waxen flesh and vacant sentimental smile, and it was not only the corners or the sky lines which were so tenanted. But these darlings of the British matron were so bad because they were so artificial, and though the camera might not make them so sweetly pretty, yet it would turn out a version much closer to nature and much less repulsive to art.

To turn to history. No subject was more monotonously common than the Virgin and Child, to which was often added the infant St. John. This particular version of the religious picture would never have been so multiplied from ecclesiastical reasons alone, had it not answered to the requirements of art and the deeper needs and affections of human nature. But in spite of occasional traces of realism, of independent study from nature, childhood was hardly appreciated before the rise of the English school of painting, and there has been a further development in the present century. However this may be, much of the charm of children lies in fleeting expressions and sudden turns, and to capture these no means has yet been devised so prompt as the camera. If any one wants suggestions for subjects, they lie in abundance in Mr. Lonis Stephenson's *Child's Garden of Verses*; indeed, the whole book might be illustrated by photographs, if only they could be perfect enough.

From children to animals is an easy transition, for they have many merits and many failings in common. As the value of animals arises from the fact that they do not subject themselves to our will, and so retain their own natural expression and attitude, they are of necessity hard

to manage and to arrange. But they will stand a good deal of handling without acquiring the painful look of some worried adult human models; they are generally to be found in some appropriate localities in the fields (you remember Constable), and we need have no scruples about taking up their time or paying them for their services. Their fashions do not change in fur or feather; they have the beauty of nature with few of the drawbacks of civilisation, and they are near enough to humanity for their expressions to be intelligible, and yet different enough not to be anything else than inferior. Not only are they good in themselves, but they react usefully on any lord of creation who is taken along with them; they are so unconcerned and there is so much in their looks and actions to interest the man, that he may even forget himself for a moment and look as natural as his dog or horse. At times they are unmanageable, and both wear and cause expressions neither happy nor free from anxiety. Infinite patience and experience, many small devices and much knowledge of animal nature, may be necessary for success, but these are excellent things in themselves, and not too much to demand from the perfect photographer.

Of course, we are almost entirely confined to animals domesticated or semi-domesticated, and are at a great disadvantage compared with the painters, who can insert the shyest of birds or most nocturnal of beasts in a light and locality suitable to it, while we have been forced to conclude that unless the creature could actually have been seen and photographed in life, as it is shown in the print, it cannot be inserted at all.

For animals, as I have said, very short exposures are often useful, and sometimes absolutely necessary. I then dwell on the fact that certain instantaneous attitudes are wrong because they can never be seen by human eyesight, and so are not real to us; and I need not go over that ground again. But besides being offences against reality, they are also wrong in art, because they have not that permanency and stability which are required in a permanent representation. Dr. Stillman's theory of the horse in motion, as laid down in Mr. Leland Stanford's book, is "uniform support to the centre of gravity and continuous propulsion of each extremity in turn;" and many of the attitudes are such as can only be maintained for a brief instant. Now, though the best art often represents life and action, yet it selects the typical, the representative crises, and never the intermediate transitions. For instance, there was a picture posted all over London a few years ago, I think an advertisement of a "penny dreadful:" a girl throwing herself off a bridge was suspended between the parapet and the river, and never fell any further. If any copies of the abortion survive, no doubt she is there still, not an inch nearer to the water yet. In like manner some of these instantaneous attitudes are bad art, not only because they are unreal, but also because they are forced into an unnatural and incongruous existence—they are only possible as rapid transitions from one pose to another, yet they are isolated and perpetuated on paper which can never change or explain them.

GRAHAM BALFOUR, M.A.

[JACK AND I IN NORWAY.

BERGEN TO MOLDE.—III.

On leaving Bergen we took steamer to Molde, the furthest point we intended to go, taking all the surrounding places of interest, gradually wending our way back to Bergen again. We got on board the steamer close on midnight. It was quite light then; the porters hurrying with the passengers' luggage, and the knots of parting friends on the quay, could be seen as distinctly as if it had been midday. When it never gets dark like this we forget the time and wonder why sleepiness should overtake us. The boat was crowded to excess, and all the berths being engaged we had to put up with sofas in the cabin: passengers were lying about everywhere. We took about twenty-two hours to go this trip. The weather was beautiful, and we photographed from the deck of the steamer all the way, from early morning right on. Most of the pictures were taken at the various ports at which we called. At some of these places we stayed quite a long time; at one small port we lay for about a couple of hours. Here we made four exposures that turned out first rate negatives. We called at many places *en route*, but there is scarcely such a thing as landing at quays on the trip. The passengers and luggage are transferred from the steamer to the town in small boats, and the visit of the steamer seems to be the great event of the day, as looking over the side one can see the little boats dancing on the wavelets in dozens between the harbour and our ship—some of these on business intent, such as the post boat, others with passengers, and two or three more with the goods traffic of the place, but most of them come as pleasure seekers only, intent on seeing what the passengers are like to-day. One of the principal features of the journey was watching the loading and unloading of the luggage boats, as part of the cargo in most cases were horses and cows, and the swinging up of these poor brutes from the small boats to the deck of the steamer was always interesting. The variety of temperament displayed was a source of great amusement to us. We saw all sorts—some with energy and fire enough to bash out the sides of the boat if they had got free play, whilst others were so stolid and quiet that you could have done anything you liked with them. There was always a crowd on the hurricane deck during this performance of transhipment.

* Concluded from page 431.

Quite a crowd of the sporting class were on board on the way to their fishings and shootings. Jack got on very friendly terms with one gentleman, who was travelling with his family to his summer residence beyond Molde. He turned out to be an enthusiastic photographer, so Jack and he were in the thick of the art-science in no time. Every camera, lens, and shutter in the market were overhauled and descanted upon. The shutter that this gentleman used I never heard of before (but that's not wonderful), Forman's patent I think he called it; at any rate, it could do anything and everything. You could time your exposure from instantaneous right down to as slow as you liked. He did not care for the "Place" shutters we were working, but in spite of his adverse opinion I told him that for general utility I had found them about the best shutters going. They lacked one important thing, I allowed—one never could get the most rapid exposures with them. For ordinary subjects and conditions (always excepting very rapid exposures) I find it the best shutter to carry, even suppose you carried another one for extremely rapid exposures. Our English friend had everything of the newest construction at that place of his (he was not carrying them with him then), and the names of the makers that he gave us was sufficient guarantee that the apparatus must be first class. He spent the summer in Norway every year, and on this occasion he had brought along all his belongings—wife, family, friends, and domestics, in all about twenty, I should say, so that they spread themselves over the place pretty considerably; but they were a jolly lot for all that.

On board we had Birmingham men and Manchester men on the way to their yearly fishing. "Birmingham" especially was full of it, and talked fishing and nothing but fishing to everybody about. He had gone there for years; not a proprietor or fisher for miles round his little place but what he knew, not a season's take of any of them but he could tell you to a pound. It seems that they compare notes at the end of the season, showing who was first, second, &c., according to the success of their takings.

One advantage that you gain in travelling by water here is the way they arrange the fares. You are only charged at the rate of mileage direct to the place you book for, no charge being made for the many fjords that you are taken through on your journey, this on long routes being many miles, so that in lots of cases a day's sailing can be had at a ridiculously small charge; also deductions are made for families or parties, and when husband and wife travel together they are taken at a cheaper rate. The captain told me a good story about a man and his wife travelling by his boat. The husband came to get the tickets, and the wife, fearing that he might forget about the allowance, called out to her husband, "Don't forget your wife," when the captain with a smile replied to her in English, "We never forget our wives in Norway."

Out from Aalesund on our way lay the Island of Lepsöe, which has become a spot of considerable interest since Mrs. Mount from Shetland, the lonely woman of the ocean, was driven in upon its friendly shores. All will remember the interest the incident created at the time. On a voyage from one port to another in the Shetland Isles the smack *Columbine* had her skipper washed overboard; there were only two other sailors on board, who immediately lowered a boat and set out in search of their captain. Their search proved unsuccessful. On turning to come back to the smack, what was their horror to see it under weigh and speeding along at such a rate that it was beyond all hope to get near it, and only one poor woman on board, also an ailing woman, who had been on her way to see the doctor. This was Mrs. Mount, and she was given up for lost. After a week's buffeting with winds and waves, and having no food on board save a few biscuits, worn out and nearly dead, the boat in which she lies drives in and lies stranded on the shore of the Island of Lepsöe, where the kindly natives attend to the helpless wanderer, who when restored returns to her native land and becomes the heroine of the day.

When reaching Edinburgh on her journey back she was photographed of course, and thousands of her pictures were sold. Some showman wanted to engage her at a big price, but she preferred going home; she thought she had travelled far enough.

We got into Molde about 10 o'clock p.m., and were put out in a small boat from the middle of the bay. Stayed at the Alexandra Hotel, where we had very comfortable quarters. Being amongst the first, if not the very first, visitors of the season, the landlord's face beamed all over smiles when he saw Jack, for he knew him at once. "I hope you bring good luck for the summer," he said, as he grasped his hand. Jack without a moment's hesitation promised him a good season.

In the morning we were up early and out with the camera. The sun was shining brightly and it was delightfully warm, the heat tempered by a cool breeze from the snow-covered mountains that surround the town, the snow looking quite pink in the red rays of the morning sun. Molde is but one street that zigzags along the shore, terminating at the end nearest our hotel in a picturesque avenue of small trees. The mountain at the back of the town is the spot from which the visitor obtains the most extended view of all the surrounding fjords. The most of the houses look old and antiquated, except the hotels; they are all made of wood. The shops are meagre, small-windowed places, with a poor array of stock; in one or two of the old silver shops they showed about six or eight ounces of manufactured goods in the windows, and the interior looked as if there was not much more there. The places of business comprised the furrier, the general dealer, and the old silver shops, and all of these are of the most primitive order.

There is a lepers' hospital at Molde. There are three altogether in the country—one here, and one each at Bergen and Trondhjeen. We understood that we might be allowed to visit the one here, but it was too sad a sight and we did not go. Why Norway should be so subject to such a terrible disease is not well understood; the living so much on fish, and that being partaken of to a large extent in a raw state, is assigned as a likely cause. They say that it is being gradually stamped out, which must be a source of great comfort to the natives of the country.

We got some good pictures of the place, considering our limited stay—one very good one of the Alexandra. We then started on our further journey in a little steamer called the *Molde*, not nearly so big as one of our river tugs, and after a twenty miles' sail we landed at Veblungnes.

MARK OUTR.

Foreign Notes and News.

The French Minister of Commerce has appointed a Committee for the purpose of organizing an International Photographic Congress to be held during the Paris Exhibition. The Committee, headed by the well-known astronomer, Prof. Janssen, have already commenced work. The Congress will meet from August 6 to August 17, and discuss the following subjects:—(1) Introduction of a uniform photometric unit; (2) Uniform measurements of focal lengths of objectives; (3) A uniform scale for the determination of the photometric effect of objective diaphragms; (4) Uniform periods of exposure in instantaneous work; (5) The adoption of a uniform and easily applicable method for fitting different objectives on to cameras; (6) A universal form of plate; (7) A uniform terminology for photographic operations; (8) Universal agreement of photographic formulae; (9) Uniform adjustment of Customs procedure with regard to substances sensitive to light; and (10) Protection of artistic copyright in photographic works. A Conference, in which the work of the Congress will be publicly discussed, is to take place on August 20.

PROF. DR. VOGL has been raising the question of the sensitiveness to colour of erythrochrome silver plates, which he maintains act quite well without the employment of a yellow disc, and instances photographs taken by the thousand for the last five years by Braun (Dornach), Hanftaengl, Bruckmann, and others, on eosine-collodion plates for which no light filter was employed. We must, however, remember that collodion plates possess relatively to gelatine plates a much greater sensitiveness for yellow than blue; and consequently that it does not follow that the yellow disc may be omitted with equally good effect in the case of these latter.

PROF. DR. J. M. EDEN has been examining the crystallised hydroquinone manufactured by Dr. H. Byk in Berlin, which contains $\frac{1}{2}$ to $\frac{1}{4}$ per cent. sulphurous acids, and has also compared it with the ordinary white variety. The former, both in simple solution and in the presence of sodium sulphite and alcohol, proved itself to be markedly more permanent than the latter, and to preserve its pre-eminence, though less noticeably in this respect, even when employed in developing solutions containing alkalis; the developing capacity appeared the same in both.

Our Editorial Table.

W. B. BOLTON'S FILM CARRIERS.

SINCE Mr. John Carbutt, of Philadelphia, hit on the happy thought of substituting translucent films of celluloid for glass plates as supports for sensitive gelatine films, the means for keeping these films rigid while in the dark slide have exercised the inventive faculties of many. The film carriers before us form the outcome of the consideration and the inventive abilities of Mr. W. B. Bolton, and they are withal so good and so simply made as to put in the shade anything we have previously seen. They are formed of an exceedingly thin plate of metal, with two edges turned over so as to retain the flexible films *in situ* and closely pressed against the supporting back. On the reverse side the opposite edges are also bent over, and thus render it capable of receiving another film. Each film carrier is thus composed of a thin metallic plate, to which two films are attached, the one by the sides and the other by the ends.

These film carriers are rigid and remain flat. They will prove of great convenience where space is a matter of consideration, as quite a large number of them can be carried in the inside of one of our ordinary double dark slides. A patent has been applied for for this

invention, which, from its intrinsic merits, will certainly secure for itself a large demand.

Since writing the above we have received from Mr. J. M. Turnbull, 6, Rose-street, Edinburgh, one of the film carriers which he manufactures. It consists of a plate of thin metal with the edges turned over in three directions, under which the film is slipped and kept in position by these overlapping edges. It will, no doubt, answer well its intended purpose.

JAMES MARTIN'S NEW PRICE LIST.

THE trade price list of Mr. James Martin, of 4 Park Villas, New Southgate, N., is neat and methodically compiled. Mr. Martin's speciality is printing and enlarging, and one can at a glance ascertain the prices, plain or vignette, of every size of print from the smallest to the largest, in either albumenised silver, platinotype, aristotype, bromide, or ferroprussiate. Equally well classified are the enlarging, mounting, copying, and finishing branches of Mr. Martin's establishment. Mr. Martin's skill in these several departments is too well known to need allusion.

JONATHAN FALLOWFIELD'S MONTHLY PHOTOGRAPHIC REMEMBRANCE AND TRAVELLER.

THE monthly differs from the magnificent annual of this well-known firm in that it provides for the special requirements of the month in contradistinction to those of the year. This one is a double number for the midsummer months, and contains a classified and copiously illustrated collection of those photographic appliances specially suitable for the season—and not for one season only, but for all times. All kinds of plates, all makes of paper, mounts, chemicals, and requisites in general are here to be found.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,307.—“An Improved Form of Photographic Plate and Film Holder or Double Back.” G. CLULOW.—*Dated June 25, 1889.*

No. 10,393.—“Improvements in or relating to Films or Supports for Photographic Negatives or Prints.” Communicated by F. Crane. J. S. FAIRFAX.—*Dated June 26, 1889.*

No. 10,418.—“Improvements in or connected with Photographic Printing Frames.” H. J. SHAWCROSS.—*Dated June 27, 1889.*

No. 10,504.—“An Improved Method of Deciding the Correct Exposure in Platinotype Printing and Apparatus therefor.” C. R. CRAWFORD.—*Dated June 28, 1889.*

No. 10,535.—“The Novel Reproduction of Oil Paintings, Drawings, or Photographs from Nature, Patterns, and Stuffs.” Complete specification. H. BOGAERTS.—*Dated June 28, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 1278. HENRY NORTON BUTLER GOOD, Shrewton Lodge, Devizes.—*January 23, 1889.*

This invention relates more especially to photographic cameras in which pictures are taken upon a film or strip of sensitised material, the position of which can be adjusted as and when required, so that after each picture has been taken a fresh part of the sensitised strip can be brought into the proper position to take a fresh picture, and so on until the whole of the sensitised strip or film has been utilised.

In such cameras as heretofore used the strip or film of sensitised material is wound upon a roller which is inserted into a separate slide and attached to the camera, and is wound off the said roller as required, and rewound (after the pictures have been obtained upon the sensitised surface) upon another roller carried by the removeable slide; and my present invention has for its objects novel methods of construction by which the camera and lens, and the devices for carrying and moving the film as required are united in one, instead of being separate, space is greatly economised, and the entire apparatus is very cheap, light and portable, and effective.

It is more especially applicable to small cameras in which a series of instantaneous pictures can be taken at any desired moment.

My improved apparatus consists of a box or case of suitable size, preferably rectangular, and of wood or other material. In front of this box there is an opening provided with an instantaneous or other shutter of any of the ordinary well-known kinds by which the opening can be opened or closed for the purpose of obtaining a picture.

Behind the shutter I arrange in the box a transverse partition carrying a lens of the required size and focus, and at the back of the partition I arrange two lateral vertical partitions, the front edges of which join the front partition at each side of the lens, whilst their back edges separate until they nearly reach the sides of the box at a short distance from the back. In the angular spaces thus formed behind the front partition I arrange the holding roller or spool and the receiving roller respectively, the former having the sensitised strip or film wound upon it, the end of the strip being led from it backwards, then across the space between the back ends of the lateral partitions, and again for-

ward to the receiving roller, to which it is fastened, so that when the latter is turned round the strip is wound upon it, and at the same time unwound from the full roller or spool.

At or near the back edges of the lateral partitions I arrange vertical rollers or guides, preferably of glass, or of wood or other material covered with glass, round which the film passes and is guided with very little friction or risk of abrasion. Upon the interior surface of the top and bottom of the box or camera, just in front of the sensitised strip or film, as it passes across the back, I arrange two transverse strips of wood or other material, behind the edges of which the edges of the strip pass, and against which they are pressed with sufficient force by a flat plate of vulcanite or other suitable material, which is pressed against the back of the strip by a screw passing through the back of the box, or by other equivalent device.

At the back of the vulcanite plate a transverse metal spring is arranged, one end of which is fixed to one edge of the plate, whilst its other end is pointed, and is sufficiently long to be bent forward and project slightly in front of the plate.

When the film or strip has been adjusted in the proper position to receive a picture from the lens, the vulcanite plate is pressed forward by the screw so as to hold the edges of the film firmly in position against the top and bottom strips, the point of the screw first pressing forward the spring, the pointed end of which marks the paper from the back sufficiently to indicate the position of the picture upon it when it is ultimately removed from the rollers for the purpose of being cut up and developed in the usual way. Small springs are arranged to press back the vulcanite plate from contact with the back of the film when the pressure of the screw is withdrawn.

In one of the angular spaces first described between the front partition and the lateral vertical partitions, I arrange a vertical roller, against which the film or strip presses, and which is made to revolve by such pressure when the rollers are made to revolve and draw the strip forward.

The axle of this roller passes through the top or bottom of the box or camera and is provided with a toothed pinion actuating an indicating device, by which it can be seen when the film has moved exactly sufficiently forward to present the proper surface for a new picture, and also if desired to show the number of exposures which have been made and pictures taken.

The rollers which carry the sensitised strip or film are made readily removable, so that they can be taken out and replaced as desired, their centres turning upon screws in the top and bottom of the box or camera, which can be screwed up or unscrewed as desired. The receiving roller is fitted at one end to a socket, either end of which can be turned round by a suitable key or handle for the purpose of turning the roller and so causing the strip or film to pass behind the lens as already described. I prefer to make the key removable and with a solid end, square or of other suitable form, which fits into a corresponding hole in the end of the socket which turns the receiving roller; and the same key may also fit into similar recesses, which carry the other centres for the rollers, and in this way no projecting part is necessary outside the box or camera.

Either or both the rollers may be provided with ratchet wheels and pawls, or their equivalents, by which the rollers are prevented from turning in the wrong direction, and spring or other brakes may be arranged so as to press upon the strip upon the rollers, or upon brake wheels upon the roller sockets, and so keep the rollers from too easily unwinding and thus allowing the strip to be imperfectly stretched.

A flat piece of transparent glass may be arranged in front of the strip or film, the latter being pressed against it by the vulcanite plate at the back.

By the improved methods of construction and arrangement which constitutes my invention great economy of space is effected, the rollers for holding the strip or film being placed so as to occupy the smallest possible space. The flexible strip or film is wound upon the roller so that as it passes in front of the vulcanite plate it has no tendency to curve or buckle outward, but rather to remain flat in contact with the plate and so to ensure perfect pictures. Great advantage is thus obtained, since when the strip or film is wound and used in the way described its surface is flatter, even if the vulcanite plate be altogether removed, than when wound in the manner ordinarily hitherto used.

I preferably arrange the receiving roller so that when it is filled with the exposed strip or film it can be very easily detached from its sockets, and an empty one substituted, so that it is not necessary to unwind the strip from the receiving roller. Springs or hinged clips of equivalent devices are attached to the rollers for the purpose of fastening the ends of the strip or film, and the receiving and supplying rollers are made alike and interchangeable so that they can be used for either purpose.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 8	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 9	Derby	Society's Rooms, 3, Derwent-street.
" 9	Manchester Amateur	Manchester Athenaeum.
" 9	Bolton Club	The Studio, Chancery-lane, Bolton.
" 10	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 11	Birkenhead	Free Public Library, Hamilton-st.
" 11	Manchester Photo. Society	36, George-street.
" 11	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 27.—Mr. W. E. Debenham in the chair.

Being the annual meeting, the report was read by the Secretary, and an opinion was expressed that it would be desirable to arrange outdoor meetings of the members during the summer months, and to reorganise a system of

lecturettes for the winter session, such as had been introduced by Mr. Haddon in some previous years.

The consideration of the balance sheet was adjourned to the next meeting, and the election of officers was proceeded with, resulting in the following appointments:—*Trustees*: Messrs. J. Traill Taylor and J. B. B. Wellington.—*Committee*: Messrs. Atkins, Atkinson, Briginshaw, Clifton, Debenham, Everett, Freshwater, and Moran.—*Cumtutor*: Mr. A. Haddon.—*Secretary and Treasurer*: Mr. F. A. Bridge.

The subject appointed for the evening's discussion was *The Practical Testing of Lenses*, and the Chairman having invited Mr. J. TRAILL TAYLOR to open the discussion, that gentleman remarked that the lenses to be tested should have the diaphragms removed, and that the photographer's method of practically testing lenses was by using them in the camera, but that opticians did not usually resort to that method. They generally employed a small artificial star consisting of the reflection from the mercury in a thermometer bulb placed at a short distance from a lamp. This star takes a different appearance when within and beyond the focus, and from the greenish border which it assumed when in one direction, and the claret-coloured border which it wore in the other direction, the optician was perfectly well able to test the lens for achromatism. A lens to work true to focus in the camera should be under-corrected as far as regards its visual effect. Flatness of field was another quality for which to test lenses. Mount the lens in a camera and look at a distant view, when if the centre was in focus the image at the margin was almost certain to be out of focus. Next see whether it is possible to get focus at any part of the field, if so the lens is free from spherical aberration, but with freedom from spherical aberration and astigmatism the field was round. The correction given to lenses when intended for standing figures was to obtain a considerable amount of flatness of field at the expense of some astigmatism. It was desirable to have lenses of the rapid doublet or Steinheil type set in a mount in which there was a certain amount of adjustment possible, so as to get greater flatness of field by separating the lenses, and greater freedom from astigmatism by approaching them together. If asked whether it was possible to have a lens which should include a wide angle of view and at the same time have a large aperture, he should until quite recently have replied in the negative, but the new kinds of optical glass recently manufactured had extended the possibilities of combining various advantages, and he had quite recently seen a lens, which would be described in the photographic journals, that really did possess both a wide angle of view and a large aperture. With single lenses it was impossible without a diaphragm to get sharp definition with the flatter side outwards, but on the other hand, if the flatter side was next the plate, the definition was confined to the centre of the field, a very small area. Telescopic lenses gave the most perfect definition conceivable when used as in telescopes with the more convex side outwards, but the field was sharp only just in the centre. He had single lenses that would give sharp definition and be suitable for portraiture with an aperture of $f/8$. When further stopped down, a field of 50° or 60° was covered. It was convenient to remember that if the length of the plate was equal to the focus of the lens, the angle included by the length of the plate was 53° . For testing for astigmatism it was convenient to focus a sharply defined cross, such as that made by the sash bars of a window. When it is attempted with a lens possessing astigmatism to focus such a cross near the margin of the plate that it would be found the vertical and horizontal lines forming the cross could not be got to focus at the same time, the lens would have to be turned in for one line and out for the other. Miethé, a German optician, claims to have invented a lens in which flatness of field and freedom from astigmatism are combined. From what Vogel says of the lens it must resemble one recently patented by Dr. Schroeder, the conditions of which are that the doublet is formed of two deep meniscus lenses, the surfaces of which are nearly concentric. A lens of this kind made of any single glass would be negative, and would not form an image, but by combining different glasses a positive lens capable of yielding an image could be formed, and with the new glass chromatic aberration could at the same time be corrected. To see if the glass of any lens was free from spots and defects, hold it between the eye and a source of light, such as a gas flame, at such a distance that it appears to be full of light. Then by turning it about any defects become evident. For seeing that the glass of a lens is as free from colour as possible, take out the lenses and lay them on white paper, when the colour is readily seen.

The CHAIRMAN considered that it required the practised eye of an optician to test lenses for chromatic aberration by observation of the colour of the fringe of light when within and beyond the focus. A convenient way for the photographer was to use Claudet's focimeter, but with type of varying degrees of fineness on each arm of the instrument. A method requiring no special apparatus was to focus a piece of newspaper placed much upon the slant. If at the centre of the field certain words came out sharply on the focussing screen, and words at a greater or less distance came sharp in the negative, the lens did not work true to focus, and the amount which it had to be racked in or out to get the same words sharp on the focussing screen that were sharp on the negative was the measure of the chromatic aberration. It was, of course, supposed that the camera was in itself true in its adjustment of focussing screen and plate holder. Flatness of field he held to be very important, and the manner in which he tested for it was to arrange the camera so that it could be swung round without much displacement of the lens, and to focus some distant object, first in the centre of the field, and then at measured distances, say an inch apart upon the focussing screen. The amount which the lens had to be turned in for each fresh focussing was measured, and by plotting these distances out on paper the curvature of field for the particular lens was shown.

It was announced that Mr. Scotton would demonstrate the blue iron printing process on Thursday, July 11.

UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

JUNE 25.—Dr. R. T. Plimpton in the chair.

Mr. A. GRYK exhibited some negatives which were covered with dark spots, and asked the opinion of members as to their cause. No satisfactory explanation could be given—dust, irregular development, and the action of the paper used in packing upon the film were suggested as possible causes.

Dr. PLIMPTON then resigned the chair to Dr. H. Foster Morley and proceeded to give a demonstration of the hot bath platinumotype process, after which Mr. LEON gave a similar demonstration of the Platinumotype Company's cold bath process, for which he claimed a greater power of control over the quality of the print produced than by the older method.

A discussion took place in which most of the members joined, the most important question raised being the relative cost of the two processes. Doubts were raised as to the possibility of developing the quantity of paper stated on the Company's labels with the given quantity of platinum salt by the cold bath process, except perhaps in the case of large quantities.

The Society made an excursion on Saturday, June 29, to Elstree.

The next meeting, Tuesday, July 9, will be the annual general meeting of the Society, at which the present officers and Committee will be proposed for re-election.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

JUNE 27.—Mr. A. W. Beer in the chair. There was a very good attendance of members.

The PRESIDENT referred to the loss the Association had sustained in losing the services of Mr. W. A. Watts, their Honorary Secretary. A better or more capable gentleman it would be difficult to find, and it was now his pleasurable duty to submit the Council's nomination, viz., "That Mr. W. A. Watts be elected as an honorary member," which was carried unanimously.

The Council had elected Mr. W. Hughes, their Hon. Secretary, as successor to Mr. Watts.

Mr. G. R. Johnson was elected a member of the Association.

The House Committee's statement of expenditure incurred in the alteration, fitting-up, and furnishing their rooms amounted to 149*l.* 5*s.* 4*d.*

The PRESIDENT hoped it would be satisfactory to the members, and, judging from their present comfortable quarters, he thought the money had been advisedly spent.

The leader of the excursion on June 1 to Burton and Ness, and of the excursion on June 15 to Speke Hall, Old Hutt, and Hale, gave particulars of their respective trips. Fifteen joined in the former and were fortunate in the weather, one hundred and two exposures being made and good results secured. Respecting the latter, the party numbered forty-nine; two large wagonettes were requisitioned for the occasion, and a most enjoyable day was pleasantly spent, two hundred and twenty-nine exposures being made.

Attention was drawn by the HON. SECRETARY to the excursion on Saturday, the 29th instant, to the Bollin Valley, near Bowden, Manchester, a prize of a bronze medal being offered for the best picture, irrespective of size. The party would be met at the Central Station, Manchester, by Mr. James Davenport, Vice-President of the Manchester Amateur Photographic Society, who had very kindly offered to act as conductor.

Mr. PAUL LANGE gave his demonstration on *Enlarging*, using the Society's enlarging camera recently purchased for the use of members, and proceeded to make an enlargement from a half-plate positive to a negative 15×12 . He found the most satisfactory results were obtained by first securing a good small-sized positive by contact, from which the desired negative could be obtained and any number of prints could be supplied. Enlarging direct on bromide paper was not certain, and only one copy could be made, whereas a good negative once secured was always ready and the results uniform. For enlarging purposes he preferred a tinted positive, such as the colour produced from soda development, the effect of the colour tending to soften the shadows. The formula he used was:—

	No. 1.	
Pyro	3 grains.	
Water	2 ounces.	
	No. 2.	
Washing soda	2 ounces.	
Ammonio-bromide	40 grains.	
Water	16 ounces.	

He explained, for the benefit of those who had not hitherto tried to enlarge, the various parts of the camera and uses of all the adaptations with which it was fitted, and congratulated the members on such a valuable acquisition to the rooms, and hoped his few remarks would induce many to use it. The lens was a nine-inch doublet, $f/16$, with thirty seconds' exposure at six p.m., bright sunlight, resulting in a very satisfactory negative.

A vote of thanks was then accorded Mr. Lange for his interesting demonstration.

Prints were exhibited on the screen for the inspection of members, taken at the recent excursions by Messrs. Beer, Tomkinson, Timmins, Tunstall, Mackrell, Thomas, Wilkinson, and others, some of which were greatly admired for artistic excellence.

BATH PHOTOGRAPHIC SOCIETY.

JUNE 26.—Mr. Austin J. Klog in the chair.

Messrs. J. Mendum, W. Hinds, and W. H. Davies were elected members.]

A communication from the President was read inviting the Society to a garden party upon his return from Switzerland.

The CHAIRMAN pointed out that fuller details would be announced later. The Committee did not think it necessary to interfere with the regular excursions; that fixed for July was Chepstow and Tintern, which would occupy a whole day, and the month of July had been chosen on account of the light. The garden party would probably take place towards the end of the month, and he hoped both meetings would be well attended.

The SECRETARY drew attention to a new monthly paper entitled the *Optical Magic Lantern Journal and Photographic Enlarger*, specimen copies of which had been presented to the Society.

The receipt of Vever's *Practical Amateur Photographer* and various circulars having been announced, Mr. FRIESE GREENE read a paper entitled *Colour, its Study and Relation to Photography; also the Taking of Pictures on Opal*

Cards [this will appear in a future number]. During the delivery Mr. Greene showed by means of the spectroscope the colours which are transmitted through such media as ruby glass, and at the close exposed (about ten seconds to gas-light) two of the cards and developed positives thereon. The nature of the sensitive coating was not divulged, nor the method of preparing the cardboard to withstand washing, but other points elucidated were: development of the prints similarly to that of bromide paper by means of ordinary ferrous oxalate restrained with bromide and after slight washing in water fixed in hypo; but instead of prolonged final washing and the use of clearing acid, they are soaked in a three-grain solution of hydroquinone which is claimed to supplant it. Finished examples of the method were shown, and a general conversation ensued concerning the employment of hydroquinone after fixing.

The proceedings terminated with the usual votes of thanks.

THE third excursion of the season took place on the 29th ultimo. A four-in-hand brake left the city about noon for Great Chalfield Old Manor House, Trowbridge, journeying by way of Bathaston and Box. The day was very fine, and the proverbially dusty character of the roads after a long spell of dry weather caused the travellers to arrive at their destination like dusty millers. Cameras were already on the ground, some members having previously arrived in private carriages.

Old Chalfield is the property of Mr. G. P. Fuller, M.P., and is most unique. The church, old manor house, farm buildings—in fact, the entire village—is built within the moat, and must have been a formidable stronghold in bygone times; it dates back at least four hundred years, parts being still older.

The whole village, easily taken with a wide-angled lens from within the moat, was soon attacked by two dozen cameras, but the reminder that luncheon was already spread in a shady nook at Little Chalfield, about a mile off, caused a hasty packing up. Having filled a page in the visitors' book, we adjourned to the new quarters. Here we found our Vice-President (Mr. Austin J. King) had provided a capital spread, which, it is needless to say, was warmly appreciated. While the party were yet reclining in the cool shade afforded by the surrounding elm trees Canon Williams exposed one of the new celluloid films on the assembled guests as a memento of the occasion, but as the worthy Canon was not himself included in the group, another camera was quickly brought into play by Mr. Perren.

A pleasant drive of a few miles brought us to the Old Manor House, South Wrexall, the property of Mr. Walter Long, M.P., and preserved by him exclusively for inspection by visitors. The place is of great historical interest, and abounds in subjects for the camera, the majority of which received attention.

Once more on the road, a good pace was made along the high ground commanding extensive views of Wilts and Somerset and the cloth mills in the valley below. Skirting Bradford Leigh, our road lay through the village of Winsley, which is very quaint and picturesque, but the day was too far advanced to halt. About a mile further on we arrived at Rowas Lodge, the summer residence of Mr. King. Here, upon the spacious lawn in this beautiful and secluded spot, our host again bountifully provided for the party.

Daylight was fast waning when a move was made through the forest glade to the foot of Winsley Hill, where the brake was in readiness for our return to the city, and, after a smart drive, we arrived shortly before ten o'clock, having accomplished a total distance of about thirty miles.

Next outing, July 27, to Chipstow and Tintern.

IPSWICH PHOTOGRAPHIC SOCIETY.

THE monthly excursion took place on Saturday afternoon, June 29, to East Bergholt, which was reached about three o'clock after a pleasant drive of ten miles from Ipswich. Mr. J. Reynolds, a resident member, met the party and acted as guide. The church was first visited. It is a fine building with a nice interior, but the "narrow angles" were quite out of it for both interior and exterior pictures. There is no tower to this church, merely the foundation walls of one, and legend says that the enemy of mankind has so strong an opposition to a steeple being built, that he has always at night demolished any work done the previous day, and the hope of ever completing the tower has therefore been abandoned. The bells, a peal of five, are hung in a quaint wooden structure in the churchyard apart from the church. Having exhausted the village, tracks were made for Flatford, a pleasant walk of a little over a mile. Here are some picturesque cottages, a large mill, and a rustic timber-built bridge. Many of Constable's famous pictures were taken at this pretty spot in the Stour Valley. A return to the Bergholt Red Lion was the next proceeding, and a tea done ample justice to. A pleasant drive home brought a most enjoyable outing to a satisfactory close.

Next excursion, July 28, to Helmingham.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE June excursion meeting of the above Association was held at Bradford-on-Avon on Saturday, the 22nd instant. There was a fair attendance of members, but it was to be regretted that a larger number could not avail themselves of the opportunity.

On arriving at Bradford, the Hon. Secretary acted as guide, and the river scenery below the town was first visited, a reach below the fourteenth-century bridge affording good work.

Members then adjourned to the Swan Hotel for lunch, and afterwards worked for a time among the various old-fashioned byways of the town, where many admirable subjects for the camera exist.

After seeing Kingston House, the Saxon Church, and one or two other places of interest, a waggonette was hired and the party drove to South Wrexall Manor House, an ancient place, now much decayed, full of the greatest interest to artist and antiquarian. The exterior is partly Tudor and partly Elizabethan, and, from its quaintness, very suitable for photographic work. Much of the interior work is also charming, notably the carved chimney-pieces throughout

the building, and the oak panelling of the walls, and plaster Jacobean ceiling of the reception room.

Several hours were profitably spent here before the time came to drive back to Bradford and return home.

The July meeting will take place on Saturday, July 20, Wells being chosen as the spot to be visited. Although there is much work to be done in Wells, it may be useful to state, for the benefit of those who have already taken pictures there, that Glastonbury is within easy reach, and affords abundant material for exposures.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

JUNE 5.—The President (Mr. Frederic Graff) in the chair.

The Committee on Joint Exhibition presented the following report:—

The Third Annual Joint Exhibition of the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, and the Boston Camera Club, was held in the Galleries of the Pennsylvania Academy of the Fine Arts, Philadelphia, April 8 to 20, 1889, under terms of agreement and rules adopted at a meeting of representatives from the three Societies held in New York, October 22, 1886, revised and amended November 10, 1888. By the revised and amended rules definite regulations were adopted for holding and governing such meetings of the Joint Exhibition Council as may be deemed necessary. All entry of exhibits by classification was abolished, and the awarding of diplomas by classification was limited to the seven diplomas for "special excellence" reserved for the recognition of exceptional merit in certain principal lines of photographic work, one diploma being placed at the disposal of the Judges for each of the seven classes. Your Committee believes that critics generally recognised a marked improvement in the quality of the pictures exhibited by all participants. The increased proportion of bromide and platinum prints was noticeable over former exhibitions, and indicates a change of taste from the warm tones and glossy surface of the albumen print to something more permanent and more pleasing to the eye of the artist. An even greater revolution may be expected within the next year, owing to the introduction of the cold process in platinotype printing and in the new toning of plain silver prints with a platinum salt.

The aristotype and prints made from negatives on orthochromatic dry plates, and prints from celluloid films, were among the newer features of the exhibition. The exhibits of pictures made with detective cameras were interesting in many respects, and no doubt furnish valuable studies for an artist, but in close comparison with larger and direct prints from negatives made with time exposure they suffer in respect to technical qualities and the careful composition so important to a photographic picture. It is to be hoped that the ease and fascination of hand camera work will not induce photographers to neglect the use of the larger plates or films, which, though entailing more cost, care, and labour, repay it all in more satisfactory and pleasing results. We are informed by one of our foreign exhibitors that among landscape photographers of England, who aspire to pre-eminence in their art, larger plates are now in use than ever before.

Exhibitions of lantern slides were held upon Tuesday and Thursday evenings of each week. The improvement in the quality of gelatine lantern slides was marked and encouraging, also the uniform size of slides and neatness in mounting, qualities no doubt engendered by the labours of the American Lantern Slide Interchange.

By special resolution of the Joint Exhibition Council the Board of Judges was to consist preferably of "three artists of acknowledged ability, at least one of whom shall be well versed in practical photography, and two expert practical photographers."

Diplomas were awarded as follows:—

Diplomas for Special Excellence.—1. "For landscape or marine views," Harry Tolley, Nottingham, England (*On the Lonely Shore*). 2. "For portraits," Frederic Gutekunst, Philadelphia (miscellaneous portraits). 3. "For genre subjects and figure compositions," W. W. Winter, Derby, England (*My Mamma*). 4. "For work by ladies," Mrs. S. M. Cleveland, Philadelphia, (entire exhibit). 5. "For enlargements," William H. Rau, Philadelphia. 6. "For lantern slides," Professor Henry A. Rowland, Johns Hopkins University, Baltimore, Maryland. 7. "For applied photography, scientific or technical," Professor Henry A. Rowland, Johns Hopkins University, Baltimore (for photographic maps of the normal solar spectrum, second series, 1888).

Diplomas for Excellence.—"For entire exhibits," Frank M. Sutcliffe, Whitby, England; William Perry, Shields, England; J. P. Gibson, Hexham, England; John Bartlett, Philadelphia; Charles L. Mitchell, M.D., Philadelphia; George B. Wood, Philadelphia; Paul Lange, Liverpool, England; Robert S. Redfield, Philadelphia; Richard Keene, Derby, England; Harry Symonds, Portsmouth, England; S. W. Burnham, Lick Observatory, California; The Rev. F. C. Lambert, M.A., Cambridge, England; H. A. Latimer, Boston, Massachusetts; A. K. P. Trask, Philadelphia; George A. Nelson, Lowell, Massachusetts; R. T. Hazzard, Philadelphia; Clarence B. Moore, Philadelphia; Mr. and Mrs. Anckhorn, Arbroath, Scotland.

While the object of the joint exhibitions is not that they shall serve as a source of revenue to the societies interested, it is gratifying to your Committee to be able to report that the late exhibition was peculiarly a success.

The experiment of conducting the exhibitions of photographers in the three cities—New York, Boston, and Philadelphia—annually, and in rotation, under the same rules and management, now having been given a trial by each of the societies, a proper time has arrived for considering the question of the desirability of a continuation of the plan and agreement. The benefits which have accrued from the co-operation are very apparent; the objects of such exhibitions are identical in each society, and the limitation of one exhibition to each city once in three years keeps fresh and increases the interest taken in them by the public and by contributors.

The three societies now so fully understand and agree upon the general object of the exhibitions, it may be well before entering upon another three years' series for each society to consider whether the plan adopted shall be continued in its present shape of joint exhibitions or whether they would prefer to conduct future exhibitions each under its own rules, confining the

agreement simply to holding the exhibitions annually in rotation in one of the three cities under the control of the local organization. If continued as a joint arrangement it would seem desirable that a medal be adopted for distribution at future exhibitions in place of diplomas. A medal is the time-honoured token for award in recognition of high merit. It is recognised as such in all countries, and conveys an idea of value and dignity which a mere written document or instrument can never equal.

(Signed) JOHN G. BULLOCK, } Committee on Joint
ROBERT S. REDFIELD, } Exhibition.
SAMUEL M. FOX, }

The Treasurer's report showed a balance to be placed to the credit of the Society over and above all expenses on account of the exhibition of about twenty-five thousand dollars.

VEREIN ZUR FORDERUNG DER PHOTOGRAPHIE IN BERLIN.

JUNE 7.—Dr. Vogel in the chair.

The determination of the Association Belge de la Photographie to take part in the coming Jubilee Exhibition of Photography at Berlin was communicated to the meeting, the announcement being received with applause.

The new patent developer, "Eikonogen," which it appeared had previously been mentioned and tested by Dr. Vogel, then became the subject of discussion.

Herr STOLL observed that he had already made some very satisfactory experiments with it, especially in the case of instantaneous work, obtaining very powerful negatives in every case.

Herr VOGEL, jun., remarked that this developer permits a considerable reduction of the time of exposure, and that cases in which, hydroquinone being employed, an exposure of three seconds was necessary, required on employing eikonogen an exposure of only one second; that though plates that developed well and rapidly might be too thin, yet after intensifying they could be made use of. The speaker did not employ a preliminary bath, which Herr Stoll so strongly recommends.

Herr STOLL stated that he had made use of the prescribed alum bath, but found that it made the plates look exactly as if they had gone mouldy, an effect which he attributed to the precipitation of alumina. He, moreover, regarded the alum bath as superfluous.

Herr VOGEL, jun., confirmed the above statements, adding, however, that eikonogen (which, it would appear, is a naphthalin-derivative discovered by Dr. Witt) exercises a hardening influence on gelatine, causing the developing action to be confined to the surface.

Herr STOLL, on the contrary, was of opinion that the plates developed rapidly right through.

Professor Dr. VOGEL announced that the splendid rooms of the Krieg Academie had been obtained for the use of the coming exhibition. The speaker pointed out that the rooms in question offered some 8000 square feet of well-lighted wall surface.

Herr VOGEL, jun., exhibited a new metallic camera by Oertel in Augsburg, entitled the "Invincible." The camera in question is composed entirely of Britannia metal, and folds up like a pocket-book. It may be employed like Anschütz's cameras for photographing objects at high elevations, as it can be given a stable movement by means of a joint attached to the stand.

Herr Anschütz (Lissa) exhibited some instantaneous photographs of the recent manoeuvres. Herr Anschütz operates from a carriage, which enables him to follow the movements of the troops, and prevents his field of view being obstructed by persons in the foreground, which often occurs to photographers on foot, one of whom appearing in the foreground of one of Herr Anschütz's pictures occasioned a good deal of amusement.

The heat caused the meeting to adjourn early, but most of the members resorted to a neighbouring garden, where the fresh air and suitable "materials" contributed to the "development" of sociability, although the liquid employed was not "eikonogen."

Correspondence.

✉ Correspondents should never write on both sides of the paper.

PHOTOGRAPHY IN THE ARGENTINE REPUBLIC.

To the Editor.

SIR,—“Buenos Ayres,” in a back number (March 22) of the JOURNAL, desires information concerning the Argentine Republic, its climate, and the possibilities of obtaining employment as artist, retoucher, &c. The climate is very fine and the winters mild, but the prospects of obtaining employment are not so satisfactory, and I for my part should not advise him to come out here on “spec,” as the River Plate is overrun with photographers, and the supply is far in excess of the demand. We have any amount of applications for employment both here and in Buenos Ayres, and I feel certain that the majority have to take up some other pursuit or leave the country. These are immense countries and are going ahead rapidly; the immigration is something enormous, consisting mainly of Italians and Spaniards, who are at once drafted into the “camps” to take up land in the colonies, or work on the “estancias” or cattle farms.

The luxury and wealth of the River Plate is concentrated in Monte Video, Buenos Ayres, Rosario de Santa Fé, and Coriova, and these cities are amply provided with all that wealth can bestow. Outside these are immense tracts of “camp,” covered with cattle farms, with here and there the nucleus of a future city, but where, for the present, “Buenos Ayres” should he depend on retouching alone—would fare badly.—I am, yours, &c.,

J. FITZ-PATRICK, Manager.

Casa en Buenos Ayres, 126, Calle Florida, Monte Video, May 14, 1889.

A CORRECTION.

To the Editor.

SIR,—May we ask you to allow us to contradict, in the most unqualified manner, the rumour which is being so industriously circulated (for what object we do not venture to say), and which is alluded to in the copy of letter we annex?—We are, yours, &c.,

THE BRITANNIA WORKS COMPANY.

The Britannia Works Company, Ilford, London, E., July 1, 1889.

[Copy.]

THE BRITANNIA WORKS COMPANY.

Dear Sirs,—Will you kindly inform me if you have decided not to make any more Ilford plates, ordinary rapidity, as I have heard to that effect? Your reply by return will oblige.—Yours truly,

F. D. F. NEWMAN.

Rugby, Westbourne Avenue, Hull, June 28, 1889.

PLATINUM TONING BATH.

To the Editor.

SIR,—In the last number of THE BRITISH JOURNAL OF PHOTOGRAPHY, under “Foreign Notes and News,” you have given my formula of a platinum toning bath for *aristo* paper, and not platinum paper as stated by you. Please to correct.—I am, yours, &c.,

ALFRED STIEGLITZ.

Berlin, June 29, 1889.

[By the publication of this letter we make the correction desired.—Ed.]

THE EIKONOGEN DEVELOPER.

To the Editor.

SIR,—Referring to a paragraph that appeared in your esteemed JOURNAL, relating to Dr. Andresen's new developer, eikonogen, we are pleased to inform you that we have made arrangements for the introduction of this important novelty into this country, and shall be prepared to supply same in a few days.—We are, yours, &c.,

MARION & Co.

A CORRECTED FORMULA.

To the Editor.

SIR,—In THE BRITISH JOURNAL OF PHOTOGRAPHY ALMANAC I find what I think is an error in the developing formula for W. & W.'s plates—250 minims ammonia to the ounce. Should it not be 2.50 minims? Not a great difference in writing or printing, but how about the developing?—I am, yours, &c.,

T. MORLEY BROOK.

Withington, Manchester, June 28, 1889.

[Certainly; it ought to have been 2.50.—Ed.]

Exchange Column.

•• No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as “anything useful” will therefore understand the reason of their non-appearance.

I will exchange 12x10 burnisher for watch, magic lantern, or half-plate camera and lens for outdoor work.—Address, Moorak, c/o Mr. F. Hilton, Photographer, Tibshelf, Derbyshire.

Wanted, half-plate portable camera, parallel bellows, lacks, stand, and rapid rectilinear lens (first-class only), in exchange for iron foot-lathe, three-foot planed bed, two-foot driver, four speeds; telescope, three draws, O.G. one and a half inch clear, fine definition; and quarter-plate rapid rectilinear lens. Urgent.—Address, GRABORN, Photographer, Rotherham.

WE have received from Mr. W. Chambers a catalogue of photographic lenses and apparatus, from which we perceive that this gentleman, well known in London circles, has commenced business in Featherstone-buildings, in the premises so long occupied many years ago by Mr. Andrew Ross.

MESSRS. PERKEN, SON, & RAYMENT send us a letter they have received from Dr. Fridtjof Nansen, of Christiania, who says: “Having lately returned from Greenland after my expedition last year across the inland ice, I have great pleasure in now informing you that the instruments supplied by you for the expedition, namely, the three aneroids and the pocket sextant, have been proved to my entire satisfaction. Time not allowing the aneroids to be verified at the Kew Observatory as intended, I had this done at the Meteorological Institute here with the most satisfactory results as to their correctness, and although the necessarily severe usage and tests to which from the rather unexpected high altitude of upwards of 9000 feet reached, and the great change of temperature, varying from +55 to -55 Th. in the day and night, they were exposed, yet they worked admirably together, and on again reaching the sea level they differed but very slightly. The pocket sextant also, the only instrument we had for fixing our latitudinal position, proved invaluable to us and justified fully the excellent workmanship and finish.”

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

QUINOL (Beverley).—No. 1 on your list is trustworthy in the highest degree.

F. P.—Thanks for your letter; but now that the "sweating" question has lapsed into a state of quiescence, don't you think it had better be allowed to remain so?

X. Y. Z.—The reason so little subject is included in the picture is that it was taken with a lens of too long focus. In taking interiors a wide-angle lens, for most subjects, is imperative.

N. PHILLIPS.—Negatives developed with hydroquinone resemble very much those developed with iron. Both partake more of the wet-plate character than do those developed with pyrogallie acid.

W. A. HARLAND.—If you let the products of burning gas into your drying box there is little wonder that the plates are foggy. If gas is used at all, the fumes from it must not be permitted to come in contact with the plates.

R. S. A.—About the best thing you can use for the ironwork of the studio is the Brunswick black of the oilshops. It will, however, scarcely answer for the curtain rods, as the rings will not run freely on the varnish; for these there is nothing better than blacklead.

THOS. J. FOSTER.—The work that will probably answer your purpose best is Fresenius's *Chemical Analysis*, published by Messrs. Churchill & Co., New Burlington-street. There are two volumes—*Qualitative* and *Quantitative*. They may, however, be had separately.

VERAX.—Ivory may be obtained at most fancy stationers in small sizes, but if you require it in large sheets you will doubtless have to go to the wholesale houses for it. There is no novelty in its use in photography. We have alluded to the subject many times during past years.

A. WILCOX.—You will be permitted to take photographs in the Paris Exhibition under certain restrictions. A charge of, if we remember rightly, twenty francs a day is made for the privilege. The same conditions, of course, apply to detective cameras. Using these surreptitiously entails a forfeiture of the apparatus and a fine of, we think, four hundred francs.

J. C. (Southport) writes: "In your leading article on pyrogallie and hydroquinone development you state pyro to be practically unusable with caustic alkalies except ammonia. I wrote some time ago that with the addition of equal quantities of sal-ammoniac and caustic potash as good results could be got. I might be wrong. I enclose negative (Thomas's) developed with two grains of caustic potash, two grains of sal-ammoniac, one grain of bromide of potassium, and two grains of dry pyro. Please give me your opinion."—The negative is excellent.

R. S. writes: "I wish to orthochromatise some plates with erythrosine, according to the formula given in one of the German journals. Will it do, after the plates have been treated, to rear them up on the dark room shelves and allow them to dry spontaneously? or must they be dried in a properly constructed drying box? The dark room is so arranged that it can be made perfectly dark."—The plates may be allowed to dry spontaneously. At this time of year, if the plates are treated overnight, they will generally be dry and ready for use by the following morning, unless the room is an unusually damp one.

BEX.—As some papers you have experimented with work well with the hydroquinone and others do not, it is clear that this agent does not suit all paper—that is, without modification. Most of the commercial bromide papers have hitherto been prepared specially with a view to iron development. These papers being now in the market, it rests with workers to adapt other developing agents to suit them if they relinquish those for which the paper is intended, at least until an article specially prepared for hydroquinone development is put into the market. Our experience is that hydroquinone may be adapted to all papers that we have tried, with suitable modifications.

F. S. (Bordeaux) says: "I. I would like to have the address of the makers of the freezing machine, 'Arktos,' mentioned in No. 1517 of your JOURNAL.—2. Could you let me know if emulsion makers use silver recipients or silvered copper for boiling the emulsion, for I am afraid any metallic recipients in boiling would metallise a part of the silver bromide?—3. If metallic recipients cannot be used, could you give me the address where I could find large porcelain recipients for boiling emulsion?"—1. E. M. Perkins & Son, Seaford-street, King's Cross, London.—2 and 3. Better use porcelain vessels for this purpose, although we know of both silvered brass and solid silver being employed.

NEMO says: "I have been troubled of late with curious smears on my negatives for which I could not account, and on sending a few negatives to the maker of the plates the reply was that the marks were due to the developments, but no means of avoiding them was suggested. The other day curiosity led me to take a plate out into the light for examination, and I found marks upon it just as if a snail had crawled over the film, and these marks corresponded with the smeary stains when the negative is developed. I send you a couple of unexposed plates and a negative for your inspection."—The marks are clearly in the film and are not due to the development. The plates are defective, of that there is no doubt.

S. E. BRUCE writes: "I have recently come into possession of a lot of photographic apparatus and chemicals and amongst the latter there is a bottle labelled 'nitrate of silver (fused).' It is in irregular-shaped lumps, and is of a slaty blue colour on the outside. But the lumps when broken are white, and show a crystalline fracture. The things belonged to an uncle of mine, and must be fully twenty-five years old. Can this nitrate of silver be utilised in photography—if so, how?"—The silver can be used for any purpose for which nitrate of silver is required, such as for sensitising paper. It has not deteriorated by keeping. If it be used for the purpose suggested, the solution should be made slightly acid with nitric acid.

INTERIOR.—For photographing the interior of the shop, you had better employ a wide-angle lens. The exposure will, of course, depend upon the light; but this you will be able to judge of when you see the image on the focussing screen. The use of an extending front to a camera is to permit a lens of long focus to be employed. The size of the image is not influenced by the length or otherwise of the camera, but the focus of the lens. The less light there is between the lens and the object the better. Instead of hiring apparatus specially to take a single picture of a kind you are not familiar with, would it not answer your purpose better to get some professional photographer in your neighbourhood to do the work for you? It would probably be cheaper in the end.

A. COLLINS (New South Wales).—1. By far the largest proportion of the enlargements made in this country at the present time are on bromide paper. As a rule (except for the very cheapest work) they are more or less highly finished in monochrome or in colours. The surface of the rough paper is admirably adapted for working in pastel or crayon. Some of the best houses here are working bromide paper almost exclusively for their enlargements.—2. The wet collodion process is rarely used now except for copying, and then chiefly for photo-mechanical purposes.—3. Detective cameras vary in price, from 2/ 10s. upwards.—4. A large proportion of the highest class work is printed by the platinotype process, but albumenised paper still rules supreme. Thanks for the pictures; they are charming views and well selected.

PUZZLED writes as follows: "I have been trying the quinol developer (Thomas's formula) on Ilford plates and Morgan & Kidd's bromide paper, but fail with both. The plates develop well enough at first, but when detail is well out they veil over, and after fixation, looking at the back, seem an opalescent blue, particularly in the parts of the picture where the deposit is thinnest. On the film side there appears a metallic lustre, particularly round the edges. This last seems a yellow stain when viewed by transmitted light. The paper in the vast majority of cases comes out covered with spots, as if sprinkled with black pepper. I have tried varying the proportions of the solutions, also diluting with water, but with no better success."—Perhaps some of our readers who have experimented in this direction will give their experience.

BROMIDE writes: "Can you suggest to me any restrainer to prevent collodion-bromide fogging under the developer? Some years ago I was quite successful in developing enlargements on paper, &c., coated with collodion-bromide. Recently I am quite unable to do so without their fogging, even where the paper is covered with a mask. I can succeed when a print is made direct in the printing frame, but when I make an enlargement the whole fogs. When I was successful it seemed as if it was not possible to go wrong; but with whatever care I use I cannot go right. With gelatino-bromide I cannot fail—all is so easy. If you can suggest any means of preventing it I shall be much obliged."—There is no better restrainer than a bromide. Were it not for the fact that satisfactory results are obtained by direct printing, we should have suspected the emulsion was at fault. As it is we suspect that the paper gets fogged by light during the exposure in the enlarging, or during the handling of the paper.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, July 10, 1889, will be on *Photographing Lightning*. Saturday outing at Loughton.

ON Thursday, the 11th instant, Mr. Thomas Scotton, of Derby, will read a paper and demonstrate the working of the ferro-prussiate and cognate methods of iron printing at the London and Provincial Photographic Association.

NORTH LONDON PHOTOGRAPHIC SOCIETY.—The outing of this Society for Saturday (to-morrow) will be at Loughton. The members will meet there at three p.m., a convenient train for this purpose leaving Liverpool-street Station at eight minutes past two.

PROPOSED SOCIETY FOR RICHMOND.—It is proposed to organize an amateur photographic club in Richmond, Surrey. All those in that district favourable to such a movement should lose no time in communicating with Mr. Horace S. Hopkins, Railway Hotel, Richmond, Surrey.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1523. VOL. XXXVI.—JULY 12, 1889.

SHEATHS FOR DRY PLATES.

It appears as if the question of metallic backings, holders, or sheaths in which to hold sensitive plates or films were likely to become a somewhat burning one. By a sheath (the word is, we believe, the invention, in this application, of Mr. Thomas Samuels) is meant a piece of thin metal with turned-over edges, so as to hold a plate in such a manner that no light, if it were exposed in the camera with another sensitive plate immediately behind it, would be transmitted through the film to the detriment of that behind. It is, indeed, nothing more than a plate of metal or other rigid opaque substance placed behind a sensitive plate, and having overlapping edges to retain the plate in its place.

For this very simple contrivance several patents have been obtained or applied for. The first of which we are aware was that of Mr. T. Edward Merritt, who, on August 1, 1854, obtained a patent (No. 1696) for several improvements in photographic apparatus and means of taking photographs in the open air, and in whose specification was included the identical sheath which forms such a bone of contention at the present time. We say "identical," for Merritt's sheath is both described and drawn with so great a degree of accuracy that if the specification were placed in the hands of a workman for the purpose of having one made as there described, the resulting piece of workmanship would be the modern sheath.

The object of this sheath, as described by Mr. Merritt, is the holding of a collodionised plate of glass, or a sensitive sheet of paper kept flat by being attached to a glass plate, and, like the sheath of the present time, it is described as "a small frame of tin or other suitable material," to be employed in connexion with a camera mentioned in his specification, and in which was "a dark chamber or box capable of containing any required number of prepared papers or glasses." In Merritt's "claims" this frame or *sheath* forms a special feature in these words: "Second, the construction of a frame for holding collodionised glasses in the manner hereinbefore described." This was in the old collodion times, when as yet the sensitive surfaces were either collodion, albumen, or paper.

Later down, and twenty-nine years after the previous patent, Mr. Thomas Samuels obtained a patent (No. 813, Feb. 15, 1883) for a camera with which was also connected a sheath for holding sensitive plates, and the ninth claim of which reads:—"The combination with a photographic plate or film of a protective sheath or envelope, constructed substantially as shown and described, for the purpose specified." And in the body of the specification we read:—"My invention further comprises an envelope or sheath for each plate, by means whereof the contact of the plate or films with one another when preposited in my holder, and especially when transferring or packing them away after exposure, is avoided, and the light is prevented in passing through a plate, when under exposure, to those behind

it." The drawing which illustrates this sheath is substantially similar to that of Mr. Merritt.

Still later we have two applications for patents for film carriers by Mr. Turnbull, of Edinburgh, and Mr. Bolton, of London. But into these we are indisposed to enter more fully at present than we have done by way of append to Mr. Turnbull's letter in our correspondence in this number, because, the specifications of these gentlemen not having been yet completed, we are somewhat in ignorance as to what their claims really are. But so far as concerns what we may here term the *single* sheath, Merritt's patent, which has now expired, may possibly cause such patents for a similar piece of apparatus for holding sensitive plates to rest upon an insecure foundation. What is the difference between the sensitive plates of over thirty years ago and those now in daily use? One was collodion while the other is gelatine. Supposing that litigation were to arise out of this, would a judge in Chancery be likely to recognise this distinction? Or, to put the matter on a different footing, suppose another piece of apparatus—a lens, for example—had been patented and fully described thirty years ago, would a very recent patent for the same lens be good on the alleged grounds that the former was used for taking negatives by collodion, whereas the latter was intended for gelatine negatives? We scarcely think so. Then why should there be a like distinction made in the matter of sheaths?

We well remember when Cook's patent camera was brought out that we experimented much with it during 1869-70 (for particulars see this JOURNAL of those dates). Dry collodion plates were employed, friction between the plates being prevented by a rather thick paper edging on two sides of their faces, while the light was prevented passing from one to the other by an opaque backing, which was sometimes composed of black paper, and in our own case more frequently by applying a non-actinic varnish of Spanish brown and gum water to the back. This we eventually found to be troublesome, and supplanted it by a thin metallic backing with turned-over edges. While this was an improvement, we looked upon it as such a trumpery matter as scarcely to merit any public notice; and yet one of the modern patentees could, were he so disposed, debar us the use of it, did not Merritt's patent intervene and stop such proceedings.

By all means let us have as many inventions, and even patents, as possible; but let us not quite forget those of such as have gone before.

DENSITY WITH HYDROQUINONE.

Our article a fortnight ago on the comparison of pyro and hydroquinone as developing agents has elicited more than one inquiry as to the possibility of obtaining with the latter a degree of density under similar conditions equal to that pro-

duced by pyro; while one correspondent in set terms condemns hydroquinone as incapable of rendering certain subjects with the vigour needful for special purposes, such as photo-mechanical work.

The doubts, no less than the definite statement last alluded to, are equally surprising to us, for we have always found, and have on other occasions stated, that, if anything, the tendency with hydroquinone is in the direction of over density. In the article of the week before last, in fact, we laid special stress on the peculiar power possessed, when using the alkaline hydrates, of making provision for a greater degree of density than ordinarily required; and it is in this immediate conjunction, curiously enough, that two at least of our correspondents scent the danger of feeble images. It seems probable, therefore, that some serious misapprehension exists as to the precise conditions necessary for obtaining density.

The suggestion is made that, looking at the increased energy of the action of the caustic alkalis, the natural tendency will be to produce thin, delicate images full of detail, and in the case of even slight over exposure, the class of result formerly recognised colloquially as "burnt up." To this we can only reply, that judging hydroquinone upon the same lines as pyro, the inference is, perhaps, only natural; but that is just what we desire to impress upon our readers they ought not to do. The sooner they will thoroughly recognise the fact that the two developers are essentially different in their general style of behaviour, no matter how nearly similar their ultimate effects may be, so much the sooner will the two find their proper relative positions, and the anomalies and discrepancies in practice with hydroquinone cease to be heard of.

We long ago pointed out the fact that hydroquinone will bear the addition without injurious effect of far larger quantities of alkali than is the case with pyro. We have also described the difference in its behaviour in the presence of restrainers, such as alkaline bromides, and such substances as sodium sulphite, which in the case of pyro is variously judged in that capacity. In fact it is, we think, generally recognised that such additions, though practically essential with pyro, are not so with the newer agent, though for various reasons it may be advisable to use them in practice.

Now it is only by the full recognition of these facts, and their practical application, that hydroquinone can be made to yield results that are at all comparable in regard to quality and general convenience with those of pyro, and this is more especially the case in connexion with the question in dispute—that of density.

Under normal conditions, that is, employed in "plain" solution, or with no further addition than the alkali, hydroquinone gives images of great beauty and delicacy, entirely free, except in the case of serious under exposure, from all fog or stain, such as would be almost inevitable with pyro. But this beauty and delicacy are accompanied by a strong tendency to thinness and poorness of deposit; in other words, a difficulty in obtaining density, which is not materially affected, as in the case of pyro, by increasing the strength of the solution used. Used in this manner, the only thing that can be claimed in favour of hydroquinone is that it works without fog.

By simultaneously increasing the strength both of hydroquinone and of alkali a heavier deposit is produced, but it is not of the character that leads to vigour and contrast; it is, in fact, density, not intensity. The increase of the opacity of the high lights is accompanied by a similar and perhaps proportionately greater effect of the same kind in the half

tones and finer gradations, the whole image being pervaded by a sort of veil, not of the nature of "fog," but sufficing to give additional "harmony" to an already too "soft" picture. The ultimate effect is, indeed, simply to lengthen the time occupied in printing, without in the least improving the character of the result.

When, however, we use an addition of bromide, especially if accompanied by a sulphite, the behaviour of the developer is entirely altered. The first and most noticeable feature is the greatly protracted time required, not only in starting, but in completing the image. This is accompanied by greater clearness in the shadows, and the sum total is a strong tendency to the production of harsh results.

To overcome these, recourse may be had to one or both of two expedients, either of which will, except under proper conditions, only aggravate the evil. To increase the exposure or the proportion of alkali in conjunction with pyro development is usually tantamount to producing greater harmony and softness in the resulting image. Either remedy, however, in the case of hydroquinone, acts primarily in a contrary direction, namely, in the production of greater density and contrast, apparently for the reason that the action of the restrainer is greater proportionately on the shadows of the picture than on the lights as compared with pyro. The presence of bromide permits the use of a far larger quantity of alkali without fogging or veiling the half tints, and with this increase the density obtained is constantly augmented, so that the general tendency is to push forward the lights without a corresponding effect upon the finer details.

If the development be continued long enough to bring out the tardy half tints, the probability is that such a degree of opacity on the lights will result, that the negative is of little use for any but photo-mechanical processes, and then not for half-tone subjects, as the shadows will be too feeble.

The proper way to proceed for ordinary half-tone negatives is to keep down the proportions both of alkali and restrainer, and to exercise patience. Where ultra density is required, as for line work, then both may be increased almost *ad libitum*, and we believe no method of alkaline development will then give greater opacity.

So far we have alluded to the employment of the carbonates. If these be replaced by the hydrates, the effect is certainly an increase in the energy of the solution, but it is chiefly confined to its rapidity of action. The hydrates, in fact, seem to relieve hydroquinone of a great portion of its abnormal sensitiveness to the *retarding* action of restrainers, and to place it more on an equality with pyro. But the same peculiarities remain, namely, the capacity for using large proportions of alkali, and the disproportionate effect produced upon the lights and shadows, the property, in fact, of giving increased density with increase of alkali. By varying the quantity of restrainer this may be so varied as to add to or decrease the contrast, and so by judiciously ringing the changes any desired effect may be obtained, and with the same facility as with pyro, though with a far greater degree of density than the latter.

A SUGGESTION TO PLATE MAKERS.

It is by no means early in the day to make a suggestion to plate makers which it is matter for wonder that it has never before been carried out. It is, simply, that every individual plate should be branded. The manufacture of gelatine plates is now a business of commercial magnitude, and that hundreds

of thousands of pounds' worth of plates per annum should be sent into the market, in the direct name of those who produce them, each make having its own distinctive peculiarities of working, and that not one of them is branded or marked to distinguish it from another, seems neither more nor less than an absurdity. If the plates themselves possessed peculiarities of appearance that in the dark room would render recognition easy, these remarks would be uncalled for, but they do not; and few, if any, will be inclined to deny that if a dozen plates, each one from a different maker, were placed unwrapped in a dark room, the photographer does not exist who could place the maker's name on each with no more assistance than a mere inspection. It may be said that the users of the plates could mark them for themselves if they required anything of the sort; but, granted they could, there would be no pertinence in the reply, seeing that the complaint in question is that makers send out unbranded goods.

There is scarcely a photographer, who has not entirely confined his work to a particular brand, who will fail to appreciate the value of a plan which should enable him, no matter at what distance of time, to be able at a glance to know what particular plate he is working with when he unearths a forgotten boxful; or, in experimental work, has neglected to keep each kind sufficiently apart.

The need for branding is by no means confined to the amateur, for the professional who has to depend upon other hands than his own for filling his slides with plates, or for putting aside for development plates that have been exposed and are awaiting the bath of pyrogallol, is in the same category. How very pleasant for a dozen double slides to be charged, say, one half with quick and the other with slow plates, and through stress of weather or other circumstances kept unused for a few weeks, and then on the day they are to be used for the photographer-in-chief to be told that his assistant has mislaid his memorandum, and can't be quite sure whether the first twelve or the last are the quick plates—he knows it is one of the two! Or, again, on another occasion, when during press of work two lots of plates are put into a grooved box with a slip of paper between to separate the kinds, and the box and its contents are forgotten for a while, how very pleasant the effort to try to remember whether those to the right or those to the left were a particular kind wanted! It is useless to multiply examples; almost every photographer could supply them, and must, at some time or other, have suffered from the effects of his plates being "mixed," and maker A's plates undiscoverable from maker B's, though at the time he is possessed of a craze in favour of A or of B. Again, in the anxiety for fame it is quite permissible to imagine that when a particular negative is in question, say in competitive exhibitions, it should be easy to ascertain unmistakably by whom the plate was made.

We have said enough to show that we are fighting no imaginary grievance, it only remains to point out a remedy. The first idea that would naturally occur would be to mark or scratch, with a diamond or otherwise, some name or device on each glass before or after being coated; and there is no doubt this alone would be a step in advance. But in the dark room, which in so many instances are still merely dark dens, the labour of finding, and then of reading, the marks when found would rob the assistance of most of its value. Still, assuming that the back of the glass, and not the film itself is to be branded, it is obvious that either paint or printed label would be far better. Paint would have the advantage of being capable of application in such a manner as to be permanently

attached, unless strong friction were used—spirit mediums might be employed, and then the drying would be so quick as not to interpose with the speedy storing of the plates. It is true, labels might be attached by means of chrome alum or gelatine solution, and so be in little danger of washing off, but it is probable that preference would be given to a "painting" process. There would be a great advantage in a label, inasmuch as when it was desired to, as some photographers prefer, write a memorandum of subject or exposure on each plate upon removal from the dark slide, the maker's label might be left partially blank for the purpose of making those notes often found so useful.

Painted marks might be put on by indiarubber stamp, by stencilling, or by any other process found most easy and expeditious. The chief point to decide would be the form the device was to assume. The method likely to find favour with the makers would be to put their own names on; but it is by no means the best plan. What is wanted is a sign that could be read at a glance in the dimmest of lights, and this would not be the case with a maker's name. Of course, a capital initial letter might be used; but what would be far better would be a series of geometrical forms, each maker to announce his as chosen. There might be diamonds, squares, triangles, stars, circles, parallel lines, crosses; and these, again, hollow, solid, or combined. If they were made large enough they could receive pencil marks in lieu of labels for notes or memoranda of exposure.

The subject ought not to need more expounding; we have made a suggestion which we consider of great value. Let the manufacturers of plates consider it and put it into practice. We trust that before another year comes round there will not be a plate on sale which does not tell its own tale by marks on its back, "who made it and when."

THE friends of that *quondam* eminent photographic amateur, Mr. Russell Manners Gordon, who was at one time so well known in London circles, will be pleased to learn that, having succeeded to an old family title, he is henceforth no longer Mr. Gordon but *Le Vicomte de Torre Bella*, a singularly mellifluous title, by the way. In course of a conversation with *Le Vicomte*, who is at present in London, we learn that, although he keeps himself *au courant* with photography, he has practised it but very little since he took up his residence in Madeira, owing most probably to the lack of suitable subjects in that sunny island. But on a recent visit to the French Exhibition he has been so much struck by the beauty and efficiency of some of the English cameras there displayed that the old love has asserted itself so strongly that he will be induced once more to enter the field he had so reluctantly to give up when called away to superintend his vineyards in Madeira.

PROBABLY at no period of his life has the Shah had so many photographs of himself taken as have been secured during his present visit to Europe, particularly during his stay in this country, for nowhere, we imagine, is instantaneous photography, with detective cameras, so largely practised as in England. And wherever the Shah has been there was no dearth of detective cameras. The Eastern potentate himself takes, or used to take, a great interest in photography, and on his previous visit to this country amongst his *suite* was his chief photographer. Whether this official accompanies him on the present occasion or not we are unaware. It is tolerably certain that there is not now the same rush amongst photographers to obtain sittings from our illustrious visitor as there was on his previous visit.

WE remember an amusing circumstance in connexion with the Shah's former visit, which exemplifies the freemasonry that exists, or at least did exist, for we fear the feeling is somewhat dying out of late years, amongst photographers. A number of the Shah's retinue

visited a studio in Regent-street, and sat for portraits of a somewhat large size. After the last sitting was made, and while the negative was being developed, the interpreter left the studio to make some arrangements in the reception room. When the photographer emerged from the dark room, by signs and gestures an unmistakable desire to see the negatives was manifested. The artist tried to impress upon the sitters that they could form no opinion from the negatives; but as he could not speak Persian and they could not understand English, the explanation, as might be imagined, was not altogether satisfactory. Ultimately one of the negatives was produced, the photographer still retaining it in his own hands for fear of injury, till one of the party stretched forth his arms, with two fingers distended to take the negative, in such a manner that the artist at once recognised a brother in the craft. Each negative was then handed out without further demur, and were as jealously guarded by the Eastern *confrère* from touches by the others as they would have been by the photographer himself. Smiles and nods, and a cordial greeting at parting, showed that these two men understood each other perfectly without the aid of an interpreter.

PHOTOGRAPHS of the interior and the grounds of the Paris Exhibition are of course interesting *souvenirs* of a visit, more particularly if they are taken by the visitor himself if he happens to be a photographer. In most English exhibitions the sole right of taking photographs is generally sold to some one individual or a firm, and no one else is permitted to use a camera within the precincts of the show. At the Paris Exhibition the Executive have proceeded on different lines, and instead of selling an exclusive right, are allowing any one to take pictures within certain hours, and on payment of specified fees—so many francs per day or per week, as the case may be. Hence photography at the Exhibition is open to all. Whether as a commercial speculation this answers better than disposing of exclusive privileges remains to be seen. Exclusive rights are usually looked upon as a monopoly, but here the arrangement has a decidedly free trade character.

It did not take the authorities very long to discover that photographs were being clandestinely taken in the Exhibition. This, of course, was accomplished by the aid of detective cameras. The Executive are now, we are informed, fully on the alert for these, however well they may be disguised. A gentleman recently paid a visit to the Exhibition with a Kodak and made some successful exposures. But he was more than once an object of suspicion by the officials, and he is scarcely likely to repeat the experiment. The penalty for taking photographs is, we believe, a fine of some four or five hundred francs and forfeiture of the apparatus. Although the penalty is heavy, and the inconvenience of the loss of apparatus is great, we have little doubt but that some photographs will yet be taken without the regulations being complied with.

CLEARLY the question of dark rooms at the different Custom Houses, raised in the House of Lords a few weeks back, is not to end in becoming a dead letter, as some predicted it would. In the House of Commons one day last week another question on the same subject was put by Colonel Cotton, which elicited the reply from Mr. Jackson that definite instructions had been given to the officers of the Custom House as to the proper examination of undeveloped dry plates; and that he would take care that suitable accommodation was provided at the various Custom Offices for the examination. This assurance will be hailed with satisfaction by every travelling photographer.

It is to be hoped that the illumination provided will be arranged under the supervision of some competent person, so that the light is above suspicion. The ideas of Custom officials, who may be ignorant of photography, as to what is a suitable light, may possibly not be in accord with those of the photographers who have to submit their plates to it.

From the *Journal of the Society of Arts* we perceive that a medal of the Society has been awarded to Mr. Conrad Beck for the paper recently read there on the construction of photographic lenses.

It would be interesting to know how many of the pictures shown at the different exhibitions now open in London—not excluding the Royal Academy itself—are indebted to photography. In landscape painting the artist frequently employs a photograph to assist him in his work, the same with *genre* subjects—the models often being photographed in the first instance, while in portraiture a very large proportion of the work is executed—in some instances almost entirely—from photographs; and all this without acknowledgment. Indeed, some of those painters who utilise photography the most never fail to decry it whenever they have the opportunity. There is no question that photography has been the means of improving art, and particularly is this the case in portraiture. At one period photographers looked to painters for their poses, hence, at one time, the universal column and curtain, or the table and book. Now the case is reversed, as the different exhibitions testify.

ECHOES.

As the first outcome of the recent mention in Parliament of the difficulties experienced in passing dry plates through the Custom House, I see it announced that instructions have been issued that a "suitable dark room" is to be provided at all the chief ports of entry for the proper examination of all packages claiming to pass as photographic plates, but which may be suspected to contain matter of a different character. This is, so far, most satisfactory, but I cannot help feeling some doubts as to the complete feasibility of the scheme, at least so far as it is likely to be carried out.

In the first place, the establishment of a "suitable dark room," in the strict and accurate sense, at all our out-ports, means a considerable expense, for which the revenue could expect very little, if any, direct return. A photographic dark room, if it is to be of any practical use for its legitimate purpose, and always available when so required, can scarcely be adapted to any other purpose, and will therefore necessarily be something of a "white elephant." Officialism will scarcely recognise the utility of setting apart a specially fitted room to be held sacred to one particular purpose, and to be used at rare intervals during the greater part of the year, and only by fits and starts during the holiday season. The chances are that the dark room provided will be anything but "suitable" in many cases, and the lot of the travelling photographer who is compelled to utilise it will be worse than ever. We have it on the authority of Lord Salisbury, that on at least one occasion a Custom House officer acted, in the matter of photographic plates, with more than ordinary stupidity, and that, as a class, those officials cannot be expected to be more than human. We may, therefore, fully expect that in the future, when an unfortunate peripatetic camera man falls in their way, they will "take it out of him" by forcing him to use the room provided for him, and to test its safety and suitability at the expense of his plates.

On the other hand, it is just possible that the mere issuing of the order referred to may act beneficially for the photographer by impressing upon the mind of the average "searcher" that sensitive plates really have an actual existence, and are not the mere invention of ingenious contrabandists. The knowledge that an official dark room is *supposed* to exist may suffice, perhaps, in the official mind as a check upon attempted smuggling of small trifles under the excuse of "dry plates," and the nett result will, perhaps, be that matters are rendered generally smoother all round.

Apròpos of the remarks made a week or two back on the proportions of gold and silver relatively in photographic residues, and especially of the effect produced upon those proportions by the *tone* of the prints, I am inclined to question whether the colour, *per se*, has much to do with the matter. The strength of salting of the paper would, I fancy, prove a far more powerful factor, for a "red" print from a suitable negative upon a heavily silvered paper might contain a far larger proportion of gold than an absolutely blue image printed from a thin negative on a paper poor in silver. In addition to that, the more heavily salted the paper is, and the stronger the silver bath employed, the further can the toning be carried without producing unpleasantly cold tints, so that, independent altogether of colour, a strongly salted paper is likely to carry a larger proportion of gold. Some few years back it was stated by Mr. W. K. Burton that the

silver image upon albumenised paper may be *totally* converted into gold without robbing the print of its warm tone, though I must confess that I was not impressed with the infallibility of the arguments brought forward in support of the total conversion. Still, if the latter result is anything like approached, and a brown tone remains, what becomes of the colour test and the relative proportion of gold and silver mentioned in the paragraph referred to?

A very practical paper on a very commonplace subject was that read by Mr. E. S. Worrall before the University College Photographic Society, and some of the author's remarks are worthy of being reprinted in book form and carried in place of the usual "exposure tables." These I have always held to be unreliable, and in one sense far worse than useless, for in the hands of a beginner they establish a confidence which only confirms him in error, and prevents his gaining that real knowledge of exposure which careful experience alone can bring. I have known two distinct cases in which beginners have relinquished photography thoroughly broken down by the constant failure engendered of too implicit confidence in "exposure tables."

"Tables are useless unless they deal with constant conditions and quantities," says Mr. Worrall, and that just precisely hits the nail on the head. Again, he says, "I do not see how these (exposure tables) can be an unfailing guide to us unless used with a perfect actinometer, and this, I believe, has still to be invented." Quite so, for in my own view any form of actinometer I have yet seen is, when applied to landscape purposes, of as little value as the tables, since it leaves all the conditions except the aperture of the lens and the strength of the light entirely to the judgment. It is of no earthly use arguing, as many have done for years past, that they have got on better with exposure tables and actinometers than without. It is no proof of anything except that they are able to use some judgment, and that, naturally, with at least one extra condition fixed, that judgment can be more accurately applied.

Mr. Worrall also touches on another pet theory of mine when he says, "The more rapid the plates the less the latitude of exposures." So far as the chemical side of the question is concerned, I think few will deny that this is a fact—at least, with the general run of plates. I do not mean to say that it is a matter of necessity that a very rapid plate should not possess *proportionately* as much latitude as a slower one, but practically it does not. But there are those who, setting on one side the chemical part of the question, will argue that it is as easy, to put it as one writer did some years ago, "to err proportionately" with a plate requiring a fractional part of a second's exposure as with one requiring several seconds. This seems to me a ridiculous contention, for, even granting that the *absolute* exposures required with each are known, the mere mechanical operation of exposing to a minute fraction of a second must necessarily be the more difficult. However, on such points as these it is of little use arguing with enthusiasts; but I may say that two of the strongest opponents of my view in this matter are practical photographers of the very first class—men, in fact, whose *experience* enables them to succeed where others would fail signally. It is scarcely fair, then, on their part to entirely ignore the "personal equation."

In reading Dr. Huxley's remarks before the Birmingham Photographic Society on the subject of platinum printing, it seems to me that gentleman holds views which differ very materially from those in general vogue. He says, "A negative from which it was difficult to obtain a silver print would yield by proper treatment a good platinotype." This is entirely contrary to anything I have previously heard or experienced, for I, with many others, have always believed that a vigorous negative with clear shadows was necessary in order to get really good results. It will be interesting, therefore, to know if other practical platinotype workers find it possible, by varying the strength of the sensitising bath, to adapt the process to negatives of different qualities and characters. This is certainly the case to a marvellous extent in the carbon process, and to a much less degree in silver printing, but I have not found any practical advantage accrue from the application of the system to platinotype.

I think, perhaps, the context explains that the description in Mr. Ernest Seyd's paper of "ferricyanide of potassium" as "yellow prussiate of potash" is either a slip of the pen or of the printer, but such accidents are frequently very annoying to beginners in any process, and should be, "when found, made a note of." Let it be

remarked, therefore, that the yellow prussiate, which I believe is intended, is the ferrocyanide.

A similar "slip" occurs in the developing formula given by Mr. Paul Lange in his demonstration of enlarging at Liverpool, in which "ammonio-bromide, 40 grains" forms one of the ingredients. Ammonio-bromide of what? I presume ammonia-bromide is meant, but why not give it its proper name, "ammonium-bromide?" Our general system of nomenclature is excessively slipshod, and matters are by no means improved by the introduction of a large number of bastard expressions of purely photographic origin, or, rather, purely the invention of photographers.

JUNIUS.

COLOURED PHOTOGRAPHS.

II.

As it is always the *finished work* that has to stand the brunt of criticism, to possess the merit and value, if any, we must not shut our eyes to any consideration that may be necessary or likely to help us in working out the same. There is no absolute necessity that our thoughts should be wholly given to the numerous ways of applying colours to photographs or to conclude that the perfect photographic base be given to us. No, we should aspire to be able to produce it, or at least aid, by our artistic knowledge, in its production. Why should the photographer be considered less than the artist, or even colourist, when discussing portraiture (coloured) on photographic base? To do so would, I think, be a very grievous mistake, and one into which I hope our egotism may never lead us. The temptations are many, but we must overcome them.

There is a considerable tax upon the art knowledge of every photographer or artist who produces a picture wherein the full or three-quarter figure is represented. At times, too, one or other may have most awkward groups to pose, and it is only at the cost of much labour and thought, combined with artistic feeling, that a successful picture will be secured. Some of the most awkward groups I have seen have been successfully tackled by a gentleman whose studio is situated within a radius of about one hundred miles from Whitby, and I feel sure, if we had his opinion on the subject, he would tell us that nothing but thought and his natural artistic feeling enabled him to make successful pictures of many of them.

It is in this kind of work (groupings and full or three-quarter figure subjects) that an operator has scope to exhibit his skill and knowledge to completeness, for here he has the posing of the head, or heads, the arrangement and artistic disposition of needful accessories and various draperies. Great judgment, too, is required in the arrangement of the light, as all the delicacies of light and shade are dependent upon careful adjustment of the same. In groups, too, a general knowledge of the rules which apply to composition will be found of invaluable help.

By this, however, I do not wish it to be understood that there is little or no knowledge required for the successful posing of a bust, or that any one can place a sitter down in a chair and dash off a successful portrait. Of course, such may be done by accident, but it is unsafe to trust to such a help. There is a deal of artistic knowledge and fine feeling required to pose a head in such a way as to impart importance to it, and, at the same time, endow it with intelligence and life. It may be the very *least* turn of the head that does it, but therein lies the artistic feeling that appreciates the want and invests the portrait with artistic merit. It is this feeling that lifts the artist's photography above that of his less favoured rivals, be it through ignorance or carelessness. To bear out what I say, I may state that I know several photographers (successful London ones) who make most excellent pictures when they have the entire figure at their disposal. They show consummate skill in lighting, a keen artistic judgment in the adjustment of accessories and draperies, and yet give them a head to pose and their pictures are to a degree ordinary. To colour such a bust of course an artist would have to endow it with life; an ordinary colourist would leave it (although coloured) as it was before, lifeless. Naturally they are more like the people coloured than uncoloured, but they will always bear a strong family likeness to the plain photograph, for they lack the artistic touch and feeling which alone can raise them to the dignity of being *portraits*. It would not be allowable to mention names in these papers, but there are two or three London photographers whose works (head and shoulders I speak of) I always find pleasure in contemplating. The artistic feeling possessed by the operator is visibly reflected upon the faces of his subjects. When I cite London photographers, don't let any one run away with the idea that I place London before the provinces. In a business way the London work that passes through my hands is

really not to compare with that which comes from the *provinces*, speaking generally. I do not feel capable to judge whether press of business or lack of knowledge is responsible for this, but if I were allowed a free selection of fifty photographs I have not the least doubt I would choose from forty to forty-five from the studios of provincial photographers.

Another point to be kept in view is that a *portrait* should also be a *picture*. We must, therefore, try to settle in our own minds what is and what is not a picture. It does not follow that the reproduction of an object, or the truthful delineation of a face, granting the same to be a likeness, will constitute a *picture*. No! A really good *portrait*, to be entitled at the same time to be called a good *picture*, can result only when the subject treated is represented under such conditions of position, general appropriateness of surroundings, light and shade, &c., as will endow it with character and expression, and at the same time lend to the general pictorial effect.

The time for thought is at the *beginning*; consequently, we must hold the operator responsible for much. This because our work must follow on his lines. It is well understood that he is hampered by many difficulties, and has not the same control over his subjects that an artist has; still there is much that he can do. He can select his positions, also control to a very great extent his lights and shades, and thus secure the most pleasing and characteristic lines and features in his sitter. Judgment may be shown, too, in the selection of accessories and their artistic arrangement, they often helping to hide natural defects which might otherwise mar the beauty of a work. Tone or colour may be secured by their artful adjustment, also balance; but care should be taken to keep them subdued lest they interfere with the importance of the figure, whereas they should lend artistic simplicity, harmony, and a feeling of breadth and airiness to the finished picture.

When starting a portrait, especially full-length, it naturally strikes one that the first point to be fixed upon is *position*. To decide this it should not be looked upon as a light matter. Upon our success in this regard depends the character of our picture, as well as the general pictorial effect. Even when this point is settled there is another to consider, the position our subject will occupy in the picture itself. Looked at casually this may not appear of much moment, but it is, and may be of vital importance. A figure, I may safely say, should almost *never* be placed in the exact *middle* of a picture. I do not think there are many positions more formal or destructive to pictorial effect. I have known cases, such as soldiers' portraits, where they have looked all right in the centre of the picture, but such form the exceptions that prove the rule. Even in these improvements might be made by placing them to better advantage. As a general rule it may be taken that there should be more room in *front* of the subject than behind. The contrary might suggest that, on slight provocation, the sitter might walk out of the picture, and such is not a pleasing effect. If a lady have a *train*, say in Court dress, we may find we have to modify the above, but much may be gained in the skilful adjustment of this portion of drapery so as to enable us to carry out our rule. This rule will be found, if anything, more important as regards top and bottom than it does to the sides.

By the position we give our subject in this regard we fix his height. If the head be near the top it will suggest that our sitter is tall, if low down the opposite will result. This may be illustrated by an incident which occurred in a West End studio some little time back. It is supposed that all the officers and troopers in the Household Cavalry are "*all very fine and large*," but it is not so. After the war in the Soudan orders were given to make the swords longer, and one day at the studio an officer came to be photographed, who was (I flatter him when I say it) low sized—I feel sure if he had to have drawn his sword in a hurry he could not have succeeded without a life-and-death struggle, or the help of a step ladder—still an imposing picture was made of him. He was placed well *up* in the picture and a *low* pedestal placed beside him, which by contrast gave him height; then when the picture was being trimmed for mounting it was cut comparatively near to the head, and when on the card gave the idea of a man valuable to his Queen and country. Although all this can easily be seen as applicable to full-length and three-quarter figures, one might think it did not apply to busts, but it does. Height can be implied, and when in a bust the face is profile or three-quarter there should be more space in front of it; if, however, the face be absolutely full, without being in the least inartistic, it may be placed equidistant from either side.

It is possible to place the human figure in almost limitless positions, but care should be taken to secure one that will suggest ease, grace, and character—a result not too easily obtained. An object or purpose should be reflected in the position selected. This does not mean that

the sitter must necessarily be engaged in any particular occupation. Great attention must be paid lest the expression of consciousness of being photographed, or that of complete vacancy, should be depicted upon the sitter's face, as such would be ruinous to our picture.

In ladies' portraits there are many positions which impart action and intention—reading letters, arranging flowers, or looking at a picture, &c., at the operator's option. These occupations for gentlemen's portraits would not be quite so felicitous perhaps, but there are others at our command. Even that conventional "*book in the hand*" can be used to advantage if skilfully arranged so as to give expression and purpose.

Many approve of complete repose in a picture, but it should be, if I may so say, "*intellectual repose*." A danger that lies close at hand is the appearance of absentmindedness, fatal alike to a good portrait and picture. In all cases avoid straight lines and angular positions, at times more troublesome than appears on the surface. The human figure in a "*bolt upright*" position is not at its *best*, although, perhaps, at its *highest*. In a man it is devoid of grace (if we can ever boast such a quality); in a lady it is awkward, if not absolutely offensive. It is, therefore, advisable that the figure should lean slightly against some article of furniture, such as a high-backed chair or screen, &c., thus giving a slight inclination, and lending itself to curved and flowing lines both for figure and drapery.

In a standing figure there is more repose suggested by resting the weight of the body upon one foot rather than both. To rest the figure upon both feet equally, and at the same time secure ease (elegance is out of the question), is a task I do not advise any one to tackle.

In a question of composition, always bear in mind the most beautiful and perfect effect to be arrived at is *simplicity*. Over elaboration mars the beauty of a portrait, and detracts from its artistic excellence. Examine the works of our most famous portrait painters, and note the tendency of all the lines, the extreme simplicity and unpretentiousness of the colouring. Yet what beauty and effect! See what a balance there is in the entire picture. In the upper parts there is atmosphere, and in the lower weight and solidity, conditions most desirable in all portraits, whether in colour or plain photography.

REDMOND BARRETT.

CARE.

THE careful photographer is careful of his belongings, and whenever you see a man scrupulously fastidious about the condition of his camera and lens, it is an outward and visible sign that he will be careful about his work generally. The reasonable inference is, that he will be tolerably successful in anything he may give his attention to. Habitual care shows itself in everything a man does, and in quite as pronounced a manner as does habitual carelessness, when we find force used instead of dexterity—lenses dropped and focussing screens broken, &c., a sort of rough-and-ready treatment all round, with a supreme indifference to the results. The work of such a photographer is generally defective, no matter how artistic his pictures may be. Careful manipulation and artistic judgment must be combined to produce thoroughly good work, and when we see it we know where to find the successful man. There are, of course, no rules without exceptions, but careful men and careful work generally go together. If we look behind the scenes, we shall, nine times out of ten, find the skilful professional, whatever his profession may be, also skilful in many other ways than the one with which the public associate his name. I believe all, more or less, possess a certain aptitude for mechanics, draughtsmanship, or a general all-round inventiveness; the fact of the exhibition of exceptional skill in any particular direction that requires special manipulative power indicates that a general all-round ability exists, that would be exercised in some form or another under any circumstances, which the bias of the possessor has turned to some particular line more congenial to himself than others.

To be a skilful photographer, scrupulous care and exactitude is required in this as in other things, and this habit of carefulness will include and extend to everything taken in hand, from the setting up of the camera to developing and finishing the negative. By the term photographer I do not mean the man who does little more than expose his plates, and, perhaps, develop them according to some special formula, from which he never intentionally deviates, but one who understands the process from beginning to end, and, if necessity should arise, could prepare all his requirements unassisted, and do it well. There exist brilliant geniuses, who, being thoroughly capable, seem to delight at being ostentatiously careless, and making an immense amount of waste without an adequate return. This class is generally found among the gilded youths of the period, who,

as soon as they have made themselves masters of their hobby for the time being, throw it up, and are equally hot on something else, to be relinquished in its turn; they are, however, most frequently a terrible infliction to those about them.

In defining the term, care of apparatus, it may be said to be protecting it from injury, and never using force when knock will do infinitely better. Good apparatus will with care last a lifetime and look well, but to keep it so, it is necessary to keep it dry and scrupulously clean. On returning home from an outing all dust should be removed with a brush or cloths, and the woodwork rubbed up with a waxed polishing flannel, then, after dusting out the case, replace it and set it aside in a cool dry room till again wanted. The dark slides should be kept in waterproof bags lined with flannel, and when the plates are taken out for development not laid down on a wet table or left knocking about open till wanted again, accumulating dust and damage. Dry storage is a wonderful factor in the preservation of cabinet work. If the camera or slides get damp the probability is that they will stick when used, and considerable strain will be given to the delicate woodwork, both in placing the slides *in situ* and in removing them; the shutters may also be difficult to open and close, to say nothing of the danger of shifting the camera with the force that has to be exercised, and so spoiling the picture. "Keep dry" is a rule never to be infringed; a square of waterproof material takes up very little room or weight and is very useful, not only to protect the apparatus from a shower of rain or a continuous drizzle when one is unfortunate enough to have to work in it, but will do excellently well for a table cloth when developing or blocking out light if changing plates. The leather bellows of a camera once soaked through is never so nice again, it becomes stiff and the glueing gets loosened. Warping may take place in the woodwork, not very much perhaps, but sufficient to make it less light tight than it ought to be, and the screws get rusty. The rough treatment some cameras get without becoming unusable speaks wonderfully well for the workmanship and the thoroughly seasoned material used in their construction.

Circumstances may occur when the care of the camera is beyond the control of the photographer; at such times, if possible, it ought to be packed with extra care. If on a railway journey, the leather cases usually supplied for them are very little protection, and require a wooden or wicker case in addition. Carriers are proverbial for destructiveness, and anything in the shape of a box comes in for their particular attention. More care than is frequently shown is required in moving the tripod and camera when set up for use; a leg may become detached and the whole apparatus swing round, and, if it does not come to the ground, will probably get strained and injured. Altering the position of the camera requires perhaps as much, if not more, care when at work than any other operation, and perhaps more damage is done in performing this simple operation than any other. Care should always be taken never to leave the camera or dark slides exposed in a blazing sunshine, or to place the focussing screen, when it is removable, in a place where it is likely to be kicked against or trodden upon. These little matters, self-evident as they are, frequently add to the discomfiture of the photographer when on duty. It is so easy to forget when the mind is full of picture taking, especially if waiting for some particular effect.

Lenses should have special care taken of them, and not scrubbed or polished any oftener than is absolutely necessary, then only with a soft leather and gentle friction. When out of use they should be kept in a close-fitting padded case, so that the temperature they are in is not liable to sudden fluctuations. The condensation of moisture on their inner surfaces fixing the dust that may be there is one frequent cause of dimness. A cold lens taken into a warm room will become covered with moisture, and a few repetitions of this produces a film on the lens that requires polishing off, and the less rubbing of any sort a lens gets the better. Care must be taken, in replacing lenses that have been removed from their mounts, that the thread of the screw is in proper register; if there is the slightest friction or force required more than usual it is because there is something wrong in the register, so do not use force to make it fit, but start afresh. If you are attacked by a dog, fling a stone in preference to your lens at him. In other words, always handle your lenses with the most scrupulous care, as if the slightest rough treatment would injure them, and always keep them under your own control.

Exercise care in the treatment of your plates from the time you take them out of their original packets till they become finished negatives worth keeping; care that no stray white light fall on them at the wrong time, or any light at all more than necessary; care that your dishes and measures are clean, and that your bottles are not left uncorked or unstoppered if there is anything in them; care that you have them properly labelled; care that, in making up your formulae, that the quantities are not transposed, or that, in developing, ammonia

is not added in mistake for bromide. If all these and other little cares are taken, it would be surprising what a number of good pictures would be turned out to what there are; for photographers may rely upon it, that success depends more on carefulness about many little things than the make of the camera or sensitiveness of the plates.

EDWARD DUNMORE.

COLOUR, ITS STUDY AND RELATION TO PHOTOGRAPHY; ALSO THE TAKING OF PICTURES ON OPAL CARDS.

[A Communication to the Bath Photographic Society.]

THE perception of colour by the eye tells us only of our impression of the thing, not at all the thing itself. When we speak of redness of a rose we really mean that its petals have the property of reflecting certain rays of light, and that the light produces in us the sensation of colour we call redness. It was not, however, until Newton showed that ordinary white light can be split up into many colours that it was easy to comprehend that the red colour of the rose is due to the property which it has of selecting the red, and reflecting it, while the other colours are lost.

There are two very common errors on the subject of "primary colours:" one is to suppose that Sir Isaac Newton discovered seven primary colours when he split up a beam of white light by means of a glass prism. The so-called seven colours are, as is well known, red, orange, yellow, green, blue, violet, and indigo. The ordinary colour of indigo is not pure enough to rank among these. A more correct and complete list would be—violet, violet blue, blue, peacock blue, sea green, green, yellow green, yellow, orange yellow, orange, orange red, red, deep red; most apparently pure tints are a mixture of a group of these, or four of these colours. The green of a leaf contains a small amount of violet and blue, and a considerable quantity of deep red. The orange of a certain kind is nearly pure. These tints, however, are not more beautiful on account of their purity, for exactly the same apparent tint could be produced by a mixture of several colours. *Pure colours are very rare in nature.*

However, I am not going to detain you with the mixture of pigments; it would take too much time. When white light falls upon a piece of coloured glass, some of it is reflected at the surface and the rest attempts to penetrate the glass—some of the rays succeed in getting through, and others are stopped; something, however, must become of them, for nothing is lost, *even in colour*. They are neither reflected nor transmitted, they are dissipated in the form of heat, &c. Those rays which get through have little difficulty in piercing another thickness, they have, as it were, a passport for that substance. Before the light passes through it meets with the second surface, and here some of it is reflected and retraverses the substance, a portion being again reflected at the first surface, the greater part of that which has not been absorbed passes through. In a mass of crushed glass the light will behave in this manner in passing through the first particle, and on striking the next some of it will be reflected and pass back through one of the upper pieces; some will strike deeper and be reflected through several layers; the general light reflected from the whole mass will be partly white light and partly coloured. This state of things exists in all coloured bodies—they are all more or less transparent. It will be noticed that the less transparent bodies have a whitish colour compared with those which are very transparent. It is now clear by this that in mixing paints we do not add the colours but subtract them, for the light which has passed through the first particle has in all probability to return through another of a different kind, and only that light succeeds in traversing both which can pierce both substances.

Colours are said to be simple when they are to be found among those into which white light is split by the prism. There are a large number of tints which are composed of pure colours and white; one colour remains which is not a simple colour, nor a mixture with white and black. This is purple, which is a compound of blue, violet, and red. There is a popular error, and one which it is very difficult to explain; it is that there are three primary colours—red, yellow, and blue. This theory was supported by Sir David Brewster, whose optical discoveries gave him considerable claim to be heard. The common argument is, You cannot make either of the colours by any mixture of two or three colours, while any colour can be matched by a suitable mixture of them. The fact is, that this power of producing other colours by mixture of pigments is due to their not being simple but compound colours, as I have already explained. There is, however, another colour theory, I mean three-colour theory, which is supported by the names of Young, Maxwell, and Helmholtz (no mean names, I can assure you), and this is founded not on paints, or, indeed, on any external colours, but on the structure of the eye. It has been

almost indisputably proved that there are three sets of nerves, or three processes of sensation in the eye for red, green, and blue, or violet. It is true that these three colours seem ill-suited to make by their combination all other colours, but that is because one is accustomed to think of mixtures of paints, not of colours proper. There are many ways, but they are beyond the scope of this paper, in which it may be plainly shown that blue and yellow, or green and purple, or red and blue-green, make white, as red and green make yellow. The red-seeing nerves take in the orange and yellow, and the green set takes in the yellow and blue, so that a yellow tint is known by its action on both red and green sets, in a proportion depending on the kind of yellow. When all three are equally excited the effect of white is produced. If one of these sets of nerves is fatigued by dwelling for some time on nothing but the colour which principally characterises it, it becomes less capable of being stimulated by it, and if all three sets are then given an equal chance, by looking at a white surface, the other two sets of nerves, being, so to speak, fresher in the field, have it all their own way, and give the impression of a blue-green. An example of this is well known in the form of a popular advertisement. Another instance of the fatigue and repose of the different colour perceptions is to be noticed at night. Artificial light is generally rich in yellow and red rays, and deficient in blue and violet; in fact, after dark the blue-seeing nerves being, as a rule, so little used, the others warp the judgment of the mind, and a false standard of white is set up—the standard is yellowish, but it is not as though we see through yellow glasses; the more the nerves are excited the whiter is the effect. The mind becomes accustomed to treat a full excitement of the red, a partial excitement of the green, and a feeble impression on the violet-seeing nerves as an equal stimulation of the three, that is, white; and when a more liberal proportion of blue rays is present the effect appears more as an excess of blue. Who has not heard of the blue and deathly appearance of the electric light, especially when they first see it? In time you get quite used to it, and do not notice that appearance; in fact, you like it. Many people are charmed with the electric light in my studio at Piccadilly. Lady Torrens, who was in Africa many years, said, "This is charming; exactly like the African sun." Nobody knows what a grand future there is for electricity, and nobody knows the troubles of the working of it at the present time which will make it more easy for the future workers. Well, the actual colour of the electric light is really a pale primrose when compared with the light of day, and the sun itself, which is, after all, our only ideal of white, is thought by some to be inferior to many stars in the whiteness of its colour.

Though nature is so full of colour, and it acts upon our senses with such force, and we may say it is inherent in all things, I believe the knowledge of the whole world will be found out by colour; I don't mean only the bright and brilliant colours, but the faint and dusty colours as well. I maintain, with our slight knowledge of the physical forces, it is impossible to give an explanation of colour, with its separation and contrast, union and reunion, augmentation and neutralisation, and goodness knows what. If the ox begins to rave at one colour, those who try to fathom it with its two million of tints may be excused if they begin to rave and get furious; nevertheless, let those that study colour for pleasure, let them only master one of the two million tints, and they will have accomplished something to the most complicated and beautiful subject. To others who are not so fond of minute detail, and take a broader view of the subject, let them take the relation of colour to the eye, its action upon that organ, and the action of colour on substances around in the evolution of nature; that is to say, the physical and chemical colours. The first is passing, the second may be made permanent for any length of time, and this is why, I believe, as time rolls on, the problem of obtaining permanent photographs which shall represent objects in their natural colours will be discovered. We are not going to master colour with reading a few paragraphs and doing a few experiments; it will be one continual game of chess: we shall snatch a pawn here and there, and by-and-by some genius will take a knight or bishop, but the grand difficulty will be checkmating—perhaps, after all, it will be a draw. A chemist looks upon colour as an indication by which he may detect the more secret properties of material things, but he finds much difficulty and inconvenience. Why? Because our knowledge of colour is very vague; but no doubt the very faintest tint has its chemical law, and I should say colour is rather calculated to bring to light the most delicate operations of nature. Of course, though I say this, you must consider that the ideas of men vary according to the way they approach a science or branch, for it depends upon which angle they begin at.

Now, the relation of colours to photography is like the relation of vitality to our bodies; it is the nucleus and harmony of everything connected with our beautiful art—which is the steady pioneer and

truthful recorder of nature's secrets—encircling the whole world with speaking shadows of profound interest, and occasionally recording the poetry of motion of the whole universe. There will be more poetry still when we can catch animate and inanimate nature decked in their gaudiest dress of colours just as they are, without pale yellow coming out dark, and dark blue coming out light. Violet we naturally regard as a moderately dark colour, but photography has hitherto represented it as one of the lightest—to understand this, let us, for a moment, consider the relation of photography to the three great divisions of the spectrum, viz., chemical, visual, and heat rays. Photography is essentially a chemical process, the chemical and ultra chemical rays affecting vigorously the sensitive plate; the visual rays have considerably less effect; the heat rays have comparatively none. Practically, no effect is produced when the sensitive plate is exposed to the dark-red rays. Now, the very important question which presents itself is, colour sensitisers, although some assert that the correct rendering of colour gradations is only a matter of exposure, and the so-called orthochromatic plates all rubbish—well, I only smile at those remarks, and wish the ones who make them had done a little practice in that way; as long as only a few practice, we shall not make very great strides, but let it be practised by a lot, and their experience diffused among the many, then we shall have the links accumulating, and not until then shall we advance much. The brightest conquest of the human mind is finding out the truth; with our exceedingly limited faculties we cannot flatter ourselves we know the absolute truth of many things, and if we study nature as a whole, we must take in consideration the mind of the whole human race; so in thinking we must consider our mind is a very small portion of the minds of all the human race, we shall then comprehend how the various minds that study colour consider it under extremely different relations, when, in fact, that which strikes one individual particularly will not strike another at all, because it has not yet been permitted to an individual to make a complete analysis of any one subject, for the desire which leads us beyond our boundary is always our failure. I mean that each science is so dependent upon a lot of others that you cannot draw the line, and, as a rule, one is always trespassing.

Electricity produces phosphorescent effects in the violet end of the spectrum. It may be probable that from the infra red to the ultra violet, the molecules of different things have their electrical conductivity in proportion to their position in the spectrum, and the effect of electricity and light is brought about in unstable bodies much more quickly than in stable bodies, and perhaps chemical affinity will be traced very near the light effect and electrical conductivity of the molecules, because here you can bring in *time* to help you in your researches, and what can help us more in making these inquiries than making photographic emulsions? Here you have in testing the sensitiveness of an emulsion slow towards the red, quick towards the grey or blue; but what is going on between? The word *time*, which ought to be the most important word in any science; and here we have, according to the time you are heating the emulsion, so according to the proportion of time does it take to act when we expose the sensitive plate to light, and according to the electrical condition of the alkali and acid developer so is the effect (which you can prove by *time*) of the clearness or fogging of the sensitive film. I am under the impression that chemists, as time rolls on, will value photography much more than they do at present, for the relation of photography to colour is one of the most simple and yet marvellous of nature's phenomena.

There is a light within us which cannot be decomposed to red, green, blue, &c., but a light which inspires and guides us in science to be always searching for facts and truth which only *time* can measure. Let us in the study of colour, or anything else, take the most simple things. If I take this ordinary wax match and strike it, what an immense study here! The friction you have is electricity (you must remember that is caused by the energy of my body); on striking the match then an explosion, during that time the top of the light is orange; when the flame is quiet you have yellow on the upper part, violet and blue at the lower. There are other colours if you look closely into it; for instance, there is a grey around the stem, besides the stem is brown as it burns away, and red at the top, which is the heat rays. Here you have all the colours of the spectrum except green, but we can trace it. As this match burns it absorbs oxygen and throws off carbon. Where does the oxygen come from and where does the carbon go? Why, the leaves of plants, &c., inhale the carbon and exhale oxygen, so this very wax of the match goes to form the green which absorbs certain of the sun's rays, so that life can live in the leaves, for the green acts as a shield which preserves life in the plant. I could talk for hours on a match, but I have tired you quite enough, so I'll conclude with saying photography is just the

thing to give you the power of perception and lead you closer to nature's secrets, for inside of us must be a *sense* by which we attract the fleeting scenes outside, and that *sense* has a great deal to do with dressing the outer scenes. The best element we have is the *ebb* and *flow* of reason; it sums up the history of all science which is coloured with curiosity, and you must have one to co-operate with another.

I'll now demonstrate before you a picture on my opal cards. I claim for it *simplicity*. You can print the pictures by matchlight, gaslight, or candlelight in a few seconds; the least you wash the better; you require no paper, toning, or solution. You can turn them out quicker than any other process because there is no mounting, and they are as permanent as any process we have in photography, according to my testing up to the present time. I attribute that to the finding out of hydroquinone for the last clearing effect, which was purely by accident.

FRIESE GREENE.

ON ALLOTROPIC MODIFICATIONS OF SILVER.*

As the material appears continually to change, the amount of washing needed must depend on the object in view. If wanted for analysis, the washing must be repeated many times until ferric salt ceases to come away, but no amount of washing will entirely eliminate it. After seven or eight solutions in pure water, and as many precipitations, the material is to be thrown on a filter, the liquid forced out as completely as possible with a pump, and then the ammoniac nitrate washed out with ninety-five per cent. of alcohol until the filtrate leaves nothing on evaporation. The substance at this point is still soluble, though much less so than at first. During the washing the solubility slowly but steadily diminishes, a fact rendered noticeable by less and less ammoniac nitrate being required to precipitate it from its solution.

Analysis.—The product, after thorough washing, as above described, with alcohol, was dried at ordinary temperatures or a little above, and was then reduced to very fine powder, and washed again with water as long as anything dissolved. It was then dried at 100° C. in a water bath. Three silver determinations were made:—

A ₁	97.31 per cent. silver.
A ₂	97.18 " "
B	97.21 " "

A₁ and A₂ were made with different portions of the same material; B with different material prepared in exactly the same way.

The substance, therefore, contained on an average 97.27 per cent. of silver. The nature of the residue would decide whether the material was silver with a certain amount of impurity firmly attached to it, or whether we had to do with silver in chemical combination with other elements.

The filtrate from the silver chloride in analysis A₁ was evaporated to dryness, and was found to contain chiefly iron and citric acid. The iron was thrown down as sulphide, redissolved in nitric acid, precipitated hot, washed with boiling water, and gave 0.8947. The residue, therefore, consisted of ferric oxide and citric acid, probably in the form of ferric citrate, and attached so strongly that even the very careful and prolonged washings given failed to remove them. Stronger means would be required than could be used without altering the condition of the substance. The conclusion, therefore, seemed to be justified that the material consisted of uncombined silver mixed simply with impurity.

To verify this conclusion by additional evidence, the substance was examined as to its behaviour when heated. For if any other element were chemically combined with the silver, it would only be (in view of the high percentage of silver) hydrogen or oxygen. We might have to do with a hydride, analogous to Wurtz's hydride of copper; or possibly an oxide; but not probably, as Ag₂O would contain only 96.43 per cent. of silver.

The presence of either hydrogen or oxygen in combination with silver seems to be pretty certainly negated by the action of dilute sulphuric acid on this (and the other two substances, B and C, to be described farther on). They are all converted into grey metallic silver without the slightest escape of gas. This seems tolerably conclusive in itself, and the result of exposing a great number of specimens of all the forms A, B, and C to the action of heat was equally so. As the object was to expose the fresh and moist material to a gradually increasing heat, from that of boiling water to a low red heat without interrupting the process, the following arrangement was found convenient:—

A piece of Bohemian glass tube about six inches long was sealed in the lamp at one end; the other closed with a rubber cork, through which passed a small gas delivery tube; and another tube passing into a small test tube partly filled with water, and having another tube through the cork passing under the surface of the water, thus preventing regurgitation. The material was thus first exposed for some hours to a heat of about 160° C. in a chloride of calcium bath; this was next removed, and the heat continued to low redness. Only traces of gas were evolved, and this was found to be in all of the many trials made, carbonic acid, derived from the citric acid, adhering. This treatment was repeated many times with all the different varieties of the substance, and with the same result.

* Continued from page 461.

The temperature was always raised sufficiently high to ensure the complete conversion of the material into normal grey silver, but in no case was oxygen or hydrogen set free.

It could not be overlooked that in all these trials the material had passed into an insoluble form before the silver determination was made. There remained, therefore, this possibility, that the silver, so long as soluble, might be in combination with citric acid, and that its change to the insoluble condition was caused by its separating from the citric acid. It seemed desirable that this view should be tested. As the object was to determine the condition of the silver in the substance as originally formed, avoiding, as far as possible, to change that form by attempts at purification, the only course available was to determine the ratio between the silver on the one hand and the citric acid on the other, either excluding from the determination, or else removing, that portion of the citric acid which was combined with sodium (sodic citrate being used in excess) or with iron. The first attempt was to exclude without removing it, by using Wolecott Gibb's ingenious method of precipitating the base by hydrogen sulphide, and determining the acid thus set free in a solution originally neutral. It was ascertained by careful experiment on weighed quantities of pure anhydrous citric acid that exact filtration could be made with the aid of phenolphthalein. The silver was next redissolved and estimated as chloride. A large number of determinations were made, but the method proved unsatisfactory. It was found that portions of the same material operated upon separately gave different (even widely different) results. In fact, this very discordance was in itself a proof that no stoichiometrical combination existed between the silver and the citric acid.

The importance of the matter led me to take it up again with different means, estimating the citric acid by Creuse's method. In this method the solution, after being reduced to a small bulk, is exactly neutralised (with ammonia or citric acid), is tested with a slight excess of barium acetate, and then mixed with twice its bulk of ninety-five per cent. alcohol, let stand a day, and filtered and washed with sixty-five per cent. alcohol. In igniting, a few drops of sulphuric acid convert the barium salt into sulphate, in which form the estimation is made. A preliminary trial with a weighed quantity of citric acid showed that this method gave fairly good results. I was obliged to vary the method somewhat; the precipitate of barium citrate carried down with it enough iron to render it ochrey in appearance. It was, therefore, after thorough washing with sixty-five per cent. alcohol till every trace of barium acetate was removed, dissolved on the filter with dilute hydrochloric acid (acid 1, water 10), in which barium citrate is extremely soluble and washed through. This was followed by still weaker acid, and finally with water. From the filtrate, sulphuric acid precipitated snow-white barium sulphate.

But this method requires that both the sulphates and the excess of sodic and ferric citrate shall first have been perfectly removed. The blue precipitate was therefore washed with dilute solution of ammoniac nitrate until this was effected. The necessity for this purification was regrettable as introducing a possibility of a change during the treatment. It was, however, indispensable that the ferrous, ferric, and sodic citrates should be got rid of. The material after this treatment was still freely soluble in water, to a dark-red solution. An examination of its absorption spectrum showed it to be still a true solution. From this solution the silver was first removed by H₂S, and then the citric acid was determined in the above described way. (If the silver were thrown down by hydrochloric acid, the reliability of the citric determination would be impaired.) Next, the silver sulphide was converted into chloride and weighed.

The result gave the ratio:—

1 gramme silver to .03195 gramme citric acid.

In this case, washing out the sulphates, &c., was an affair of several days. The work was repeated, reducing the time as much as possible. The material was precipitated, decanted as soon as settled, thrown upon a filter pump, and the funnel kept constantly full of ammoniac nitrate in dilute solution by a wash bottle. By using very thick paper and a powerful pressure the entire washing was rapidly finished, so that in about six hours from first precipitation the material was thoroughly washed, redissolved, and again filtered, and placed under the action of H₂S. The result was,—

1 gramme silver to .0130 citric acid.

When these relations are reduced from weights to equivalents, they become:—

No. 1.	1 equiv. citric acid to 55.63 equiv. silver.
No. 2.	1 " " 193.7 " "

indicating both that the proportion of citric acid present is variable, and that it is certainly not in stoichiometrical combination with the silver in the substance examined.

It has already been said that these solutions, before being acted upon by H₂S, were optically examined and found to be true solutions. The inference, therefore, seems to be very strong that there exists an allotropic form of silver freely soluble in water. This is a property so exceptional in a metal that I have admitted it with much hesitation. The principal arguments are as follows:—

The content of silver in the various products was very carefully, and I believe I may say quite accurately, determined. It was extremely high, always above ninety-seven per cent. As already remarked, this virtually

excludes the presence of all elements except hydrogen and, possibly, oxygen. These elements were carefully searched for; but their presence could not be detected. To suppose that we had to do with a mixture in which some compound of silver was mixed with metallic silver was not possible; for, as the whole was soluble, we should still have to admit the solubility of silver.

We have consequently to deal with a substance containing over ninety-seven per cent. of silver, and neither hydrogen nor oxygen in combination with it, the remaining two or three per cent. fully accounted for by ferric oxide and citric acid, determined as present as accidental impurity, the substance itself readily amalgamating with mercury by simple friction, nevertheless abundantly soluble in water. If I had been able to find any other explanation for these facts without admitting the solubility of silver I should have adopted it. But none presented itself.

Whether in solution it exists as a hydrate, that is, in more intimate combination with one or more equivalents of water, cannot be said with entire certainty; but the easy amalgamation with mercury seems hardly to favour that view. No means could be found for settling the question absolutely. Certainly at 100° C. all water is expelled, but this of course is not an argument. All the water is not expelled by indefinite exposure to a vacuum over sulphuric acid, but the proportion left is very small.

The material examined was in all cases as nearly as possible the same as that originally precipitated, but absolute identity could not be obtained. The purification absolutely necessary effects some change. This is shown by the colour. The freshly precipitated material dissolves to a blood-red liquid; by great dilution, yellowish red. The purified substance gives a darker red, which with dilution remains still red. Of the nature of the substances in the condition in which they were analysed I can speak with some positiveness, and these include a substance soluble in water and nevertheless appearing to be nearly pure silver.

The constitution of the lilac-blue substance at the moment of formation, and whilst under its mother water, is a matter of much more difficulty; it could not be said with certainty that it was not in some way altered in the purification. Much time and labour were spent in endeavouring to settle this point, without entirely satisfactory results, and I am at present engaged in the search for a better method.

When this blue soluble substance—purified either by washing very moderately by ammonium nitrate, or by washing with pure water, using these portions which remain undissolved after most has been carried through the filter—is brushed over paper and dried rapidly, it exhibits a very beautiful succession of colours. At the moment of applying it appears blood red; when half dry it has a splendid blue colour with a lustrous metallic reflection; when quite dry this metallic effect disappears, and the colour is matt blue. Examined with a polariser it shows the same characters as to two reflected beams of light polarised in planes perpendicular to each other that are described further on under B.

When the blue substance prepared in either way dries more slowly in lumps, the result is very variable: sometimes it is bright bluish metallic; sometimes dull lead colour, with a metallic reflection only where it has dried in contact with a smooth surface.

M. CAREY LEA.

(To be concluded.)

JACK AND I IN NORWAY.

IV.—MOLDE TO NAES.

We left Molde in a small local steamer named after the town, and in size, as I stated in my last, about half as large as an ordinary river tug; as we crept along the shore we made some exposures on the most interesting views, but the boat was so small that the vibration from the play of the engine showed a decided shake in many of the negatives so taken, no matter how quick the exposure. We were going on to Naes, a distance of some twenty miles, embracing a panorama of the grandest and wildest description, through a continuous interlacing of waters that lapped, and swished, and surged along the mountains' base, mountains that towered thousands of feet in the air majestic and grand. In many cases these mountains rise perpendicular as a wall. Sheer rock and barren of foliage of any kind, except where small trees here and there have found a home in the crevices of the rocks. Now and then the eye is relieved by patches of green grass and belts of foliage, but barren rock is the most prominent feature in this endless chain of mountains, each and all of them wearing their caps of snow. So awe-inspiring is the first entrance into these wilds that the visitor stands breathless with very wonder as he gazes upon them.

On board this boat we again met young Naes, a gentleman who came across in the *Norge* with us. Between the taking of pictures he started to amuse me by declaiming in his native tongue the patriotic poems of his fatherland, but when one only hears the sound, and fails to catch the sense, it gets to be tiresome after a little, so I told him if he could not turn it into English, that I had got as much as I could carry away, when he immediately tried the English and settled to it in something like this: "We love our country—dear native land surrounded by the sea—it is ever progressing; with affection we embrace its rugged cliffs towering to the sky furrowed and lined and worn by the sweeping storm and the lashing sea. This tempest-tossed child of a thousand homes holds our undying love, &c." To hear him orate something like the foregoing in

broken English and stopping every now and then at his best points to think out the English words was very amusing. I think as a people they are peculiarly fond of their native land.

The many little hamlets that we put in at on our way were each composed of a dozen to two dozen houses—little wooden erections dotted all over the lower incline of the hills and coming down close to the edge of the sea, where usually a little wooden pier ran out some thirty feet into the water. In the smallest of these villages there is one feature scarcely ever absent, namely, a little church with spire standing out white and conspicuous. All these places, as a rule, lie in a sheltered spot at the top of a fjord or arm of the sea, so that we seemed to be continually running out and in to these bays, for no sooner did we get out of one than we would be turning into another, and this continued all the way, our little boat looking like a nutshell floating along under the shadow of the towering cliffs. We got a good photograph of one of the most important of these stations—Nordvick—after which we came sailing round a promontory on which, quite close to us, was reared a pillar of rock on which was carved or printed an inscription. The captain told us that it was the pilot's monument. This pilot turned out to be a hero, one who had done good service to the State by misleading the enemy when in charge of his vessel and bringing him into the toils of the Norsemen. We made a picture of this monument, but the colour of the pillar was too much like the surrounding rocks to be effective.

The boat stayed for some time at Vehlungsnaes, so that we had an opportunity of taking the Romsdalsfjord from this quay. Then we sailed round the peak of land that strikes out into the sea at this point and arrived at Naes, it being but a two miles' journey between the stations. We had our traps transported to the Bellevue Hotel situated at the top of the incline on which the village is built. Here we found an obliging landlord, good food, and a comfortable house lying in the centre of an amphitheatre of hills, the snow in patches scattered here and there all round the house wherever there was a sheltered nook; crisp and hard it lay in the face of the blazing sun: in many places where we measured it it was eight and ten feet deep. In this valley, or rather flat bit of land (the word flat is only comparative), there were trees and grass and a few wild flowers. After the many barren spots we had passed it looked beautifully fresh and green.

From the Bellevue Hotel, which is one of the Government stations, we engaged a stolesjaerrie (pronounced stolecarré), and a first rate little pony; we arranged to keep this conveyance and the attendant for the few days we were in the Romsdal Valley. We preferred the stolecarré, as it was seated for two, hence the more sociable; but the most comfortable conveyance for the traveller in this country is the carriage—it is seated for one person only. The body of this vehicle is just like a round smoking-room chair, stuffed bottom and back, the passenger's legs stretching out to two small iron rod foot rests that are fixed from the tram to the bottom board, the usual space being left at the back of this bottom board for your luggage and your boy.

As a rule these conveyances are engaged from station to station, but we arranged to keep this one all the time we were in the district, rather than have six or seven changes in our journey through the valley.

The lad we got from the Bellevue to take charge of the pony and trap was a very intelligent young fellow and spoke excellent English—he had been over in this country for some time, hence his perfection in the language.

In this country it is usual for the traveller to drive himself, but if you so desire it you can have the boy to drive. When the boy is driving, should there happen to be any accident, or if anything was to go wrong with the horse or vehicle, you would not be held responsible for the same, but when you are driving yourself you become liable for damage if such should occur.

The ponies are sure-footed animals, and well-made little things they are, with full manes, long tails, curved necks, and full chested; the great majority of them are a sort of cream colour. They look made for their work, and to see their willing impatience one can't help observing that they had settled to do it. It is perfectly marvellous to see them rattling down steep, to the eye almost perpendicular, hill sides. Sure and steady without a trip; and where there has been deep ruts or holes in the roads, over and over again I have observed them just avert so much as kept the wheel from getting caught, and this without ever altering the pace. All over the country we were told that these ponies could be bought at from five to seven pounds apiece; and it seemed to me that if they were on this side they would have brought much more money.

On leaving our hotel we descended into the vale; the day was cloudy and the wind rather high for foliage pictures. The first exposure we made was on the Romsdalsfjord, one of the celebrated hills in the chain, it looked rugged and grand towering up some five thousand feet above the little bridge that crossed the river below.

This mountain is so precipitous and void of vegetation near the top that there is only hard and bare rock to be seen, and for a long time it was considered impossible to ascend to the summit of it, and many tourists had tried and failed; but in 1881 the feat was accomplished by a gentleman, but who, alas! when he got to the top found that some one had been there before him. A mound of stones was gathered together on the summit with an inscription showing that a mad shoemaker belonging to the valley had dared the ascent and succeeded in performing the task some fifty years before.

The next exposure we made was on the house of Mr. Wills of English tobacco fame. It had been an hotel previously, and it made a very pretty picture nestling amongst the trees on the slope of the hill. Even here, in this secluded spot amongst the wild hills, the march of scientific progress is observable, for we find the telegraph and the telephone playing their parts—the village, two miles distant, and this residence being united by wires. After taking this picture I started to turn the roller slide, when away went something inside snap, and the roll would turn no more—here was a fix! Jack proposed that we should go up to Mr. Wills's house, and see if we could get any place to turn into a dark room, so that we might have the slide put right if possible, but after talking the matter over we arranged to drive on to the first station, Horgheim, a distance of about eight miles.

As we drive on further down the valley, and at the other side of the rushing river, we come upon the mountain of the Goblins. On the top of this mountain, thousands of feet high, groups of rocks can be seen standing up on end and looking like crowds of human figures, and as we twist and twine along the beaten track we get tricked into the fancy that they are changing places and positions, and seem to be moving about in a demon dance.

MARK OUTE.

QUARTERLY REPORT OF PHOTOGRAPHIC PROGRESS.

[A Communication to the Birkenhead Photographic Association.]

I HAVE now the pleasure of presenting the second quarterly report of the progress of Photography.

The summer so far has been pre-eminently fine, and the opportunities for instantaneous exposures very great. Our worthy President, Mr. Paul Lange, who has just returned from a photographic tour in Norway (the land without a summer's night), tells us his 150 pictures were, of necessity, instantaneous exposures, and he fears that even with that precaution some will certainly be over exposed.

In my own experience in Barmouth and its neighbourhood, I found a similar condition of the actinic force, and took to an old single lens (by Ross), which I found to work admirably. The sensitive plate is now so quick that we may safely return to single lenses, only taking care that we avoid buildings at the extreme ends of the picture, such lenses being naturally liable to curved lines.

An important advance has just been made in the means of focussing cameras by Colonel C. O. Ellison, a member of the Liverpool Amateur Photographic Society, who has, I believe, taken the steps necessary to patent the invention, which consists of the attachment of a mirror or reflector to the outside of cameras having a back focussing plate, so as to show the intended view or subject the right way up, as in nature, instead of "upside down" as usually focussed; and the picture being seen from the top of the instrument instead of the back, the operator is enabled to stand in an easy graceful position while focussing instead of the stooping, cramped attitude, which we all know so well, and to dispense entirely with the hideous black sheet over head and shoulders; the light being kept from the reflector by a guard of black silk or any light non-porous material, or even a dark pocket handkerchief, arranged so as to receive the eyepiece or focussing glasses if preferred.

One great advantage of this patent is that it can be fixed to any kind of camera, and so simply, that it can be detached and refixed in half a minute; used or not at the operator's pleasure; and when not in use, or the photograph is being taken, is suspended under the camera ready for re-use, or lays flat against the back for travelling.

Another method of using the reflector is to attach it to the frame of the focussing screen or plate, and so fix the latter to the camera that both (screen and reflector) can be hung together as above, leaving no loose or unattached fittings to get broken or misplaced.

This arrangement also, by showing the picture from the top, allows of the use of very short camera legs, thereby securing freedom from vibration and reducing the weight to be carried by the amateur.

The adoption of this simple and improved method of focussing will prove highly acceptable to amateurs generally, and to the ladies it will be simply invaluable, saving hat, &c., from the horrors of the black cloth, and we may count upon a large addition of the fair sex to our ranks now that the grace so natural to them can be introduced even into the focussing part of our art.

I am glad to record that several members of our Society have taken up the re-enslaving of the stereoscopic department, and we hope to see a display of views at our monthly meetings, when attention should be given to the means of better and more conveniently displaying such pictures. Mr. Chadwick, of Manchester, is doing good work in this direction, and his introduction of Harnett's American dark slides is a great boon to amateurs.

I would suggest to camera makers the use of the well-known "ball-and-socket" joint between the camera and the legs, as a desirable improvement to ensure quick adjustment when about to expose. I would also suggest the introduction of a lock spring to the dark slides, so as to prevent the possibility of double exposure of the same plate.

I would draw attention to celluloid films, as possessing immense advantages in easy development and extreme portability. The best carrier is the question, and I see our old friend, W. B. Bolton, London, is

offering this to the public, the following paragraph appearing in last week's British Journal "Editorial."

[Here follows the notice of the film carriers of Mr. Bolton and Mr. Turnbull which appeared in last week's issue of this JOURNAL.—ED.]

THE EASTMAN TRANSPARENT FILM.—The substitution of paper for glass as a support to the sensitive film was a marked step in advance. Then came the American film for negatives, which, when completed, has many advantages over glass, particularly in lightness and portability. But this required the rather tedious process of transferring, and celluloid was hailed as a still greater improvement. It was transparent, light, and required no stripping. It, however, could not seem to be made thin enough, or in large enough sheets to be used on a roll holder. The Eastman Company now announce that it has overcome all difficulties, and can manufacture sheets of absolute uniformity of thickness fifty feet in length and only three-one-thousandths of an inch in thickness. This enables them to apply their new transparent film to the roll holder and the Kodak, and places in the hands of both professional and amateur photographers a vastly improved process. The specimen sheet which we have seen seems to be all that Mr. Eastman claims for it; certainly, the negative made on it, which he showed, is all that could be desired.—*Photographic Times*.

The above is certainly progressive, if not startling; the name of the Eastman Company is a pretty sure guarantee of its success, therefore, I say, look up your "roller slides," and prepare them for "celluloid film" adoption.

The realization of this will bring about a vast change in the photography of the future. There is no greater difficulty of the present day that meets the enterprising traveller to all parts of the world than the safe transit of sensitive glass plates over rough roads and ignorant handling. I hail this advent as the most successful article that has yet appeared to supersede glass as a support to the sensitive image; as a glass maker it it has served my time well, and in the language of my native poet, "Blessings on your frosty pow, John Anderson my Joe."

JAMES ALEX. FORREST.

KEIGHLEY PHOTOGRAPHIC EXHIBITION.

A Photographic Exhibition will be held in the Mechanics' Institute, Keighley, from January 6 to 18, 1890 (inclusive).

All pictures must be framed and mounted. No oval or Oxford frames will be admissible.

The Committee will undertake to unpack, repack, and deliver exhibits to the carriers for return at the close of the Exhibition, and will, by engaging professional assistance, use the greatest care, but at the same time the Committee will not hold themselves responsible for any accident which may occur.

Under no circumstances will the exhibitor's name and address be permitted on the front of the frame. The title only of the picture may appear on the front of the exhibit. The particulars of each picture must be written in ink on a special label (the required number will be forwarded by the Secretary on receipt of Form A), a separate label to be attached to each frame.

The Committee reserve the power to reject any exhibit which may be sent in. No picture or series of pictures having received a *First Prize* at any previous competition shall be eligible for competition in any class except Class XV.

In the Amateur Class the photographs must be entirely the work of the exhibitor—exposing, developing, printing, and toning. All enlargements and enlarged negatives must be accompanied by a print from the original negative, and in the case of retouching the same to be stated.

The entrance fee for one class only will be 1s.; and 6d. for each additional class. A charge of 2s. 6d. will be made to each exhibitor of apparatus and trade requisites.

Medals and certificates will be given. For further particulars apply to the Secretary, Mr. James Robson.

THE IPSWICH PHANTOM PHOTOGRAPH.

STRANGE COINCIDENCE.

FROM the *East Anglian Daily Times* we learn a strange sequel to the phantom photograph story we published a few weeks ago. We condense the following from its issue of Monday last:—

"Devout believers in psychical phenomena no doubt derived great encouragement from the so-called 'phantom photograph' which was taken on the River Gipping about two months ago. Their belief will probably be still further strengthened by the fact that on Saturday morning a woman's body was found in the Gipping at the exact spot where the photograph was taken. Some people will be inclined to look upon the photograph as a supernatural warning of the sad event which has just taken place, while other folks, and more wisely, will be inclined to treat it as merely a singular coincidence. However, the coincidence is undoubtedly a very strange one. The facts are briefly these. On Saturday morning Charles Hill was proceeding along the towing-path on the Gipping at the back of Mr. Peter Bruff's house, when he saw a woman's hat with a basket lying on the bank. Approaching nearer, he saw the

body of a woman floating face downwards in the water and near the other bank. Hill immediately went to find a policeman, and meeting Police-constable Folkard at the Barrack corner, the two returned together, first getting some drags. Police-constable Folkard threw a grapnel across the stream and pulled the body out, and it was then taken to the mortuary. The body was identified as that of Sarah Ann Porley, residing at 4, Clamps-buildings, Harland-street, Stoke. From the evidence of the deceased's neighbours, it appears that she kept house for an elderly man named Horace Watling. Deceased was in the habit of drinking very much, and on Friday night, while in a state of intoxication, she quarrelled with Watling. Finally the latter told her to leave the house or he would fetch a policeman, and she left in a rage about 11.30. The spot where the body was found is, as we have said above, the exact place shown in the 'phantom photograph,' and Sergeant Nunn, who was engaged to drag the river on that occasion, says there is not a yard's difference."

Our Editorial Table.

THE LONDON STEREOSCOPIC COMPANY'S NEW CATALOGUE OF APPARATUS.

A TRULY elegant little book of 192 pages, beautifully printed in two colours, and illustrated plentifully, not alone with woodcuts, but with several full-page pictures printed in various colours by the photo-mezzotype process in use at the Company's works. These in all cases are illustrative of the capabilities of the apparatus sold or made by them. Here we have a yacht under full sail, there a portrait of a child; an instantaneous view at the seaside during the bathing season; another view suggestive of a village in the Isle of Wight, roadside scenes, and so forth. It is a good idea, and one which ensures care being taken of the catalogue. The variety of apparatus catalogued is very great, and embraces everything known or required in photography. We notice just one mistake. In the price list of journals THE BRITISH JOURNAL OF PHOTOGRAPHY is catalogued as threepence, it should have been *twopence*. The work is beautifully printed on fine paper, price sixpence.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,584.—"A New and Improved Camera Stand." L. G. STRANGMAN.—*Dated July 1, 1889.*

No. 10,594.—"Improvements in Shutters for Photographic Cameras." J. KERSHAW.—*Dated July 1, 1889.*

No. 10,602.—"Improvements in Photographic Shutters." J. BROWNLOW.—*Dated July 1, 1889.*

No. 10,853.—"Improvements in Photographic Cameras." M. WALKER and W. E. KERSLAKE.—*Dated July 5, 1889.*

No. 10,930.—"Improvements in Photographic Objectives." R. KRÜGENER.—*Dated July 6, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN THE CONSTRUCTION OF SUPPORTS FOR PHOTOGRAPHIC PICTURES, PLATES, OR FILMS WHILE UNDER MANIPULATION.

No. 10,865. WILLIAM HARDING WARNER, St. Augustine's Chambers, Unity-street, College Green, Bristol.—*June 15, 1889.*

THE object of my invention is to manufacture improved supports for sustaining one, two, or more photographic pictures, plates, or films when aluming, fixing, washing or otherwise manipulating the same. My invention consists of solid or hollow articles formed of vulcanite, india-rubber, glass, porcelain, stoneware, wood, or other suitable material.

These supports are used in pairs, each one being preferably in form of a right-angled triangle with the hypothenuse uppermost. When made of vulcanite or similarly firm material, two of the angles only are sufficient, viz., the hypothenuse and perpendicular formed of thin material, the sides and bottom being left open. In some cases the hypothenuse and two sides may be so formed, leaving the end and bottom open. The rests or supports are placed in position in one or more pairs with their slanting surfaces towards each other, the photographic pictures, plates, or films being supported upon the slanting surfaces. Plates of various sizes may thus be supported during manipulation, the larger plates above and the smaller below, and smaller supports and plates may be superposed over and upon the larger ones.

The plates are used in the washing tray or vessel with the film sides downwards or in other positions as required.

I do not confine myself to any particular angle in forming my improved supports, as any form which furnishes an angle of repose may be used.

What is claimed is:—The manufacture and use of angular supports, rests, or holders for photographic plates, films, or pictures in fixing, washing, aluming, or developing trays or vessels or analogous apparatus, substantially as described and illustrated.

IMPROVEMENTS IN HOLDERS, CLIPS, OR EASELS FOR PHOTOGRAPHS, MIRRORS, PHOTOGRAPH FRAMES, CARDS, AND OTHER ARTICLES.

No. 11,134. HARRY WHITFIELD, 68 Broad-street, Birmingham.—*June 15, 1889.*

My invention is primarily a metal holder or clip constructed to hold or clip a glass plate, behind which is held a photograph, picture, or card. It is also constructed to hold or clip a mirror, photograph, card, or other article. My holder, clip, or easel is composed of three arms of flat or round strips of metal or other suitable material, which are rivetted or in some other way loosely fastened together at the end of each arm. The other end of each arm is formed as a hook. These hooks are meant to clip or hold the article it is desired to hold.

To two of the three said arms of my clip is attached a spring which exerts an outward pressure.

Now when it is required to clip or hold a glass plate or other article by my invention, the one of the arms of my clip to which the spring is not attached is extended in one direction and the hook hooked over the edge, or otherwise; while the two arms to which the spring is attached are extended in an opposite direction, like the arms of a letter Y, and the spring being compressed, the two arms of my clip attached to it approaching one another lengthen the clip, and the hooks are hooked over the edge or otherwise of the article it is required to hold; the spring being released, the clip shortens, and thus holds or clips the article in the manner desired. Thus, when it is required to release the article held it is only necessary to compress the spring, and the two arms attached to it approaching one another, the clip lengthening looses the hooks from the article held.

Any kind of spring exerting an outward pressure will actuate my clip in the manner desired.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 16	North London	Myddelton Hall, Upper-st., Islington
" 16	Bolton Club	The Studio, Chancery-lane, Bolton.
" 17	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 17	Bury	
" 17	Manchester Camera Club	Victoria Hotel.
" 17	Edinburgh Photo. Club	5, St. Andrew-square.
" 17	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 18	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 4.—Mr. W. E. Debenham in the chair.

A question being raised as to the making of a ten per cent. solution and the different weights and measures in use, Mr. A. HADDON said that a convenient way to make a ten per cent solution was to take an avoirdupois ounce of the required substance, = 437½ grains, and dissolve in water made up in quantity to 4375 minims.

Mr. A. PRINGLE mentioned a case in which the same subject was exposed twice upon the plate with the result of producing a second or duplicate image. The remarkable thing was that the two images were both distinct and did not appear to interfere with each other.

Mr. J. TRAILL TAYLOR said that Mr. A. L. Henderson, when in America, had found an image on the plate of a word that was printed on the shutter of the dark slide, and he argued from that that the slide itself was not perfectly opaque, but had let enough light through to print the word in question upon the plate. He (Mr. Taylor), however, had come to the conclusion that the image of the word was caused by an emanation of a phosphorescent character proceeding from the printed matter. It was well known, too, that some kinds of material gave off an emanation capable of fogging the plate; this was particularly found to be the case with the leather sometimes used as a hinge for the shutter of the dark slide.

Mr. HADDON observed that it was difficult to find a substance that was not to some extent phosphorescent.

On the subject of combination printing and printing from combined negatives, Mr. TAYLOR said that in the old collodion days he had seen excellent results obtained by taking two negatives and clearing off all that was not required in each by means of a chemical solvent; one film was then loosened from the glass support by acid and floated in the proper position on to the other negative. For printing from several negatives one after the other, there was the method of registering printing frames as used by Edwards and by Hemery.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JULY 2.—Mr. J. Traill Taylor (President) in the chair.

Mr. W. Few showed some plates marked by the packing, also a plate which had been exposed through the glass; it was sharp, but was marked by the emulsion which had been on the back.

Mr. G. J. Clarke showed a plate stained a deep yellow colour.

Mr. A. MACKIE said that the stain was caused by hyposulphite of silver, and the plate had not been fixed sufficiently, it being sweet to the taste.

The CHAIRMAN remarked, with reference to a Voigtländer's orthoscopic lens exhibited at the previous meeting, that the focus of these lenses was measured from a point outside the front lens, and not as in other lenses of single or double type.

Mr. Clarke showed some negatives on tannin plates, also an old wet collodion negative, and a copy of a print taken with a triplet lens.

Mr. J. DOUGLAS asked if there would be any objection to using acid in the alum bath for Ilford plates.

The CHAIRMAN replied that there would not; he had always used it.

Mr. W. BISHOP said that he used a little acetic acid in the alum bath before fixing.

Mr. MACKIE said that there was a theoretical objection to acetic acid, as it is a solvent of gelatine. He also recommended the use of two hypo baths for fixing plates, as it was far more important to fix them well than to wash them a great deal afterwards. Mr. Mackie drew attention to the American annual of the present year, in which a writer recommended the back glass of a portrait combination as an object glass for a telescope.

The CHAIRMAN said that this would be the worst lens possible for the purpose, as there was a great deal of negative aberration in such a lens, and one would not be able to see through the telescope as well as with the naked eye. The Chairman also stated that very fine photographic engravings could be obtained by coating a negative on the face with bichromate of potash and gelatine and exposing it to light through the glass; it should then be placed in water, which would raise it in relief, and when dry a cast could be taken from it either by fine plaster of Paris or by rendering the surface electrically conductive by bronze powder or silver and taking an electrolyte; the process gave extreme delicacy of results, and M. Placet, of France, had produced very charming engravings by means of it.

An excursion was arranged for July 16 to Loughdon.

The next meeting will be on July 16, and will be a general technical meeting.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

JULY 5.—Mr. Dowling in the chair.

Mr. F. W. Edwards was unanimously elected President of the Society.

The following were elected members:—Messrs. Edwards, Fellows, and Homewood.

SHEFFIELD CAMERA CLUB.

THE first excursion of this Society was to Miller's Dale on Wednesday, June 28. Several friends (non-members) also availed themselves of the opportunity to visit this favourite locality. Although the Dale does not possess the grandeur of some others in Derbyshire, it presents most charming views equally well adapted for the camera as for the pencil. The course of the River Wye in the direction of Buxton is particularly interesting. The weather, being remarkably fine and still, was favourable to the pursuit of photography. A large number of successful views were taken, and a most enjoyable day was spent.

JULY 5.—Dr. Morton presided.

There was a good attendance, the subject of the evening being *A Lecture on Lantern Slide Making and Colouring*, by Mr. T. A. Manton, L.R.C.P. (Lond.), M.R.C.S. (Eng.). He recommended quarter-plate-size negatives and contact printing, using a suitable rapid rectilinear, and found most convenient an outfit consisting of a detective camera with time shutter. The lecturer gave a description of the different methods of development and toning, and afterwards demonstrated hand painting with water colour and oil. The latter method he adopts, and had found a satisfactory medium in a preparation known as Rowney's Oleo Excelsior. The brush charged with colour was dipped in the medium and diluted with a little turpentine applied to the slide, and then softened down with the finger. Clouds were picked out with clean cotton or linen rag. When the desired effect was produced the slide was subjected to gentle heat, which caused the paint to become hard and brilliant. The colours most in request were Prussian blue, burnt sienna, yellow, and red. The aniline dyes were not permanent, nor yet was rose madder a safe pigment. Great care was necessary to avoid dust of any kind, and the colours had to be artistically applied, and not too thick. The covering glass when stained a light brown or other tint gave a remarkable beauty to the slides. The process of painting a slide being completed, it was with others tested in the lantern.

In the discussion which followed the PRESIDENT said he had hitherto been rather sceptical as to the utility of colouring photographic lantern slides; perhaps it was due to the recollection of crudities of the past. The lecturer had, however, shown examples which proved the efficacy of careful tinting, and no doubt the practice would become more general.

Mr. H. RAWSON thought the toning by chemical means, as in the use of gold and platinum, &c., assisted very much the ordinary developers, and some subjects were not so suitable for colour as others.

A series of slides, various subjects and methods, were projected on the screen. The Secretary (Mr. Hardy) distributed notices of the forthcoming Exhibition of the Photographic Society of Great Britain, held in September.

LEEDS PHOTOGRAPHIC SOCIETY.

JUNE 26.—The President in the chair.

Mr. J. W. Ramsden was elected a member of the Society.

The question of the Society holding a Photographic Exhibition in connexion with the Municipal Fine Art Exhibition in the autumn was discussed, and it was decided that the Hon. Secretary should write the Fine Art Committee and ascertain what arrangements had been made.

The outdoor excursion to Fountains Abbey announced for July was arranged for the 17th, leaving Leeds at five minutes to eight a.m.

Mr. W. DENHAM then read a paper on *Various Methods of Photographic Printing*. [This will appear subsequently.]

MANCHESTER PHOTOGRAPHIC SOCIETY.

JUNE 21.—Mr. Abel Heywood, jun. (Vice-President), in the chair.

This was a special meeting called by the request of ten members, at which Mr. W. G. Coote (Treasurer) moved, "That any member joining the Society after the March meeting in any session be only liable to a subscription of half a guinea for the remainder of that session."

The motion was seconded by Mr. ALAN GARNETT, supported by the Chairman and others, and carried unanimously.

Question box:—"Is Darlot's 'Universal lens' now used? What was or is its combination?"

A member replied that it was a portrait lens, and so arranged in the mounting; that by removing one lens it could be used for landscape purposes.

"Has any member tried Blanchard's platinum process, and with what result?"

Mr. H. SMITH had tried it, and was understood to say he preferred the Platinotype Company's paper.

"Can any one recommend a reasonably cheap shutter for instantaneous exposures that will work without jarring?"

Various opinions were expressed, the majority were in favour of Kershaw's, price 18s. to 25s.

The HON. SECRETARY (Mr. W. I. Chadwick) said, as there was no subject before the meeting, he had arranged a small exhibition of detective or hand cameras. Having written all the makers of these instruments, he was glad to say several had arrived.

Mr. GARNETT then exhibited and described the Kodak from the Eastman Company, and also a very nice little apparatus from Messrs. Shew—the Eclipse camera—with dark slides and their patent changing back; this, Mr. Garnett said, was very simple and efficient when the instructions were complied with.

Mr. HEYWOOD followed by exhibiting and describing Messrs. Marion's various hand cameras.

Mr. JOHN SCHOFIELD took in hand the detective of Messrs. R. & J. Beck; and the HON. SECRETARY explained the camera sent down by Mr. Turnbull, of Edinburgh, the compactness of which was highly appreciated, as was also the film slides and carriers.

After various minor exhibits, the CHAIRMAN said he did not know whether members were in the habit of reading a somewhat new paper devoted to photography, which he had seen that week for the first time. In the number dated June 13 would be found an article signed "A. P." (which initials stand for Andrew Pringle), on the subject of *Stereoscopic Photography*, which seemed to have been called forth by an earlier article in THE BRITISH JOURNAL OF PHOTOGRAPHY, written by Mr. W. I. Chadwick. Mr. P. began by announcing that he was about to write a strong communication, at least one which should not be charged with being "weak and misleading," but he had fallen into the error of supposing bluster, denunciation, and abuse to be strength; there was no exhibition of strength in the thing said, and none of the power shown which knowledge of a subject can alone give. The article professed to be on the stereoscope, but it was almost as much on binocular vision; and Mr. P. seemed to complain that the Almighty had given men two eyes when (as we may presume he argues) one would have done better. "The true effect," he says, "of atmosphere or distance is to be attained not by more or less looking round corners which almost describes binocular vision, but by—" something else, no matter what. Instead of a stereoscope for producing the illusion of solidity, let a person look at a photograph or a painting through a pinhole and he will have "quite as much [of solidity] as is good for him." Mr. Pringle objected that "a short lane of trees is often by a stereoscope made to look miles long (!), and this illusion can be produced at will if the worker has any intent to beguile." Therefore, argues this guileless writer, the stereoscope ought to be discontinued and classed among other toys like "Rupert's drops, Pharaoh's serpents, suckers," &c., which Mr. P., it is to be hoped, can write more intelligently of than of a stereoscope. Just as reasonably might he condemn the whole art of photography because by photography it is quite possible to make a gooseberry bush look as high as a house. A stereoscope "might interest a scientific observer for a few times," and "might astonish a child or a savage for a few times," and so on. This kind of twaddle is put forth as an example of strong writing! But the climax of absurdity is reached when Mr. P. declares that he has not looked into a stereoscope for many years. Who will doubt it? Mr. Heywood continued that there was more of such writing in the article, but the specimens given were probably sufficient. He concluded by showing a number of stereoscopic slides taken on a recent excursion of the Society to Gawsorth, in order that members might see some charming illustrations of natural scenery shown with natural effect by the instrument "A. P." had so shamefully libelled.

The meeting was brought to a close by an inspection of works by various members taken on the recent holiday rambles of the Society, amongst which were some beautiful stereoscopic slides by the Chairman, taken on Carbutt's films. Several other members exhibited stereoscopic slides. It was said that over twenty-five members were now working stereoscopic photography.

DARLINGTON PHOTOGRAPHIC SOCIETY.

JULY 8.—Mr. G. Newby Watson presided.

Mr. H. W. HOLLIS opened a discussion on *The Photography of Interiors*, which was illustrated by several photographs, some of which showed that the great difficulty to be overcome in this branch of photography was halation.

Several members took part in the discussion, and Mr. G. NEWBY WATSON stated that negatives taken by him on Eastman's films showed no trace of halation.

The subject for discussion at the next meeting will be *Vignettes and Vignetting*.

PACIFIC COAST AMATEUR PHOTOGRAPHIC ASSOCIATION.

JUNE 6.—President Runyon in the chair.

A resolution was passed admitting ten members, at fifty dollars each, to life membership, the proceeds to be used as a room fund.

In response to the prize competition for studies suggested by Longfellow's *Building of the Ship*, only two pictures were received. It is to be regretted that they were withdrawn on account of non-competition, for they were both excellent. Had there been lively competition it had been the intention of the Association to publish the study considered by the Judges as the best, and to furnish each member with a copy made by reproduction; the original was to be framed and hung upon the walls of the rooms of the Association. This suggests that did each association in this country give a subject for com-

petition among its own members, publish the photograph of the successful competitor, and exchange with the different societies, artistic effort would be stimulated, each member would try to rival his fellow, and each society would endeavour to reproduce that picture which should be finally decided to be the most successful of all presented.

A Committee was appointed to revise the constitution and bye-laws of the Association. This important work is necessary because of the rapidly increasing membership. At present none but amateurs can become members, and there are certain restrictions against any member selling his work. In the revision it will probably be decided whether it is advisable to admit professional photographers, and also whether there is a sufficient number of lady amateurs in San Francisco to warrant the Association in making special provisions and arrangements for their membership.

CINCINNATI CAMERA CLUB.

The first meeting in June was well attended, Mr. Bullock occupying the chair.

It was suggested that the Club take a number of "outings" during the summer months, to be conducted by volunteer members. This met with great favour, and immediately the excursions were provided for.

Mr. Johnson showed a circular level, which was of great interest, and was pronounced of advantage to the worker both for its accuracy and convenience.

Mr. BARTON read a paper on *Composition*, with charcoal illustrations.

On June 17 the second meeting was called to order with Vice-President Fisher in the chair.

A question of having one meeting instead of two for the months of July and August was brought up, and decided that, as the times for meetings were fixed by a constitutional provision, no action should be taken.

Prints from negatives made at the "outing" were shown, and it is remarkable that, bad as the day was, many choice pictures were made.

Mr. HOWARD KINGSBURY, of the Philadelphia Society, entertained the Club with a paper on *Luray Cave and the Theory of its Formation*, with lantern illustrations. Mr. Kingsbury showed himself to be thoroughly competent to handle the subject, both descriptively and illustratively. All the pictures were made by the use of the electric light, some requiring twelve hours' exposure, giving some idea of the time and patience required to secure them.

Correspondence.

✎ Correspondents should never write on both sides of the paper.

JULY MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—DEATH OF M. FERRIER.—DONATION OF 5000 FRANCS TO THE SOCIETY.—HYDROQUINONE A DANGEROUS PRODUCT.—PUBLICATION BY MM. GAUTHIER-VILLARS OF AN "ENCYCLOPEDIA OF PHOTOGRAPHY."—INSTANTANEOUS 14 × 17 INCH NEGATIVES.—PRESENTATION BY MM. ORELL FÜSSLI OF MECHANICALLY COLOURED PHOTOGRAPHIC PICTURES.—AN IMMENSE CAMERA.—A NEW AND INTERESTING CARBON PROCESS.—PHOTO-MICROGRAPHY.—A BANQUET.—PHOTOGRAPHIC JURY AT WORK.—PERMISSION TO TAKE VIEWS IN THE EXHIBITION.—THE CONGRESS.

THE Photographic Society of France held their monthly meeting on Friday evening last, the 5th instant, M. Davanne in the chair.

This gentleman informed the members of the death of M. Ferrier, one of the founders of our Society, and whose reputation for his stereoscopic slides was European.

The Secretary was requested to write letters of condolence and express the unanimous regret of all the members for their bereavement.

The Chairman then read a letter in which M. Ferrier, the son of the departed, had offered a donation of 5000 francs to the Society in memory of his father, the interest of which sum should be given as a prize for any photographic competition which the Society may organize.

The Secretary read a letter from a member warning operators on the poisonous effects of hydroquinone. He says that this product produces the same symptoms as bichromate of potash, and has a most injurious effect upon the hands.

A word of warning is here given to the fraternity. It would be well if other manipulators came forward and stated their experiences on this point. As to myself, I spent six months travelling, during which time I developed about 900 whole plates under the most unfavourable circumstances with the chemical in question. I sometimes observed its caustic action at the end of the fingers and by a slight inflammation under the finger nails, but nothing serious enough to condemn its employment.

MM. Gauthier-Villars, the great publishers of photographic literature, made a donation of the first fascicle of the *Encyclopedia of Photography*, by M. Charles Fabre, D. Sc. This is to be a monthly publication. The first number treats of light and photographic optics, with an introduction on the history of photography. The author has spared no pains to place the subjects in a clear and concise manner before the reader. The editor has gone to great expense to make it a specimen of the printer's art. This publication must find a place in the archives of every devotee of photography. A vote of thanks to MM. Gauthier-Villars and Fabre was passed.

M. Grascin, of Boulogne, presented some very fine instantaneous pictures of vessels going out of harbour, as well as the negatives from which these prints were obtained. The President observed that he was pleased to see that amateurs were now about to change the current of fashion by making large negatives instead of the too many small ones

which were so abundant. M. Grascin deserved praise in that his negatives were 14 × 17 inches—making pictures in themselves.

M. Grascin, in answer to questions, said he adopted hydroquinone as a developer; he did not seek a rapid formation of the image, and found that a slow developer gave the best results. The bottles containing the developer should always remain full and well corked. In order to attain the former desideratum, he lets fall into the bottle pieces of glass (marbles or beads), until the liquid touches the cork; the developer by so doing preserves its qualities for a very long time. Some surprise was expressed to see such large negatives taken so rapidly, and at the same time so sharply defined. I employ, said he, a Hermagis lens, having a focus of eighty centimetres and a diaphragm of three and a half centimetres.

Prof. Stebbing, in the name of MM. Orell Füssli, of Zurich, presented a large mechanically coloured photographic picture, stating that during his visit to Zurich he had the good fortune to visit the establishment of those gentlemen, and to see how they had brought the old bitumen process to perfection in that they are able to reproduce nature with its harmonious tones, and paintings with all their colours.

A large field is open for Swiss enterprise, which will not only bring honour to the country, but wealth to the workmen as well as to the masters. The proof presented represents one of the Alpine ice fields, with snow-capped mountains, and in the foreground (happy contrast!) a sunny and cultivated district. The colours are happily blended together and form a harmonious whole—a Swiss scene in all its natural beauties.

This house has already sent into the market a collection of coloured photographs, entitled, *Winter Scenes in Switzerland*. These have met with general satisfaction in the Paris Exhibition, where they can be seen in the Swiss section.

M. Bréhon presented the drawings of a large camera made for the Crenot establishment by MM. Gilles Brothers; this immense camera is now exposed at the Champ de Mars.

M. Victor Artigue presented his new carbon paper, and developed an image on the same before the Society. As his method is new it requires some explanation. He coats a paper with some pigment; not a tenth of the colour is required as in the old process. When about to use it a two per cent. solution is daubed (permit me this expression) over the back with a brush or a sponge; it is then dried and exposed in the printing frame. After insolation the paper is attached to a narrow flat piece of wood by means of two pegs; it now floats or hangs like a flag.

M. Artigue now performed a novel mode of developing the image. In a large earthenware basin a certain quantity of warm water was poured. Into this water was thrown a quantity of fine sawdust well stirred. The operator then took hold of the piece of wood to which was attached the undeveloped carbon print, the latter hanging down perpendicularly. He took a certain quantity of the sawdust and water in an old coffee-pot and deliberately poured the contents along the top edge of the paper. This manoeuvre was often repeated, and after a certain time the image began to appear. It appears that the sawdust dribbling down the surface of the print carries with it the unmodified gelatine, and the colour with which it had been impregnated, leaving naturally the insoluble substance with the colour to form the image in all its details, half tones, &c. By this new system no transfer is required, as the image is washed on the front and not from the back, as in the ordinary way.

The finished image has quite another aspect from that of a carbon proof. It gives a dull surface, very artistic; the blacks are very dense, and the whites very pure indeed. A number of specimens which were passed round won the applause of the members. This new idea will probably bring the carbon process into favour; if so, we may legitimately expect to hear and see very much of it ere long.

M. Duchene, who has occupied himself very much with photo-micrography, exhibited the results of his labours. An enlargement of the *Pleurisigma Formosum* was very much admired.

Many objects had attained a diameter of 7-500.

M. Mariller presented a camera all in brass; with the exception of the bellows, none of the modern appliances of swing back and front being adapted I found it wanting.

The Secretary informed the members that everything was being prepared to do honour to the fiftieth anniversary of the introduction of photography. A banquet would be prepared, followed by a brilliant *soirée*, instrumental and vocal music, &c. The price to members and their friends would be thirty francs. He (the Secretary) hoped that foreign photographers and members of photographic societies and clubs present at Paris for the Exhibition would make it international by taking part in the festivities. Tickets can be had on application to any member of the Photographic Society of France.

The Jury of Class XII. examined last week very carefully the exhibits of the British section. Although very few, quality was not wanting. The exhibits of Mr. Thomson, Van der Weyde, and Walery, were particularly favoured, not to say that others were neglected, far from it. The photographic Jury is renowned as being one of the most conscientious in their work.

Great dissatisfaction is felt as to the arbitrary manner in which the permissions to photograph in the Exhibition are dealt out. A sum of 300 francs must be paid for each camera employed: that sum covers the duration of the Exhibition, and the happy payer of 12l. can work from morning until the close of the gates at eleven at night, if he be inclined to do so. Another system is employed: By the payment of twenty francs

per camera one can take views from eight to twelve, or from ten to two o'clock. Any one infringing these rules by working in other hours, or surreptitiously using a camera without prepayment, entails the loss of the instruments employed, and can be fined 16*l*. To pay twenty francs for four hours' work appears a large sum, especially when the weather turns out unfavourable. This is not all, twenty-five cents stamp duty, the entrance fee and loss of time, make it a heavy tax; not only this, but many parts of the Exhibition cannot be photographed. The sole right to take views from the Eiffel tower has been sold by that enterprising gentleman to a photographer. The Rue de Caire, says the builder, is private property, and I have sold the right to take views to "Mons. X." In fact, obstruction is so persistent—said a poor photographer—that during the four hours he got only two exposures, having been interrupted in his work by every policeman who passed, the latter requesting to see and read most attentively the permission. This aged photographer had his camera fixed on the top of a high double ladder, and I can judge of his dismay in being ordered down every now and then to exhibit his right to be there, &c. In the beginning the Directors of the Exhibition made still heavier terms, and wanted to make an exorbitant revenue from these photographic permissions, but, thanks to the energy of the "Chambre Syndicale de la Photographie," the price, although still dear, is not so heavy as it might have been.

Several persons (foreigners) have been arrested for using detective cameras; their pleading ignorance is of no avail. Two English ladies were pounced upon the other day, and I had great difficulty in saving their apparatus.

The International Photographic Congress have commenced work. The nomination of the Committee may be criticised, they being all French, which is not very international; but a compensation is offered, or a bone thrown to foreigners in this wise: they are admitted to assist at the meetings by the small payment of ten francs and their entrance fee when the sittings take place within the precincts of the Exhibition, when the meetings are held in the hall of "La Société Française de Photographie" no payment is required.

The Committee hope that a great number of foreign photographers, amateurs, &c., in Paris for the Exhibition, will pay their ten francs and assist in the discussions.

The Jury will soon have finished in the photographic section of the Exhibition; an account can then be given of work exhibited.

196, Rue Legendre, Paris.

PROF. E. STEBBING.

FILM CARRIERS.

To the Editor.

SIR,—I have to thank you for your notice of my film carrier in last number of the *JOURNAL*. But as at the same time you notice a film carrier, and give Mr. W. B. Bolton the credit of inventing it, I would like to lay one or two facts before you.

A good few months since I turned my attention again to film carriers and slides (I had when the Eastman carriers came first in the market done this), and the double carrier you credit Mr. Bolton with was one of the first I had made. I, however, did not like it, as it is too wobbly when of large size, unless made very heavy, and the single carriers I send out suit better. If, however, there is an advantage in carrying a lot of films in an ordinary slide, I have provided for it by making a single carrier that will carry half a dozen or a dozen films if required. The carrier I enclose will show this, the front film being best separated from the others by a film stained with chrysoidine or other coloured dye. The front film being exposed is moved to the back, and the stained film is also moved one film back, and so on till the whole are exposed.

I now send you one of my film slides, from which you will see that the double carrier which you credit to Mr. Bolton is carried out, only in a better way, as in a slide it is perfectly strong. I also enclose you a piece of folded brass to show how the slide is kept light tight when the shutter is drawn. The rubber cloth is pressed up from below by small india-rubber tubing and is thus kept perfectly light tight.

On the 10th of May I applied for a patent for the slides and carrier, and about a fortnight after that Mr. Bolton applied for a patent for the same thing. My patent covers all that he has asked a patent for, and I need hardly tell you that the party who takes out a patent first is the patentee, and that any subsequent applications for patents to other parties are of no use. Neither the single nor double carriers are new, but the application to carry films is, and if there is any credit in the matter at all it certainly is due to me, as both the film slides and carriers were in the hands of parties in the trade before ever Mr. Bolton applied for his patent. There is, also, at least another camera in the market which is clearly an infringement on mine, and I am at present under advice as to whether action will be taken to stop the sale of them.—I am, yours, &c.,
6, Rose-street, Edinburgh. J. M. TURNBULL.

[Mr. Turnbull's dark slide is certainly neat and most effective. Its thickness is only five-sixteenths of an inch, or (must we adopt the metric system?) nine millimetres. There is an opaque septum in the middle, and there are the necessary appliances for inserting and keeping flat the celluloid or other film. The shutters of Mr. Turnbull's dark slide draw out entirely, it being impossible from the nature of its construction that any light can obtain access to the

plate. With respect to the separate film holders we may state that there is this distinction between those of Mr. Bolton and Mr. Turnbull, which we saw and reported upon, that Mr. Bolton's has ledges on both sides for holding the film, Mr. Turnbull's partaking of the character of the holder originally introduced by Mr. Merritt, in which one holder serves as a backing for one film. On this subject of film holders we have more to say in an article on another page.—Ed.]

MOUNTANTS.

To the Editor.

SIR,—I should be much obliged if you would let me know of a clean and easily worked mountant. When asked, almost everybody answers, "Oh, I use starch," but I have never got it satisfactory yet, owing no doubt to the way of making it. Though I find toning, fixing, &c., of silver prints (albumenised) easy enough, yet the mounting always "stumps" me.—I am, yours, &c.,
16, Inverleith-place, Edinburgh, July 9, 1889. R. G. MITCHELL INNES.

[We went over the Stereoscopic Company's mounting rooms a few days ago, and greatly admired the facility with which their mounting was effected. They used as a mountant a solution of gelatine, which must have been carefully filtered, as there was not a speck to be seen in it.—Ed.]

DARK LIGHTNING FLASHES.

To the Editor.

SIR,—There has been a great deal said lately about dark flashes of lightning appearing on photographic plates, and, to say nothing of calling them by such an absurd name, they seem to be a kind of puzzle. I wonder if I have found a possible solution in ascribing them to a species of solarisation; and that instead of being dark, they are so intensely bright as to cause the plate at that part to be greatly over exposed, and so produce the reversed action sometimes found in over-exposed plates. I have not yet seen a photograph of a dark flash, so I may be drawing a conclusion altogether at variance with the effect produced.—I am, yours, &c.,
413, East India-road, July 6, 1889. GEO. H. SLIGHT.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, portable whole or half-plate camera and lens in exchange for tricycle.—Address, E. F. USHERWOOD, Dorking.

Marion's hot rolling press and burnisher (cabinet) in exchange for Show's or other good half-plate detective camera.—Address, P. PILCHER, 15, Castle-street, Dover.

Wanted to sell or exchange, an excellent stereoscopic or copying Dallmeyer lens (good as new) for an instantaneous shutter that registers time exposures, Newman's preferred.—Address, MISS MABEL NEWCOMBE, Dorman, near East Grinstead.

Studio chair, two backs, whole-plate burnisher, 12x10 rapid rectilinear, Kershaw shutter, pneumatic discharge; wanted, Ross' rapid symmetrical or Beck's rapid autograph, sixteen-inch equivalent focus.—Address, W. H. SLOWICK, Photographer, Seelberg, Yorkshire.

Wanted, in exchange for twelve volumes of the *English Mechanic*, down to present date, any useful studio accessory, such as curtain, tablecloth, background, pedestal, posing chair, or telescope that will show astronomical objects fairly, or glazier's diamond in good order.—Address, HORTON, Photographer, Caroline-street, Cardiff.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GARNWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this *JOURNAL*, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

S. Lees, Douglas, Isle of Man.—Two photographs of the *Letins troupe*.

DRAUGHTSMAN.—Try silk mackintosh, which is thin and impervious to light.

W. S.—You have proceeded rightly enough, but you have not sufficiently washed the plates between the different operations.

KENT.—After reducing negatives with perchloride of iron they should be fixed again to remove the chloride of silver produced. Surely no one who understood the subject told you differently.

G. CORRY. The plates have evidently been "light-struck," that is, they have been exposed to light at some time or other; probably in the drying or packing. Do not waste further time over them.

MORRANT.—We never publish the addresses of our correspondents in this column. If, however, you send a letter here addressed "Care of the Editor," we shall be happy to forward it on to the gentleman.

S. A. STONE.—The exaggerated perspective in the picture sent is due to the use of a lens of too short focus, hence it includes a wider angle than is pleasing. Obtain a lens of at least a third longer focus than the one you are now employing.

W. INALL.—Before attempting to strip the negative by Plener's method with hydrofluoric acid the varnish must be first removed. Soaking the negative for a time in methylated spirit will accomplish this, particularly if assisted by gently rubbing the surface with a pledget of cotton wool.

C. B. W.—Good portraits can certainly be taken in a studio lighted from the south; but as you say you are just beginning portraiture and can put your studio up in any aspect, we should advise you to avoid the south, as it is always more troublesome, even to skilled hands, to work than any other.

L. M. inquires: "Can you or any of your readers tell me if I can buy dry plates $4\frac{1}{2} \times 3\frac{1}{2}$ in Switzerland? if so, where and what make? Lausanne would do for the former and Lumiere for the latter. Also if half-plate (English size) can be got. I think of going to the Rhone Valley. Any hints will much oblige.

G. BLANKLY.—Reduce the proportion of the bichromate of potash from five to three or three and a half per cent. during the summer months. Take care that the temperature of the solution does not exceed 60° when the tissue is immersed. Do not depend upon the time of the immersion, but judge by the laccidity of the tissue.

A. J. B. inquires if we can tell him of a large provincial town where the club system has not yet been introduced, as he would like to commence business there with a good-class picture.—We think it would be difficult to find a large town or even village in England where the club system in portraits is not already introduced. We certainly know of none.

A. Z.—It is impossible for us to give you the desired information as to whether the exigencies of the Copyright Act have been strictly complied with in any one particular portrait which is published. We cannot tell whether the work was actually done by the man in whose name it is registered or not. If you pirate the work you will have to take the risk for so doing.

A. D. R.—If, as you state, the lens was purchased from a first-class maker, he will, or ought, for the sake of his own reputation, to take it back upon your showing that it is defective in the sense of not covering in a satisfactory manner the plate it purports to cover. Take a negative by it with its full aperture, and submit it to the maker. Perhaps you are expecting more than such a lens will reasonably perform. We know of no place where it can be officially tested and reported upon.

C. J. FARLIE writes: "Can you advise me the cause of my toning bath going a brownish tint? The bath is the borax one. I find it takes a very long time to get through a batch of prints. It has only behaved so lately."—Probably the materials used in compounding the bath contain some foreign matter which causes a precipitation of the gold—impure water or a bad sample of borax, for example. Some samples of ready-sensitized paper are very prone to bring about a spontaneous reduction of the gold after the bath has been once used. When a toning bath becomes discoloured it is a sure sign that the gold is being precipitated.

M. says: "May I ask your assistance in putting me right? I made some collodion (five hundred ounces) for enamelling as follows:—Alcohol, four hundred parts; ether, six hundred parts; gun cotton, eight parts; castor oil, about half an ounce. It flows on the glass very nicely, but there is a great difficulty in getting the prints off again; about half stick hard and refuse to leave unless they are soaked off. The collodion on drying, instead of chipping off in a fine film, appears to me to dry powdery or leathery, as, if you scrape it, it forms a small lump instead of film, also in drying it dries opalescent and very dead-looking. May I ask you if you can tell me what is wrong, and how I can put it in working order?"—Our correspondent's trouble appears to arise from two sources, both separate and distinct. The sticking to the glass is no doubt due to the plates not being perfectly waxed or French chalked, and not to the collodion itself. The opalescence of the collodion is a different matter, and is a defect in it. This may arise either from the use of an unsuitable pyroxyline, or, what is more probable, employing solvents containing too much water. We fear there is no means of improving the collodion now made.

G. B. (Leicester) says: "Will you kindly tell me, in enlarging from negatives on bromide paper (by daylight, through aperture in wall and a reflector outside), at what distances I must place the centre of the lens (stop plate) from the negative and also from the paper to enlarge four times, i.e., from 11×9 to 22×18 , 10×8 to 20×16 , and $8\frac{1}{2} \times 6\frac{1}{2}$ to 16×12 ? The lenses I can use are Ross' rapid symmetrical, sixteen-inch focus; Ross' portable symmetrical, nine-inch focus; and Ross' doublet, twelve-inch focus. Which lens will do the work best as to sharp marginal definition? My reason for asking instead of trying for myself is that I have (at present) neither convenience to do so nor any experience, and I am just about altering a room for the purpose, and it may save me some expense to be on the right track at first instead of having to alter again. I expect also to be able to use the same arrangement for reduction from negatives to lantern slides by wet collodion in the camera. Is 'four times' too great a strain on the definition of the negatives to expect a good result? Mine are always as sharp and clean as they can well be got."—Here our correspondent only wishes to enlarge two diameters, and the best out of the three lenses to use is the rapid symmetrical. A table of enlargements will be found in the ALMANAC for the current year, on page 610. From this it will be seen that to enlarge two diameters with the sixteen-inch focus lens the paper must be forty-eight inches and the negative twenty-four inches from the optical centre of the lens.

REV. R. C. McLEOD inquires: "Am I justified in copying photographs which I have bought for the purpose of making lantern slides, and using these slides in lectures for which there is no payment at the doors, but after which there is a collection for charitable purposes? I presume that if there is payment at the doors I should certainly not be able to use slides so copied, and if there is no collection after I as certainly infringe no copyright. If I am wrong in these ideas kindly set me right."—If the photographs are copyright an infringement of the law takes place by copying them for any purpose whatever. The better way will be to write to the photographer for permission to make lantern copies for the special purpose mentioned.

J. H. BROWNING (Victoria, Australia) writes: "I wish to ask a favour of you. Can you tell me how to get any warmer tone on a transparency by the wet collodion and iron development? I make lantern slides by the wet collodion process and develop with iron. I have tried most other methods, but I like the wet collodion best. I have tried tannin plates, and these sometimes (only) give a warm brown tone; this is the sort of tone I should like to get on the wet plate if it is possible. I have seen some slides, said to have been on wet collodion plates, which had the tone I am trying for. I have tried a good many methods but cannot get anything much different from the slaty tones I do get, and I find out here no one seems to be able to get anything much different. The sulphide of potash does not yield the result in my hands it is said to give. Gold I have tried, and many others, but with indifferent success. I can, of course, get black tones by the silver, but this looks heavy and harsh in the lantern. Now, sir, can you help me, or is it a matter of impossibility? I get sometimes by the iron developer a red image, but this is uncertain and not under my control; my opinion is it is probably due to atmospheric conditions. I may say I am well up in making these slides by the wet method, and with the exception of the tone they leave nothing to be desired. The dry plates I have tried, but they do not give the result the wet plates do. The chloride plates also I do not like. As I have said, I have been shown wet plates with the tone I should like (brown or warm purple), but I have never succeeded in getting it. The tannin plates yield sometimes the tone I am striving for."—In reply: Warm brown tones are somewhat difficult to obtain with wet collodion and iron development. Something depends upon the exposure—the fuller this is the warmer will be the tone of the resulting picture. Brown tones may be obtained in the following manner: Give a full exposure, and develop a thin image with the iron; fix and wash thoroughly. Bleach with bichloride of mercury and then treat either with sulphide of potassium or ammonia. If our correspondent could always produce, as he sometimes does, a red image in the first instance, this could then be toned with gold, either to brown or purple, without difficulty. Wet collodion with a full exposure, and pyrogallic acid development, only, yields a brown tone which can subsequently be toned with gold. But with this development the exposure must be very prolonged.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Thursday, July 18, 1889.—Subject, *The Right to the Negative*.

PHOTOGRAPHIC CLUB.—At the next meeting of this Club, July 17, 1889, the subject for discussion will be on *Making Lantern Slides from Engravings and other Pictures*. Saturday outing at Chorleywood. Train from Baker-street at twenty-nine minutes past two.

PROCESS WORK IN THE FRENCH EXHIBITION.—The chief evidence of recent progress visible in the French exhibits is in the matter of process engraving and printing. The number of different methods of which French publishers can avail themselves appears to us considerably larger than those with which our own publishers are familiar, and the French printers are evidently paying special attention to modes of working adapted to the various engraving processes. The applications of photographic engraving for lithographic and typographic printing, and also for the same work in colours, are exhibited in many different specimens. Colour printing in relief is specially exhibited by Draeger & Lesieur, Quantin, Charles Unsinger, and A. Lahure. Colour printing from plates by Bonssod Valadon et Cie. and Charles Chardon. A special process of printing photogravures in colours is shown by M. Mouillot, Director of the Publications Périodiques. Process work from zincs in black and colours is done with special excellence by Georges J. Petit Michelet, Rongeron, Guillaumé, and Gillot; photo-lithography by Berthaud and Aron; and photogravure by Dugardin and Bonssod Valadon et Cie. Some of these printers do not exhibit, although many specimens of their work are to be seen in different cases. In the French section there are altogether one hundred and eighty-seven exhibits, those of the great houses, such as Hachette et Cie., Plon, Nourrit et Cie., Alfred Mame et Fils, the Maison Quantin, and Firmin Didot et Cie., filling the space of a moderate-sized shop, handsomely, not to say luxuriantly, fitted up. Hachette, Mame, and Didot are ineligible, members of those firms being jurors, and the gold medal will therefore probably fall either to Plon or Quantin.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1524. VOL. XXXVI.—JULY 19, 1889.

CELLULOID.

Now that there seems to be every probability of glass being, at least partially, superseded by celluloid in negative work, especially out of doors, we may expect soon to find a new subject for discussion in the question as to whether the substance referred to is altogether free from faults in its new application. It may be said, indeed, that the question has already been raised.

It is no new thing in photography to find that when a new product or material is brought into use it at first enjoys nothing but praise from those who first experience the novelty of its advantages without recognising its defects. Later on comes a period when it suffers as much condemnation from those who, its novelty having worn off, are beginning to find out its defects, or rather what, from imperfect knowledge of its proper use or treatment, are supposed to be defects. Then, finally, the road branches off in two directions—either the thing is utterly condemned, or if really good, its peculiarities having been studied, it takes a firm footing as an improvement on what has gone before.

We have almost forgotten the many *pros* and *cons* urged in connexion with collodion after its introduction nearly thirty years ago into the photographic laboratory; but every one must remember the paeans that were sung in favour of gelatine when that first showed its capability of replacing collodion Pyroxyline—so said the enthusiast of that day—was a treacherous, uncertain, and unstable substance at the best of times, but gelatine—well, gelatine was gelatine all the world over, and could be obtained as a reliable and uniform product in any village shop.

We often wonder whether the preachers of that doctrine ever felt "small" in the after years of, say, from eight to ten years ago, when "frilling," "blistering," "pits," "green fog," red, yellow, and every other kind of fog and stain nearly drove plate makers and plate users to their wits' ends. When plate factories had to be "run" in the night hours and the days devoted to rest, when a spell of hot weather well-nigh put a stop to work altogether in studio or dark room, except at a ruinous expenditure in ice. No! gelatine did not, for photographic purposes at least, bear out the simple character at first claimed for it, and it is certainly not too much to say that photography brought about such a re-study of gelatine as to cause an entire revolution in its manufacture.

It is scarcely possible or likely that a purely artificial product like celluloid will be found in use to present the variations and uncertainties met with in the case of gelatine, but it is quite certain that before it is finally given a fixed place in photography it will meet many opponents and many adverse critics, both interested and otherwise. It will take time, of course, to fairly

decide upon many points in its character, and to establish or demolish its claim as a perfect substitute for glass. So far we can say no more than that it is, apparently, as near perfection in that direction as we can hope to approach, but it remains to be seen whether it does or does not develop at present unrecognised features which may materially detract from its advantages.

For instance, some few months after the first introduction of the Carbutt films into this country, in consequence of the occurrence of several cases of "spotty" negatives, the question was raised as to the possibility of chemical action taking place between the sensitive film and its support to bring about this result. At first sight this does not seem at all probable, and yet the argument was brought forward that in the case of *collodion* dry plates a deterioration occurred with time that was generally set down, if not absolutely traced, to partial decomposition of the collodion film itself and the consequent reactions upon the sensitive silver salt. And after all, in what does celluloid materially differ from a dry collodion film?

It certainly differs in one respect, and here again the promoters of the theory of chemical action find a peg on which to hang an argument. Without going into the precise modes of preparation, which may vary, it may be said that camphor forms a considerable ingredient in its composition, as is plainly evident to the sense of smell, especially when the celluloid is scraped, cut, or heated. "May not camphor, in time, exert an injurious action on the over-lying layer of gelatino-bromide?" So, at least, ask the dubious ones, and we can only reply that it remains for time to tell, though certainly the suggestion does not seem to be one to cause much uneasiness, at least as a cause of spots. If the fault complained of were general fog there would be more plausibility in the suspicion, since the uniform diffusion of the indicted substance throughout the film would favour general rather than selective or local action in case any injurious property were possessed by it.

Glass has, at least, one incontestable quality, namely, that it is about as chemically inert as it lies in human power to make anything. In a great measure celluloid possesses the same characteristic, but it is clearly open to the charge of liability to internal decomposition, resulting not only in the giving off of nitrous products, but also of the volatile camphor which forms a part of it.

If it should be proved that these doubts are well founded, the question suggests itself as to whether the beautiful substance cannot in some way be freed from its baneful ingredients. In other words, whether it cannot be *de-camphorated* and *de-nitrated* without destroying its advantageous features, especially its transparency and flexibility.

With a view of testing the possibility of this we have made a few rough experiments, but not with any very decisive result, at any rate so far as success is concerned, but rather the opposite. With a view of removing, if possible, the camphor, a sheet of celluloid was digested with ordinary methylated alcohol, which though at first producing no apparent result, was found in the course of a few hours to have *completely* dissolved it. Here, then, there is no possibility of dissolving out the camphor since the latter lends its aid to the alcohol in dissolving the pyroxyline.

Another sheet accurately weighed (like the last) was submitted to the heat of about 180° Fabr. in a gas oven for a period of twelve hours; at the end of that time it was physically changed to the extent of being badly curled and crumpled by the heat, though that might possibly be remedied by proper precautions. But the loss in weight after twelve hours "stoving" did not amount to *one tenth of one per cent.* on the total weight. So here, again, there does not appear much hope of driving off the camphor in vapour without hopelessly spoiling the material.

Of a number of experiments in de-nitrating, one may be specially mentioned. If the celluloid be immersed in strong concentrated sulphuric acid no apparent action takes place, but if an equal volume of water be added, the sudden and intense heat evolved causes a deep yellow colouration of both celluloid and liquid, and the evolution of a powerful empyreumatic mixed up, with which camphor is plainly recognisable. After a very short time the action ceases and the colour leaves the solution.

If the celluloid be now taken out, washed, and dried, it will be found to have lost considerably in weight and to have had its surface eaten away irregularly, or corroded in much the same way as glass when treated with dilute hydrofluoric acid. Returned to the dilute sulphuric acid and boiled, no further action takes place until ebullition has gone on for some time, when the liquid commences to turn yellow, but the colour at first quickly disappears on stirring. Gradually, however, it becomes stronger and more persistent, and at the same time strong nitrous fumes are given off, these being apparently the cause of the yellowing. Finally, the colour becomes brown, and the celluloid dissolves entirely, forming a deep brown solution.

Now this seems to prove that *as celluloid* the substance for a long time resists even boiling sulphuric acid, but gradually it is de-nitrated, and then *as cellulose* is carbonised and destroyed by the acid. Thus the possibility of de-nitration is proved, but whether it can be done practically without destruction is a question.

If this can be accomplished, one at least of the possible weak points in celluloid will be removed.

NEGLECTED PROCESSES—THE ALBUMEN PROCESS.

The albumen process may now be considered as being practically an obsolete one, notwithstanding that by its aid have been produced results which for rapidity in the case of negatives, and excellence in quality in the case of transparencies, have never yet been surpassed. The albumen was really the first glass process for negatives. This process was—we are now speaking in the past tense—essentially a slow one, as most will admit when we say that it was slower than either the calotype or the wax-paper processes. From twenty-minutes

to three quarters of an hour with the lenses then in use—single landscape lenses with an aperture of $f/20$ to $f/30$ —was a very general exposure. With regard to the quality of the negatives yielded, they were fully equal to those by any of the modern methods. Many of our older readers will, doubtless, well remember the very fine series of views by McPherson, of Rome, taken on plates eighteen by fifteen inches or larger. Although the albumen process, as ordinarily worked, was undoubtedly slow, yet, with certain modifications, it was exceedingly rapid. As an example of this, the late Mr. H. Fox Talbot, at the Royal Institution in 1851, made one of the most rapid exposures on record. It was this: Some printed matter was pasted on the periphery of a wheel and the image focussed in the camera. The wheel was then set in rapid motion, and the exposure made by the instantaneous discharge of a Leyden battery. The letters were reproduced perfectly sharp and well defined in the negative.

The albumen process was troublesome in its manipulations, and on the introduction of collodion, with its greater sensitiveness, was, so far as negatives were concerned, quickly superseded. However, it continued to be extensively used, commercially, for stereoscopic transparencies. There always has been a certain amount of prejudice against the albumen process by amateurs, on account of the supposed difficulties in its manipulations. It is quite true that in the earliest method of preparing the plates it was very troublesome, inasmuch as the plates had to be dried in a horizontal position. Albumen does not set like gelatine, hence, in order to obtain an uniform coating, the glasses had to be retained accurately levelled until they were perfectly dry. Added to this, the albumen while in a moist condition appeared to have an extraordinary affinity for dust, any particle of which would produce a spot or comet in the finished picture. It was found, however, that this difficulty could be overcome provided the plates were first coated with a substratum of collodion and washed prior to the application of the albumen. The plates could then be dried in a vertical position and an even film still secured. Furthermore, if any particle of foreign matter did happen to settle on the plate it was forced, as it were, through the albumen into the collodion film, where it remained inert.

For the last quarter of a century, or more, the albumen process has always been worked with this modification. About fifteen or sixteen years ago it may be mentioned that this, even then, antiquated process was vended as a "secret process" for making enlargements, the secret being the making of albumen transparencies for enlarging from. Few, we believe, ever worked this method much in practice.

As we remarked at the commencement, transparencies by the albumen process are still unsurpassed by those of any other, and it is in this direction that the process has mainly been employed since the introduction of collodion. The famous stereoscopic slides of the late M. Ferrier, made more than thirty years ago, are as good as, if not better than any that are made now, notwithstanding all the modern improvements in photography. Indeed, even now albumen transparencies are looked upon as the standard of perfection, for it is seldom that more is claimed for any process than "that it is nearly, or quite, as good as albumen"—never that it is superior.

How, then, it may well be asked, if this process yields such unrivalled results, that it is so little used? The answer is simple. The process, like many others, requires some little experience in order to obtain the best results, coupled with the

fact that it is more troublesome than most other processes to work, as will be seen from the following brief description. Here we recur to the present tense, inasmuch as albumen transparencies, both for the stereoscope and lantern, are still made commercially, though on a somewhat limited scale.

A glass plate, after being carefully cleaned, is coated with iodised collodion of a somewhat porous or rotten character. It is then washed in water to remove the ether, alcohol, and iodide. After draining, the iodised albumen is poured on and allowed to soak well into the film; the plate is then reared on end to dry. By the way, all these operations may be conducted in open daylight. The collodion, it may be mentioned, acts purely mechanically, and takes no part in the formation of the image. The plate, when dry, is sensitised in a silver bath, strongly acidified with acetic acid; forty-five grains of nitrate of silver and forty-five minims of acetic acid to the ounce of water are the proportions usually adopted. The plate is then washed and again dried. The exposure is generally made by contact printing. In the earlier days of the process the development was by means of gallic acid, but the more modern method is with acid "pyro," used warm. After fixing in hyposulphite of soda the image is toned with gold to the colour desired.

The principal charm in albumen transparencies is the extreme brilliancy and transparency of the shadows. Indeed, the image partakes more of the character of a stain than an actual deposit. So transparent are the shadows of a good albumen picture that printed matter can be read through the deepest ones.

From the above brief description of the process it will be seen that, compared with such processes as the wet collodion, or the collodio-bromide, the albumen, though not really difficult to work, is troublesome. And now that such excellent, ready-prepared, gelatine plates specially made for transparencies are regular articles of commerce, we fear that the albumen process, notwithstanding its excellence, stands but a very meagre chance of resuscitation, at least by modern amateurs.

A PARAGRAPH pregnant with instruction to astronomers and interest to photographers appears in a recent number of the *English Mechanic*, and, as it bears upon repeatedly-given remarks of our own in a similar direction, we here give its substance. "Recent controversy in connexion with astronomical drawings compels the observation that it would be better if photography were more extensively utilised. Astronomers draw what they see as faithfully as possible, but it is clear that they do not all see alike, even when observing at the same time. Dr. Boeddicker has recently issued a series of drawings of Jupiter made with the aid of the three-feet reflector at Birr Castle, and he is about to publish a drawing of the Milky Way, which has been reproduced by a photo-mechanical process; but it would be better, when possible, to photograph direct, and we expect that considerable advances will be made in astronomical photography before the century comes to an end."

According to its inventor, the Eiffel Tower will be able to furnish a kind of scientific workshop of a general-utility character suitable for astronomical, chemical, meteorological, and a variety of other purposes too numerous to mention. Thus, in an article in the current number of the *New Review* he says, "I may even go so far as to say that there are few scientific men who do not hope at this moment to carry out, by the help of the tower, some experiment connected more especially with their own investigations." This really is carrying enthusiasm to a very high pitch. M. Eiffel even informs us that physiological experiments of the deepest interest are to be carried on there, but, as these are foreign to our province, we do no more than allude to them.

It is, however, difficult to believe that, even at an elevation of a thousand feet, photo-astronomical work could be satisfactorily carried on in the midst of a populous district and in the immediate neighbourhood of a vast city.

THE photographing of clouds and such-like meteorological work is to be undertaken in the tower laboratories, and we should imagine will be very satisfactorily performed. The question arises, Would cloud photographs specially taken for photographers' use, and which would practically have a clear, unbroken horizon, be of value for printing-in skies? We are inclined to believe that the conditions would be too far removed from those governing the clouds taken along with a landscape from *terra firma*, and so instrumental in producing illegitimate effects. All the same, a contrary opinion may be held by others, and we should not be surprised to find upon the market ere long "Eiffel cloud negatives."

SOME little time ago we announced that Mr. V. H. Veley had shown that pure silver was insoluble in pure nitric acid, the presence of nitrous acid being a necessary concomitant of the act of solution. In the last number of the *Chemical News* Messrs. C. F. Cross and E. J. Bevan have, as bearing upon the same problem, given the results of some experimental work touching the necessity of nitrous acid being present in order to obtain certain effects hitherto associated with nitric acid alone. One of these experiments was the solution of copper: a given quantity dissolved in four hours in a certain quantity of nitric acid, but when nitrous acid was eliminated only one per cent. of the amount was taken up in the time.

THE effect of the acids on jute fibre was tried, the nitrous acid being eliminated by adding urea to the liquid; it had a most marked effect, the weight of the product after treatment increasing in proportion as the urea present was increased; but when this fibre, and also cotton, were treated in the usual manner for making gun-cotton or pyroxyline the action of the addition was absolutely *nil*.

REFERRING to the solubility of ordinary glass, such as is used in the laboratory and for household purposes, an interesting fact has been noted by a recently deceased well-known contributor to the above-named journal. He found that most of the glass vessels in his laboratory, not only those which by their clouded surface showed the action of a solvent, but also the clear-looking glasses not apparently acted upon at all, turned to a rich red colour when the phenolphthalein test was applied. That glass should not only dissolve but in sufficient quantity to colour test paper is very remarkable, and shows that this action may constitute a factor of greater importance in matters photographic than has hitherto been calculated.

A THEORETICAL reply has, in a communication to the Berlin Physical Society, been given by Professor Helmholtz to the question whether gas burnt in the ordinary manner at burner is not a more economical source of light than the same gas burnt as a fuel in an electro-motor for the production of glow lamps. The result he arrived at was that it was far more economical to use the gases for driving a dynamo which supplies incandescent lamps, and to utilise the energy radiated from the latter, than to burn the gases and utilise the energy which is radiated out from their non-luminous flames.

PHOTOGRAPHIC INDUSTRIES.—II.

THE FACTORIES OF THE LONDON STEREOSCOPIC COMPANY, LIMITED.

NOTHING short of personal inspection and observation can serve to convey an adequate idea of the nature, extent, and ramifications of some of our photographic industrial establishments. The force of this truth we experienced when, a few days ago, and under the wardenship of Mr. Mitchell, the general manager, we made a tour of inspection through the more purely industrial and manufacturing *ateliers* of the London Stereoscopic and Photographic Company,

Limited. This establishment consists of a congeries of buildings, all, however, connected with each other, and is situated on one of the heights to the north of New Southgate Railway Station, where the distressing fogs and darkness so peculiar to our great metropolis but rarely extend. The fact that this is not the only photographic industry located in the northern suburbs of London speaks for the favourable meteorological conditions which there prevail.

The first room we visited is that devoted to the registration of negatives from which prints may at any moment be demanded. These are all classified in a systematic manner. Are they views? It only suffices to know in which county, or in what country, any such view has been taken, and a book of reference is at hand immediately from which is ascertained all about it—its nature, size, and (what is of equal importance) its place on the shelves of the negative stock room. It is in the portraits of what are designated "celebrities" that the *embarras de richesses* is most strikingly apparent—and in what a monster album are these celebrities contained! No attempt here to trim and square them off neatly and nicely—a head, a face only without a head, and sometimes even only a piece of a face, suffices for the distinguishing or salient points by which a portrait is distinguished from some fellow-portrait of the same individual. Fame is the key which admits to this registry, and ensures those who are thus crowned a place in its pages where they may rub shoulders with the members of the Royal family, the favourites of the footlights, the leaders of the Salvation Army, men of mark in the worlds of politics, literature, religion, science, and art. And as they are entered in the registry-book in the order in which they are taken, all attempts at classification would be futile in such an album. Hence we have in contiguity Mary Anderson, the Earl of Fife, General Booth, the Speaker of the House of Commons, G. R. Sims, "Mary Jane," Mr. Gladstone, Archbishops, "bruisers," and Indian Princes—in short, all who have been heralded by the trump of fame.

Classification of the orders as they are received in the works is greatly aided by the fact that each department employs a special colour of paper in its order forms, and a special factory department is relegated to amateur in contradistinction to professional work.

In the silver printing department about two hundred sheets of albumenised paper are used daily. These are sensitised each morning of the day on which they are to be used. The printing room is one of great length. It consists of a central chamber in which the frames are charged and then run out through a series of little windows on each side to the printers, who expose on tables in wings adjoining this central room. The vignetting masks, we observed, are all made of brown paper edged with cotton wool to ensure softness. The toning and fixing room is very capacious, and well fitted with both slate and wooden trays and tanks. Acetate toning is employed. The system for washing the prints is very complete. On removal from the hypo tanks they are transferred to one of tepid water, which is constantly changing, from which they are removed to others, in which they are subjected to a prolonged washing in thirty changes of water at the ordinary temperature, the tanks being emptied and refilled by automatic action.

The trimming and mounting room is tenanted by a whole army of happy and contented-looking girls; and here we appreciated the great value of the system which prevails in this great establishment, for in the great variety of mounts which must necessarily be used in connexion with a number of branches no hitch was apparent, but each print was relegated to its specially "imprinted" mount. The trimming guides are made of stiff card, so constructed that the knife runs beyond the cross-cut each operation, thus securing sharp corners. The mountants employed are gelatine and starch, both freshly made.

One room is devoted to the storage of chemicals. On its shelves are to be seen many gallons of ether, absolute alcohol, and all the other fluids and solids appertaining to photographic manufacture and practice.

Collo type printing is here carried on upon a very large scale, as may readily be understood; a separate room is devoted to the preparation of the printing plates, which are in some instances large, being 36 x 27 inches. Here we witnessed the coating and drying of these plates. After exposure they are placed vertically in water tanks in order to the removal of the unaltered bichromate, their duration in the water being from four to six hours. The printing is effected on

three large machines which are driven by engine-power and are automatic in action. In addition to these there are three hand presses for proofs and small jobs. On one of the large plates as many as twenty-four small negatives may be laid down and printed at a time. In this room also is a guillotine, the knife of which is thirty inches.

The temperature in this room is very accurately maintained by means of a blower on the one hand and twelve rows of hot-water pipes on the other; and both in this and in other rooms in which gelatine forms a factor in the operations, not only the heat but the moisture in the air is carefully adjusted, several hygrometers of the wet and dry bulb thermometer variety suspended around serving as indicators. A jet of steam projected from a vapouriser into the air restores it to the working equilibrium when too dry. In connexion with the large printing presses we observed some ingenious appliances by means of belts working over cone-shaped shaft pulleys, by which any definite degree of speed could be imparted to each or any of the steam presses. The inking rollers are formed of leather and composition.

Seeing that gas, by way of local heating and otherwise, plays an important part in this factory, it has been found necessary to regulate its pressure; for previous to this having been done the quantity required at the works influenced in a serious measure that necessary for the private residences in the vicinity. A Siemens' dynamo serves as the means by which illumination is obtained.

In the Woodbury printing department there are thirty printing presses. The reliefs are made by a Tangye hydraulic press, 11 x 9, giving a pressure of five hundred tons. There is another of a similar nature, but of less dimensions, for smaller reliefs; its pressure is two hundred and fifty tons. In a room adjoining, the paper is prepared for Woodbury printing. This is passed through rollers no fewer than thirteen times to impart the necessary smoothness and quality.

Carbon printing, both on paper and opal, is extensively carried on. During the late "craze" for opal prints, no fewer than two hundred thousand were supplied by this Company for two houses alone.

(To be concluded in our next.)

ECHOES.

It is a very sensible *Suggestion to Plate Makers* made in a leading article last week, namely, that every plate before being sent out should be branded in some manner, so that its maker may be identified at any future time. It is a suggestion, too, of very easy application in the case of plates that are to be used for portraiture, as in such cases a large area of the sensitive surface is generally unused. But what about landscape plates which are usually printed "up to the edges?" Surely the writer has overlooked the rather important circumstance that a label, a dab of paint, or a series of "diamonds, squares, triangles, circles, &c. &c.," might rather interfere with the beauty of the prints.

It is certainly desirable to know, before commencing to develop, what and whose plate is under treatment, and most careful operators do know. It is rather hard, though, to throw the onus upon the plate makers of preventing accidents from sheer carelessness on the part of the users of the plates.

It is desirable, I say, to possess the knowledge, but far from absolutely necessary, as I found on one occasion some years ago. Having exposed a dozen plates from a Mare's changing box, one half of which were Wratten's "Ordinary," the remainder their "Instantaneous," the two kinds being duly marked, I found that owing to the fact of the plates being inserted by the *bottom* of the box, I had, in using them from the top, got their relative positions mixed, and exposed the slow plates for the more rapid subjects, and *vice versa*. With the knowledge of my error in view, I set to work to develop, and did not lose a single negative; further than that, and showing the sterling quality of the plates, there was not one that might not have had its "best" exposure.

Mr. Edward Dunmore is an "old photographic hand," and the advice that he has to give is always good. Young beginners, aye, and older stagers, may read his article on *Care* with advantage, for nothing more than *care* helps in the earlier stages to make a good photographer. But I cannot help thinking that there is a tendency to make "care" the one thing needful to the exclusion of other equally important qualities. "When you see a man scrupulously

fastidious about the condition of his camera and lens, it is an outward and visible sign that he will be careful about his work generally." So says Mr. Dunmore in the opening sentence of his dissertation, but is it so?

I knew many years ago an amateur who might have been the very instance Mr. Dunmore had in view. He kept his three lenses in little velvet bags, which again packed into a cosy padded leather case, and his camera had a macintosh covering to envelop it completely, with a slit for the slide and shutter, so that a chance shower of rain should not spoil its beauty. He had it French polished, I believe, once a year, at least it used to be said so, and certainly it always looked as if it were just "out of the shop," and was the chief feature of our outdoor gatherings—the pride of our Society. But neither I nor any one else ever saw a picture by this careful artist, though he was constantly exhibiting "something," and wanting to know what was the matter with it; in fact, all his "care" seemed to be exhausted on the camera and lens.

A contemporary friend and member of the same Society was another peculiar example of "care," but his mania was chiefly exhibited in connexion with the chemical part of the proceedings. A separate measure or glass for every operation; a separate dish, when dishes were necessary of course—very laudable if not absolutely needful arrangements. But there was also a special place for each bottle, glass, dish, &c., his dark room contained, and each had to be returned to its proper place every time it was used. You must not have the developing solutions on the table while intensifying, and *vice versa*; develop, clear away the paraphernalia, bring down the intensifying "kit," clear that away, fix, &c.; then commence the next plate *de novo*. This gentleman rarely developed a plate himself, never if he could get a friend to spend the evening with him and do it for him, and I can speak feelingly of the pleasure his friends experienced in conforming to his rules, which were like the laws of the Medes and Persians, and changed not for any one.

On the other hand, I have known a good many photographers, both amateur and professional, whose names are as household words both as writers on photography and as successful exhibitors, but I cannot say that I have ever been very deeply impressed by the exhibition of any undue amount of care in their general arrangements—perhaps, if the truth be told, rather the opposite. I remember once, at a public demonstration of a new method of emulsion making, the demonstrator, one of the leading writers of the day, used the palm of his hand in place of a cork in shaking up the bottle of emulsion, and then, quite as a matter of course, proceeded to wipe it, not on his coat tails, but on "the domain that there adjacent lies," much to the amusement of some of the audience. The fact is, care wants to be used, like everything else, "with brains," but brains of the right sort get on fairly well with a very moderate garnishing of what is called care.

It seems, after all, that the "Ipswich phantom photograph" was not so ridiculous a matter as photographers were too ready to assume, but rather a *boni fide* spirit prophecy. So, at least, I gather from the report extracted from the *East Anglian Daily Times* last week. This is a new rôle for "the spirits" to play, to photograph a dead person two months before death on the very spot of the occurrence. How science is advancing even in spirit land! What a fine plot this would make for a novel from the Philistine point of view! Here is the "argument." An enthusiastic amateur finds a mysterious and ghostly figure on one of his negatives, the said figure not having been present when the picture was taken. He is certain it is of spirit origin, and after careful thought elaborates the theory that it is a prophetic warning of a coming crime, but is terribly ridiculed for his pains. Exasperated at this, he is determined that his theory shall be established, and so commits, or "procures to be committed," a murder, and deposits the victim's corpse on the very spot on which it appeared in the photograph. Carefully and skilfully "worked up" by a competent "penny dreadful" artist this should take well and would dramatise beautifully.

JUNUS.

THE WHOLE ART OF PHOTOGRAPHY.

VII.—FIXING, WASHING, AND DRYING NEGATIVES.

In fixing a gelatine negative it cannot be too strongly impressed upon the tyro that it is not fixed immediately upon the disappearance of the bromide under the action of the hyposulphite of soda solution,

the strength of which should be about four ounces to the pint of water.

The first action of the hypo upon the silver bromide is to convert it into silver hyposulphite, which, being a clear, transparent salt, is apt to induce the idea that because the opaline silver has disappeared therefore fixing has been effected, seeing it is no longer visible. But the invisible silver hyposulphite still remains, and as its presence in the film would ensure a bad discolouration at a subsequent period, and as it cannot be removed by any amount of washing with water, it must be dissolved out by a suitable solvent. It is fortunate that the same agent by which it was formed is also the best solvent for it, hence all that is necessary to ensure its removal is to allow the plate to remain in the hypo solution for a short time after the last visible traces of silver have disappeared, this being ascertained by raising up the plate and examining the negative through the glass.

Here it may be observed that some makes of plates fix in infinitely shorter time than others. We have some plates the bromide in which disappears after a duration of half a minute in the hypo solution; but we have also some which require about a quarter of an hour to effect this end.

In washing the negative to remove the fixing salt, if one has not a proper washing apparatus—which is always best—it can be effected in a thorough manner either by allowing a gentle spray of water to fall upon the surface for half an hour, more or less, according to the permeability of the film, or by placing it face down in a basin of water under such circumstances that it is supported by the corners at some distance from the bottom. For small plates the saucers belonging to breakfast cups answer well. Care must be taken to change the water frequently. These, however, are but makeshifts, although effective enough, in the absence of properly constructed washing troughs, of which there are numerous forms in the market.

To dry a gelatine negative is not the easy thing that appertains to one on collodion, which it is only necessary to hold before a fire for a few seconds. Heat melts gelatine in presence of moisture, therefore it must not be thought of. By rearing the negative up on a slip of blotting paper to absorb the drainings, a few hours suffice to find it quite dried. But it is often not expedient to wait so long a time for the drying of a negative. By what means, then, can it be hastened?

The first thing to do is to get rid of the surface water. To do so lay the negative back down upon a sheet of blotting paper, and spread over the face one or two thicknesses of clean cambric, or a thick absorbent sheet of blotting paper, and apply gentle pressure all over the surface. It is of no consequence that markings of the textile fabric be impressed upon the soft gelatine; they eventually become levelled and disappear.

The moisture having thus been minimised, place the negative in a current of air admitted through a partially open window, and in from five to fifteen minutes, according to the dryness and force of the air, it will be quite dry.

It is well known that water and alcohol have a great affinity for each other. A method we have often tried, although inferior to the one just described, consists in laying the negative in a vessel of alcohol and causing it to flow in waves over the surface. Very soon the water is displaced from the film, the alcohol taking its place. The plate thus treated dries quickly—nay, it may even be dried by heat, although this, in consequence of a possible modicum of water still remaining in the interstices of the gelatine, is rather risky.

It is always well to warm the plate after it has been air-dried, so as to ensure its complete desiccation. After this it may be varnished, if it is considered worthy of being kept for a long period, although it is not necessary when only a few prints are desired.

DINNER TO MR. THOMAS BOLAS.

On Tuesday evening Mr. Thomas Bolas was entertained at dinner in the Holborn Restaurant by several gentlemen connected with journalism and photography, the occasion being his severance from the editorship of the *Photographic News*, which post he has filled since 1880. Mr. J. Traill Taylor presided, the vice-chair being occupied by Mr. E. W. Foxlee.

Letters and telegrams expressive of their sympathy with the meeting, with regret for inability to be present, were read from Messrs. T. R. Dallmeyer, W. B. Bolton, H. M. Hastings (F.C.S.), and others.

The Chairman, in proposing the toast of the evening, said that he could speak of Mr. Bolas from the vantage-ground of a very long acquaintanceship, dating anterior to that gentleman's connexion with the *News*, and he could testify to his honest and straightforward character. As a rival editor he had invariably found him honourable and courteous, and although they did not think alike on all topics, there never had arisen the semblance of friction to disturb their personal friendship. He asked them to honour their guest in full bumpers.

Mr. W. E. Debenham could endorse every word in praise of Mr. Bolas uttered by the Chairman. He, too, had known him many years, and highly appreciated his abilities.

Mr. William Bedford was in very strong sympathy with Mr. Bolas, who had invariably fought the battle for the photographer as against others; he was upright, unreserved, and plain-spoken, and he wished him a cordial success in his new undertaking.

Mr. Foxlee was, perhaps, better able to testify to Mr. Bolas's good qualities than any one present, as he had known him much longer than they, and he could merely echo all that had been said in his favour, but he would do that in the strongest manner possible.

Similar sentiments were expressed by Mr. F. A. Bridge, Mr. J. J. Briginshaw, Mr. G. F. Williams, Mr. E. Dunmore, Mr. E. Clifton, and Mr. Alexander Cowan.

Mr. Bolas made a suitable acknowledgment. He expressed his high appreciation of the compliment paid by such a representative body of gentlemen as those present.

Mr. Foxlee, in proposing the health of the Chairman, called attention to the fact that Mr. Taylor had just completed a quarter of a century since he first took the Editor's chair of THE BRITISH JOURNAL OF PHOTOGRAPHY. He first made his acquaintance at the presentation made to Mr. George Shadbolt, the former editor, on his retirement from journalism twenty-five years ago, and personal friendship had existed ever since; a similar friendship he believed ruled with all those present.

Several remarks were made *apropos* of this, and after a pleasant evening the party broke up at a late hour.

MOUNTING AND THE SURFACES OF PRINTS.

It is a gratifying proof of the interest shown in photographic matters by our modern practitioners that old processes are being revived, almost unearthed, we might say, and worked side by side with the most recent refinements and improvements.

An instance of this, which has just come under our notice, is the re-introduction of a well-known process for obtaining prints on rough-surfaced paper, the details being as follows: Drawing paper is salted with a proper salting solution containing enough gelatine to size the surface, and is afterwards sensitised with ammonio-nitrate of silver applied with a cotton brush. The paper is not fumed, but simply well dried and printed as usual. It is toned in a carbonate of soda bath and fixed. It is mentioned as a strong point in favour of this process that "tones resembling those of the platinum print may be obtained." We can strongly recommend the process to those whose artistic feelings are wounded at the glossy surfaces of the albumen, gelatino-chloride, collodio-chloride prints, &c. But let us add that the process will be found most suitable for subjects that present bold contrasts of light and shade without much fine detail. In portraiture, for example, we should select a negative lighted in the so-called "Rembrandt" manner, and one of large size rather than a small one full of delicate detail.

The surface, or rather the absence of surface, of prints thus made will depend upon the grade of paper selected. Whatman's papers have been recommended as possessing every requisite quality. Now, in common with the platinum, plain silver, and blue prints, these prints on drawing paper offer the great advantage over those made on albumen, gelatino-chloride, &c., that they are *non-contractile*, and may be easily mounted without risk of injury to the surface of the picture. It is a matter of common observation among those who have had experience in printing on albumenised paper, that after the print is finished the surface is more or less covered with minute cracks. In some cases this constitutes a very unsightly defect. If the paper is highly albumenised, and the weather when the prints are made very cold and dry, and the prints hurriedly dried in a hot room after removal from the last wash waters, it may be impossible to obtain a good smooth surface free from cracks, even if the print be thoroughly rolled.

As a general thing, however, the commercial brands of albumenised paper have too little albumen on the surface to behave in this manner, and there is rather a general want of brilliancy than any defect, owing to a too heavily albumenised surface.

Should any of our readers be troubled in this manner, they will be able to improve matters by adding a little pure glycerine to the last wash. The exact quantity to be added, of course, would have to be determined by experiment: an ounce to the quart might be used to start with. After the prints have been thoroughly soaked in this they should be lifted out, placed together back to back, and dried in this position by means of spring clothes clips. As each print exerts traction upon the other, both will dry quite flat, and the small quantity of glycerine will remove the obstinate tendency to curl and prevent the albumen surface from becoming unduly dry and cracking.

Some operators insist that the prints be mounted while still wet, in order to prevent cracking of the surface, but this necessitates that the prints be finally trimmed before the washings and handlings, which seldom fail to fray and disfigure the neatness of the corners and edges. The best reason for pursuing this plan, to our minds, would be that the mounted print could be passed through the rolling press while the albumen surface still retained sufficient moisture to render it pliable and compressible under the heavy pressure. If the prints were first dried and then re-wetted before mounting, it is evident that the same end would not be effected.

Any one who has had to mount large batches of prints knows very well how much the work is expedited by wetting them. Those nearly of a size are brought together face down and laid on a sheet of glass. A large soft towel is dabbed over the back of each print until the superfluous moisture is removed, and the gelatine then quickly laid on with a flat hog's-hair blender. The card being ready, all that remains to be done is to pass the point of a knife under the upper print, lift it off, and apply it to the card. A clean sheet of blotting paper is then laid over, and a few passes with the hand finish the operation. The print, it will be seen, requires no holding with the hand during the pasting, and there is no possibility of the gelatine getting on the surface of any of the other prints. The cards, however, will always cockle badly when the prints are thus mounted, unless dried under pressure between blotting papers.

The surface of the aristotype and other papers in which gelatine is employed in sufficient amount to give great gloss is by far more difficult to manage than the albumen surface. Authorities are somewhat divided as to the manner in which the finished print should be treated. Dr. J. Schnauss, in the *Archiv*, says, "I have abandoned the practice of mounting prints wet, whether made with collodion or gelatine, but particularly the latter. I do not advise the employing of a warm gelatine solution for mounting gelatine prints, because the gelatine surface becomes very much softened and so sticky that it requires the greatest care to finish the work without injury to the film. In my hands the best method has been to dry the picture as flat as possible and mount it with a rather thin, cold paste made of rice starch. The most brilliant aristotype prints may be mounted in this manner, as well as those on collodio-chloride paper."

Dr. Schnauss then proceeds to say that prints on albumenised paper should be mounted wet. We have already sufficiently discussed this point, but let us add that neat results may be had when prints are to be mounted in albums if they are first *slightly rolled*, not too much, so as to crush the substance of the paper, and then mounted in with the well-known alcoholic solution of gelatine. By placing a sheet of clean thick blotting paper between each pair of leaves and keeping the album under pressure, there will be little or no cockling of the leaves when the work is finished.

ELLERSLIE WALLACE.

—*American Journal of Photography.*

COLOURED PHOTOGRAPHS.

III.

JUDGED by a liberal mind, there will be little difficulty in deciding that there is more than a very strong family likeness between *pure art* (if I may be allowed to so express myself) and the *photographic art*. The same fundamental rules of art must guide us in both cases, in the general composition, lighting arrangement and adjustment of accessories, the keeping of the latter in judicious yet complementary subordination, &c.—as we would in a *picture*, so should we do in a *photograph*. The same fine feeling should actuate the photographic operator in his glass room that inspires the artist in his studio. Take my word for it, there is a very much closer affinity between the camera and the easel than a mere first-cousinship in art.

As a starting-point, we should fix well upon our minds that in all pictures there should be at least one leading or predominant light, a

point of attraction as it were, that will at once catch the eye and arrest the attention, and to which all others should be subordinate. It naturally suggests itself that in portraiture this leading point of attraction is the face, for upon it depends the value and interest of the entire picture. Everything should give place to the face; there should be no obtrusive accessory, no too apparent dash of colour, for such, or any other distracting influence that may be in a picture, must unhesitatingly be set down as a fault. By this I do not wish to convey the idea that the face must be the *only* point of light or attraction. Quite the reverse: lights may be repeated in various places and ways throughout the picture, but in a subdued degree. Treated so they will enhance the general effect of the picture, impart to it a life and airiness, give tone and importance, whereas without them a sense of heaviness and lack of interest might pervade the picture. Of course in all these matters individual judgment must be used, as no hard-and-fast lines can be laid down. In many cases, for example, it might be found not only advisable, but absolutely necessary, to relieve a heavy mass of deep shadow by the infusion of a little light. In this regard the artist has a very powerful advantage over the photographer. The latter is obliged to effect this result by letting in *real* light (very difficult to govern and direct as one would wish), which may in many ways interfere disadvantageously with the rest of the picture; while the former holds complete control over the various means at his disposal to accomplish such an effect. In the construction of a picture, where there may be a number of accessories, the photographer will assuredly place such coloured articles as will catch the light more than the surrounding objects, or whose action qualities will produce a different degree of intensity, and so impart a certain degree of transparency to what otherwise would be meaningless masses of dark shadow. Still, as I said, there are many difficulties in the way, while the painter, by a judicious and harmonious blending of colour, can secure the desired effect, and yet not alter in the least the general tone and importance of his shadow. It is always a matter of serious importance to treat the deepest masses of shadow in such a manner that they will not appear too *heavy*. In doing so, however, we must not detract from their importance, as failing to preserve them sufficiently dominant would be to seriously imperil the two very essential qualities of a good picture—balance and solidity.

Bearing this in mind, when arranging a portrait (more particularly three-quarter or full-length), the masses of shadow—that is, those portions which suggest weight—should be located at the base, or lower portion of the picture. This applies as much to colour as to form. Take, as an example, the production of a three-quarter or full-length portrait of a gentleman. Now, suppose we paint or photograph him against a plain background, the light and everything else so arranged that it will present an equal tone all over, and what will be the effect? A most uncomfortable and absurd picture. An uncultured eye may look at it, feel there is something wrong—he cannot detect where the trouble lies—but his feeling of dissatisfaction is palpable.

Now, what can we do with such a picture to render it satisfactory? The photographer, unless he calls in artistic aid, must needs take the picture again, and in doing so take the necessary means to produce the effects which the artist carries out as follows. It is breadth of base that is the main fault—there is a lack of solidity and balance, and this must be altered. We must introduce a little shadow in the lower portion of our picture, which will be found to materially steady it. The introduction of accessories, such as a stick or an umbrella, judiciously taken advantage of, will also add to the solidity and steadiness of the figure. The idea is imparted of support to the body, which must naturally in turn carry with it the effect of a greater breadth of base. To the thoughtful photographer this does not offer much trouble, and to the artist still less, for he can so arrange that his darker masses of shadow will naturally incline to the bottom or base of the picture, and thus secure that equilibrium or balance without which success is impossible.

It is essential that these and all similar effects should be conceived and carried out in such a manner as not to unduly attract the eye. That they should appear *natural* must be ever our first endeavour. To appear *artificial* would be to considerably mar the beauty of our picture, as well as to expose the intention of an artist, a result which would very seriously discount the advantages otherwise gained.

To the beginner or amateur who has made up his mind to acquire a general knowledge of the primary rules for the artistic composition and grouping of portraiture, be it in the photographic studio or on the painter's canvas, the form known as *pyramidal* seems to be the most general favourite. It seems to him the easiest, as, perhaps, it is the least complicated. I have nothing whatever to urge against its adoption, but I can assure you it requires no small amount of artistic knowledge and skill to carry it through *successfully*. The great

danger is that we let the means by which we gain our effects be too palpable. This would give our composition the appearance of being *strained*—a fatal error. At first sight all this will not appear very striking; but, believe me, however easy it may appear to be to carry out this style of composition, it is not so. I therefore warn the beginner that he must work carefully if he desires to gain a mastery over it. One must cultivate a keen artistic appreciation as a sure means of success in this form of composition. The labour expended in gaining a thorough knowledge of the various forms of composition will be more than repaid in the working out of your profession in after years. We will have to produce groups of the most awkward numbers and disproportionate subjects, such as would many times almost baffle a Sir Frederick Leighton to realise grace of composition in making a picture of them. I feel sure any operator of a few years' standing will bear me out in this regard.

Next to form comes *contrast*. This is a most important element in every form of pictorial effect: contrast as regards the drawing or leading lines in your picture, contrast as regards tones—be they in colour or merely light and shade. For example, the value and natural grace of *curved lines* can not only be made forcibly apparent, but be very considerably augmented, by the judicious placing of *straight lines* producing *contrast*. If this be true as regards *lines*, how much more so must it be when we consider colour. I feel inclined to say that a good half of the beauty of any picture is the successful carrying out of contrast as affected by colour, the value of a colour being enhanced or neutralised by its juxtaposition to others of a more or less complementary nature.

Vigour, relief, brilliancy, and above all a general harmony, are some of the many results produced by artistic contrast and the skilful arrangement of the numerous varieties of tones. Contrast should not be harsh or abrupt, as a rule, nor should it be considered as in all cases *pictorial effect*. It may or it may not. Contrasts, badly treated, can mar a picture effectually, just as they can benefit when skilfully carried out. For instance, the bringing together of a mass of white and a mass of black (without the assistance of a half tone) will produce *contrast*, but will be devoid of any pretensions to pictorial effect. One of the grandest and most desirable qualities necessary in a picture of merit is *breadth*, and this will not be found where there are harsh and violent contrasts. In arranging the background, draperies, and accessories, therefore, we should never let black and white come in immediate proximity, and the same applies to such colours as would present a similar violent and unfriendly contrast. Black and white and similar colours (if I may be allowed to call black and white colours) of a violent or opposing nature may be necessary, and even advantageous in a picture, but their approach should be softened by such gradations as would avoid the least feeling or suggestion of harshness or crudeness.

On the judicious and artistic lighting of the model depends to an enormous extent the means of producing harmonious contrast of tones—either in colours or simply light and shade. It is, therefore, worth a moment's consideration. Avoid throwing a direct front light upon your model; such a treatment would deprive it of all relief. Unless some very special effect is sought after, the light should be thrown on the model at an angle of 45°; direct *vertical* light is bad, but the use of the *side light* is unlimited, except by the boundary of common sense. A point worth bearing in mind is that force is gained by a direct light, while softness and delicacy can only be produced by diffused light. Never try to obtain a picture by one or the other, but rather by a judicious combination of the two. Form and strength of outline may be secured by the use of the direct light, and the diffused light then step in and impart softness and quality. There are generally two things necessary in regulating the diffused light—the *pole* with which you push the curtains, and the *brains* which more or less should govern the pushing of the pole. I say this because too much diffused light will impair the quality of the shadows and result in the production of a flat and tame picture. Indeed, I repeat, to produce a really good study, full of force and vigour, and yet possessing softness and half tone, it is necessary to use the *direct* and also the diffused lights.

In *half* and *three-quarter-length* pictures many prefer plain backgrounds; by this I mean without accessories. It is advisable, however, to have them tinted in such manner as to indicate a deeper shade at the bottom than at the top; this is simply to secure balance. These pictures, so treated, although very pleasing and satisfactory, should not form our model for *full-length* portraits. The latter really require a little help in the way of accessories and general surroundings. In the arrangement of these too much care cannot be expended in seeking after a harmonious balance; each article should be selected with a distinct object, and should be in harmony with the surrounding objects, as well as with the character of the sitter.

I have seen many strange combinations in my time in this regard. Were it not that I have seen them I should be inclined to doubt the facts. Some little time ago it was nothing so very uncommon to see an article of furniture, most at home in the drawing room, enjoying, as it seemed, a short stay on the seashore. I should think every one has seen a curtain in an open-air background; I have seen a lady in evening dress photographed against some snow-capped mountains: all this is bad, and seldom occurs now, yet I know a first-rate West-end house where it occurs even now. Another favourite and less observable blunder of the thoughtless operator. I have seen balustrades painted, &c., with the light coming from the left and throwing shadows accordingly, while the sitter was lighted from the other side altogether—of course this is a pity, and should not occur, but it does.

An operator to turn out good work should have a goodly supply of accessories, as only thus can he surmount the difficulties he has to contend with in photographing some ungainly subjects. In painted backgrounds care should be taken that the sun shines on the sitter as it does on the landscape. The less form there is in a background the better—many pictures have been spoiled by shadows coming in an unfortunate place, spoiling the face or head. The carpet should not be too pronounced.

I think we have now touched upon nearly all those points which tend to giving us a really good photograph upon which we can start colouring, and we will now start on mastering the delicacies and methods for producing coloured photographs. A photograph, however good, is not like life—it is cold and lifeless; but by the skilful application of colour we can endow it with life and animation; colour can give the idea of a man's character, his occupation, and even his mind.

REDMOND BARRETT.

VARIOUS PHOTOGRAPHIC PROCESSES FOR COPYING LINE DRAWINGS, ETC.

[A Communication to the London and Provincial Photographic Association.]

WHEN I promised your esteemed Secretary (Mr. Bridge) that I would come to give a demonstration before your Society, I think I made that promise rather rashly, not thinking at the time to whom I was coming, and before whom I was about to demonstrate, and that there were gentlemen in this Society to whom I ought to look to for instruction and advice instead of my coming to attempt to teach them. But in this particular branch of photography, viz., the copying of line subjects, it may be new to some of you, and as a considerable portion of my time is occupied in this particular branch, I thought it would not be out of place to show you some of the work I have already done, and also my mode of procedure in doing it.

I may say at the outset that I do not prepare my own paper, as this can be obtained ready prepared from several photographic dealers, whose names I shall mention later on; but those who wish to prepare their own will find several formulæ in the Photographic Annuals. It is not my intention to night to advertise any particular process, but shall leave you to judge which you think the most suitable.

There are various methods by which maps, plans, tracings, &c., can be copied. First, there is the "Ferro-prussiate" process, by which copies can easily be obtained from a tracing. The operations are the most simple of any process known. After printing, the copies are merely washed or fixed in clean water, producing white lines on a blue ground. The face of the drawing is placed against the glass of the printing frame, and the prepared paper is then placed on the back of the drawing. It is advisable that the paper should be somewhat larger than the drawing, so as to leave a margin exposed to show the action of the light upon it. The exposure required in very bright sunshine varies from five to fifteen minutes, but in the very dull days of winter it may require two or three hours, or even a whole day. During the exposure to light the paper assumes various tints, from greenish blue to olive. When the exposure is complete the print is taken from the printing frame and immersed in clean water until the lines become purely white. The time required for washing occupies from five to ten minutes, but if warm water be used the result is obtained much quicker. Over washing reduces the intensity of the blue ground, but the copies darken somewhat in drying. If a line or figure has been left out by mistake on the original drawing before being copied, the same can be produced upon the printed copy by using a solution of soda and water.

The greatest drawbacks to this process are the length of time occupied in printing and the ground being blue, which make the copies unsuitable for colouring. Copies, however, can be obtained with blue lines on a white ground by this process, but a negative has first to be made. The negative print to produce this result requires at least three or four times the exposure as that by which white lines on a blue ground are produced.

Very pleasing pictures can be made by amateurs who may wish to make a fanciful experiment by printing from negatives on this paper, which can be obtained, ready prepared, from Marion & Co., Soho-square, London, and Messrs. Bemrose & Sons, London and Derby. Those who desire to prepare their own paper can do so by the use of the following formula:—

A.
Ammonia citrate of iron 1 part.
Water 5 parts.

B.
Ferricyanide of potassium 1 part.
Water 4 parts.
Mix together in equal quantities.

BLACK LINE PROCESS.

I now come to a process which is more suitable for colouring purposes than the latter, whereby black lines on a white ground are produced. The exposure required in this process is considerably less than the ferro-prussiate. The operations are as follows:—

The drawing to be copied should be on very transparent tracing paper or cloth, of a white or bluish tint; care, however, should be taken to make the lines of the drawing uniformly black, and not too fine, as the lines on the copy are rendered somewhat finer. Place the drawing in the printing frame with its face to the glass, then over it lay the sensitised paper. It is advisable that the paper should be somewhat larger than the drawing, in order to leave a margin exposed to show the action of the light upon it. The exposure is complete when the ground of the sensitised paper, which is yellow, has become a pure white, and a distinct copy of the original appears in dark yellow lines. To develop, remove the copy from the printing frame, and immerse in a gutta-percha-lined bath containing the acid solution, prepared as follows:—

Gallic acid 1 part.
Citric acid 1 "
Alum 8 parts.

Take one and a quarter ounces of the above to one gallon of water. This should be mixed in another vessel the same day it is used. Allow the copy to remain in the solution until the lines are a deep black. The same solution can be used over again for several prints, or until it becomes quite black. After development the copy must be thoroughly washed in clean cold water, frequently changed, and then hung up to dry.

BLUE LINES ON WHITE GROUND; OR, PELLET PROCESS.

The next process I wish to describe is, perhaps, more difficult and complicated than either of the two already mentioned, but its advantages are many; it can be worked in all weathers and requires no dark room. The copies can be coloured and varnished, altered and corrected; and last, but not least, they do not fade. This process is ten times quicker than any other, was invented by a well-known French chemist, M. Pellet, and was introduced into England by Mr. G. E. Chapman, 69, Victoria-street, Westminster, who is the sole licensee.

The instructions are: Place the drawing to be copied in a printing frame, and upon it a piece of the prepared paper, close the frame and expose to the light. The exposure can only be determined by constant practice and test slips. These test slips should be placed in the printing frame alongside the tracing which is being copied. These small test slips are inserted so as to remain about two-thirds inside and one-third outside the frame at the back. They can then be conveniently drawn out without opening the frame or disturbing the print.

After a time one of the test slips is drawn out and dipped in a saturated solution of yellow prussiate of potash, and its chemical action watched for from forty to fifty seconds. Should the background remain perfectly yellow, and the lines come out dark blue, the exposure has been sufficient. It is not necessary to develop the copies immediately after exposure, therefore all the printing might be done while the light is strongest (especially in winter), leaving the development until the evening or the following day. When the copy is to be developed it should be placed face downwards on a smooth board, and the edges turned up carefully, so as to form a sort of tray, three-quarters of an inch in depth. This renders the sheet more easy of manipulation, keeps stains from the back, and renders it white when developed in the prussiate bath.

The copy is now placed face downwards and floated on the prussiate bath for about thirty seconds. The operator should see that uniform contact takes place everywhere while in the solution. Raise the copy, inclining it to allow the solution to drip off one corner; then notice particularly how the lines seem to stand out.

If they do stand out, and the ground remains perfectly yellow, the development may be considered complete. After development the copy is immersed in clean water in order to check the further action of the prussiate, and then immersed face upwards in the acid bath of a ten per cent. aqueous solution of hydrochloric acid, care being taken that the entire copy, both front and back, is saturated. The surface of the copy should be worked all over carefully with a soft brush, to loosen the blue mucilage. The copy is next placed face upwards in an empty tray, and again well brushed, to get rid of the superficial mucilage, being flushed copiously at the same time with water both back and front, so as to remove all traces of the previous chemical solution.

Any blue stains on the copies may be removed or alterations made by the use of the blue solving supplied with the paper. Any blue stains on the hands may also be quickly removed by a very weak solution of hydrate of sodium. It is essential that the contents of the two chemical baths do not get mixed, or blue stains will appear. To prevent this, it is advisable to well rinse one's hands in clean water after each operation.

COPYING DRAWINGS BY THE AID OF A CAMERA.

Mechanical drawings are sometimes required to be reduced by the aid of photography with the camera. I may say the best results are to be obtained by the wet or collodion process, but very good negatives can be secured with a dry plate if properly managed. The greatest drawback with the dry plate is the probability of the fine lines on the drawing becoming clogged or veiled over during development.

But I have seen an excellent developer mentioned in THE BRITISH JOURNAL OF PHOTOGRAPHY a few months ago, which I have tried with excellent results. It may not, perhaps, be out of place to give it here for the benefit of those who, like myself, have sometimes fine subjects to copy:—

Carbonate of potassium	360 grains.
Sulphite of sodium	360 "
Water	6 ounces.

To each ounce of developer two drachms of this solution, together with thirty or forty minims of the ordinary ten per cent. solution of pyro (and sulphite) are added. The mode of development found to answer best is to soak the plate first of all in gallic acid solution (two grains to the ounce) for half minute or so, and then transfer it direct to the developer, where in about another half minute the image begins to appear. Watch carefully, and when the details in the darkest part of the picture acquire tolerable strength, add five minims of a sixty-grain bromide solution, and proceed until sufficient density is acquired.

Should matters hang fire at all, a few drops of the ordinary dilute ammonia solution may be added to freshen up the developer, but this is rarely needed if the exposure has been correct.

On the latter point a word may be said. Though the use of gallic acid does not necessarily lengthen the exposure required, it has been found better to give more than is absolutely necessary. Thus, if five seconds be sufficient to produce a perfect image under ordinary circumstances, give ten or even fifteen. The result will be quicker development and less necessity for forcing, and hence less chance of fog, stain, or filling up the lines. Six times the normal exposure has not produced any signs of the plate being overdone; indeed, it seems next to impossible to produce such a result when the gallic acid is employed in the manner described.

THOMAS SCOTTON.

JACK AND I IN NORWAY.

V.—ORMEIM, FLADMARK, HORGHEIM.

We drove on to Horgheim, where we had arranged, if we could get a convenient place, to see into our slide. A cellar under the house was placed at our service, which, after considerable planning, we were successful in making available for use. There was a window in it, and the difficulty was to get the light from it stopped out. This was one of the occasions when Jack's hammer, nails, and tacks became of indispensable service to us, for not a thing of the kind was to be procured in the hamlet for love nor money. Outside we nailed our waterproofs and rugs over the window, but the wind kept bulging and blowing them out, no matter how well we tacked them down, so we got together all the long-handled agricultural implements that we could lay hold of, and propped them up to hold the coverings, and by this means they were kept fairly steady. On opening the slide we found that the small, white, wood holder, with the brass wire spiral springs at each side (that is used to keep the film taut when winding) had come out of its place, and was rattling about loose in the bottom of the slide. The worst of the accident was that the sharp ends of the brass wire spiral had caught, and torn the last two negatives taken. The only way we could account for the holder leaving its place

was that the jolting of the stolecarré had shaken it out of its fastenings. Believing this, we were for the future most careful to look after these springs, and to fix them with more than ordinary caution before closing the slide.

After enclosing a 'new roll in the slide we came out and made an exposure on the station-house, found everything right, and drove on our way rejoicing. We stayed at Fladmark for supper, and after resting an hour or two proceeded to Ormeim. From this place our intention was to photograph the surrounding scenery, and on our way back to Naes arranged to take the most prominent features of the Romsdal Valley. We did not reach Ormeim till midnight, as it was quite light we went out and had a look round.

The Vermo Fos, or Fall, is quite near to the station-house. There is a terrace or veranda built out at the end of this inn, from which the visitor can sit and see this stupendous Fall in all its magnificence. From the top to the bottom it will be over a thousand feet; with a rush and clear fall it precipitates itself half way down the mountains, where, breaking on a rocky flat into three separate torrents, they hurry in their mad career down into the rushing river below. The constant din of falling waters fills the air, and we have to speak at the top of our voices to be heard. With this perpetual sound of many raging torrents in our ears we tumbled into bed and went to sleep. We found the Ormeim station a clean and tidy inn, and the food was plain but good.

We were out early next morning viewing the land and making notes of the points to be taken. The whole place and its surroundings commended itself to us as a very paradise of lovely bits for the camera: scenery that would not pall upon the enthusiast for weeks if he had but the time at his command. So enchanted were we with the place that the proverbial eager impatience of the amateur took possession of us, and before breakfast we started to our labour of love, and we had secured some good little studies before we were called in to *frökost*. It was really the little bits that were so beautiful here. For instance, we had a waterfall nearly opposite to the door, with part of an old wooden lade lying picturesquely half in half out of the water, a tub set on some cobble stones catching the spray from the fringe of the fall. Stray, trailing foliage twining all around, whilst the old stable with small fir trees growing from its roof stands in the near distance, and the mighty chains of hills reaching until they are lost in cloudland. No description can convey an adequate idea of such pictures, they must be seen to be appreciated—and here they may be seen. The most general view we got at Ormeim was that of Vermo Fos itself from above the inn, taking in a part of the terrace at the end of the houses; this made a very effective picture.

After exhausting this place as far as our time would permit, we drove a few miles further to the Sletta Fos. This Fall we found even more imposing than the Vermo Fos. Far away, high up, it sweeps over the rocks, and, in full volume, white and seething, it descends into a chasm hundreds of feet deep, nothing impeding its progress until, down in the depths, it is heard lashing in fury at the bottom. Standing on the frail bridge that crosses the top of the fall and looking over, the very immensity of the body of water lashing on makes one giddy and queer to look down upon it. We clambered away down as far as we could get with safety, and from a point of vantage got two or three good negatives of the Fall.

It was at Ormeim that we first met Sheldon and Thompson, two American gentlemen who were out doing the tour. After this meeting we came upon them here and there, all over the place, as we journeyed along, and we had some good times with them. They were travelling with Bennet's tickets and conveyances. Bennet holds much the same position in Norway as Cook does in England. The advantage gained by having a carriage from him is that you take it with you all the journey instead of having to change at every station, hence your baggage need never be removed, and only the horse and boy are new. This style of travelling comes to be very expensive however, as many of the longest runs are made by water, and the carriage must go with you, and you have carriage to pay for it from place to place, when on board steamer, which runs away with a lot of money for a supposed luxury that could easily be dispensed with, as a carriage can always be at had any station, and when you have run your distance you are done with it, and no bother or responsibility in the matter, so I would advise any one travelling in Norway to hire the conveyances supplied at the stations as a much cheaper mode of travelling, and one attended with less trouble and inconvenience.

The boy we had with us here was a very useful and obliging fellow; we utilised him for balancing many of our pictures. He was quick to pick up an idea and act upon it, and we found him no end of help. He told me one peculiarity regarding names here that struck me as strange. His name was Peter Oaak, the latter being the name of the place where he was born. He said it was quite a common thing in Norway to surname a child after the village or place where it was born, and we really came across many instances favouring this assertion, such as "Bergen," "Naes," &c.

We, on our return journey through the Dal, got into Fladmark on the Sunday. The most we did here till the Monday morning was to "loaf" round and see what was to be seen. One sight we got that is not usual at home, that was an eagle wheeling over the mountain brow, and lingering around a considerable time as if enjoying the Sunday quiet. It must have been a very large bird for it could be seen by the naked eye thousands of feet up, and with Jack's telescope it was perfectly plain.

A little fellow who had heard, away in the hills where he stayed, that

two strangers were passing the night at Fladmark, came all the way from his home, which must have been several miles, with a small stock of white wood carved things tied up in a red cotton pocket handkerchief. He undid the parcel, and, in a sheepish way, placed his wares before us and asked us to buy. The class of articles introduced were wooden salad spoons and forks, knives with white wood carved handles along with some other primitive-looking articles, of which the carving is the principal feature. This carving is done by the inhabitants of these wilds and sold to the tourist and the stranger when passing through. We bought a few pieces from the lad, and he went away home quite happy.

The natural politeness and extreme simplicity of the people are very striking, and often amusing. When you please them with any little act of kindness or courtesy they immediately put out their hands to shake hands with you. It was great fun to sit and watch Jack and the native boys and girls. He carried about with him always bags of sweets, which he was continually giving away to the youngsters he met, so that if there were any about he usually had a small crowd around him; to watch these children when they received the sweets was as good as a play. Out went the sweets from the right hand into the left, and the hand of the giver is grasped, the boys pulling off their caps and the girls so modestly curtsying low. When paying your bill, if you give a small tip, like demonstrations take place, and when your carriage boy has received some sixpence or eightpence for himself, after having driven you some twenty miles, he is quite profuse in his demonstrations of pleasure. Wherever pleasure is conveyed to any one, no matter how lowly in station, out comes the hand to be shaken as a mark of appreciation of your great goodness.

We heard the notes of a bugle, and the echoing sounds came leaping from hill to hill. On making inquiry regarding this seeming levity breaking in upon the silence of the Sunday, we were informed that it was the signal that the postman was drawing near, and we had not long to wait before he came into view, and, driving through the gateway, came close up to the station-house. Here, in all haste, the boy took out his horse; another boy with a fresh one was standing waiting, this he yoked at once, and in the space of three or four minutes was ready for the road again, for he used the same carriage, and the mail bags were securely strapped to the back of it. The postman himself looked the perfect picture of a stage brigand. A tall, powerful-looking man, with a long blue, tight-fitting coat, ornamented with two rows of brass buttons; he had a broad leather belt buckled round his waist, into which were fixed two huge pistols quite exposed and ready for use. In his hand he carried the bugle that helped to enliven the way. He stood waiting by the carriage till the horse was changed, then he got into his seat and drove away without exchanging a word with any one.

I do not know why he should wear pistols, and that in such a pronounced position, for they say that there is no such thing as thieves in Norway. Perhaps it is to keep in check any foreign rascals that may be prowling about.

MARK OUTS.

ON ALLOTROPIC MODIFICATIONS OF SILVER.*

B.—INSOLUBLE FORM OF THE FOREGOING.

The solution of the blue product just described is influenced in a remarkable way by the addition of almost any neutral substance. So far I have not found any that do not precipitate it. Not only saline solutions do this, but even a solution of gum arabic.

Neutral salts may precipitate the silver in either a soluble or an insoluble form. Alkaline sulphates, nitrates, and citrates throw down the soluble form; magnesium sulphate, ferrous sulphate, nickel sulphate, potassium bichromate and ferrocyanide, barium nitrate, even silver nitrate and other salts, throw down a perfectly insoluble form. The soluble form constitutes a blue or bluish-black precipitate; the insoluble a purple brown, which by repeated washing, by decantation, or otherwise, continually darkens.

What is very curious is that the insoluble form may be made to return to the soluble condition. Many substances are capable of effecting this change. Sodium borate does so, producing a brown solution; potassium and sodium sulphate produce a yellowish red solution, and ammonium sulphate a red one. None of these solutions have the same blood-red colour as the original solution; the form of silver seems to change with the slightest change of condition.

The solutions used must be extremely dilute, otherwise the silver, though rendered soluble in pure water by them, will not dissolve in the solution itself, a singular complication of effects. So that if a moderately strong solution of one of the above substances is poured over the insoluble silver substance it does not dissolve; but by pouring off the saline solution and replacing it with pure water the substance dissolves readily. The insoluble substance is also readily soluble in ammonia. The solution has a fine red colour, and not the yellowish red of the sodium sulphate solution.

Most neutral salts act in one or other of the ways just described, precipitating the solution of the blue substance A in either the soluble or the insoluble form; the latter soluble in ammonia. But sodium nitrate is an exception; its solution effects an entire change, and renders the substance wholly insoluble, probably reconverting it into normal silver.

Sometimes the substance will spontaneously pass into a soluble form.

* Concluded from page 462.

A specimen, rendered insoluble by precipitation with ferrous sulphate, after much washing began to run through, not only as a suspension, which often happens, but as a solution, clearing itself after a day or two of insoluble portions, and furnishing a rose-red solution. I have kept this solution in a corked vial for eight months, during which time it has remained unchanged.

The general properties of this substance can be much better observed in the thin films obtained by brushing the moist substance over paper than in the lumps. The films thus obtained are bright greenish metallic, and this green evidently results from a mixture of blue and yellow, as in some lights the blue, in others the yellow, is most evident. When these films are examined by light reflected from them at a large incidence with the normal, and a Nicol's prism or an achromatised prism of calc spar is interposed between the film and the eye, it becomes at once apparent that the blue and yellow light are oppositely polarised. The yellow light is polarised in the plane of incidence, the blue light perpendicularly to that plane. All specimens show the yellow light; but the quantity of blue light is very variable, and is directly connected with the amount of washing applied to the precipitate. The more it is washed, the more the yellow predominates. To see the blue form in its full beauty, a little of the red solution may be precipitated with a very little magnesium or aluminic sulphate, and be thrown on a filter. As soon as the liquid has drained off, and without any washing, the deep bronze-coloured substance is to be brushed over paper. On drying, it has all the appearance of a bright blue metal with a remarkable lustre. The mirrors obtained by brushing the substance over glass are so beautiful and so perfect that it seems as if this property might have useful applications, especially for silvering irregular surfaces. Much care, however, would be necessary in the preparation to obtain a permanent product.

Crystallisation.—On one occasion this substance was obtained in a crystalline form. Some crude red solution had been set aside in a corked vial. Some weeks after, it was noticed that the solution had become decolourised with a crystalline deposit at the bottom. The bottle was carefully broken; the deposit, examined by a lens, consisted of short black needles and thin prisms. Evidently the saline matters present had balanced the silver in solution so nearly as not to cause an immediate precipitation, but a very gradual one only. The mother liquor was drained off, and a few drops of pure water were added. No solution took place; the crystals were, therefore, of the material B, the insoluble form. The contact of pure water instantly destroyed the crystallisation, and the substance dried with a bright green metallic lustre. Contact with pure water evidently tends always to bring this form of silver into the colloidal state, sometimes soluble and sometimes not; whilst the contact with certain neutral salts renders it crystalline.

The extraordinary sensitiveness which allotropic silver shows to external influences contrasts strongly with the inertness of normal (probably polymeric) metallic silver. When we place this fact alongside of the well-known sensitiveness of many silver compounds to light, heat, and (as I have elsewhere shown) to mechanical force, we are led to ask whether silver may not exist in this form in these very sensitive compounds.

To obtain the substance in a pure condition suitable for analysis, it is necessary to choose a precipitant not giving an insoluble product with either citric or sulphuric acid. Magnesium sulphate or nickel sulphate answers well; I have generally used the first named. A very dilute solution is made of it, and the red solution of A is to be filtered into it. The precipitate soon subsides. A large quantity of water is to be poured on, and then washing by decantation can be continued to three decantations, after which the substance remains suspended. It can be made to subside by adding a very small quantity of magnesium sulphate; one-fourth thousandth (0.25 grammes to one litre) is sufficient. The substance may then be thrown on a filter and washed with pure water.

Analysis.—A specimen dried in vacuo over sulphuric acid gave:—

No. 1.....	97.17 per cent. silver.
No. 2.....	97.10 " "

A specimen dried first in vacuo, and then at 100° C., lost in the second drying .83 per cent. water.

So that the substance dried at 100° contained 97.96 per cent. of silver. The remaining 2.04 per cent. consisted of ferric oxide and citric acid.

C.—GOLD-YELLOW AND COPPER-COLOURED SILVER.

It has long been known that golden-yellow specks would occasionally show themselves in silver solutions, but could not be obtained at will, and the quantity thus appearing was infinitesimal. Probably this phenomenon has often led to a supposition that silver might be transmuted into gold* This yellow product, however, is only an allotropic form of silver; but it has all the colour and brilliancy of gold, a fact which was apparent even in the minute specks hitherto obtained.

By the means presently to be described, silver can be converted wholly

* I have a little volume, published in Paris in 1857, by a chemist named Tiffereau, who was firmly convinced that in many reactions minute portions of silver are converted into gold, especially with the aid of powerful sunlight. In Mexico, he affirmed, he had actually produced several grammes of gold, a portion of which he presented to the French Academy with one of his papers. To his great disappointment he did not succeed in repeating these experiments in Paris with more than an infinitesimal result. All gold, in his opinion, had been originally silver; and this belief, he affirms, is universal amongst Mexican miners. The book has for a title, *Les Métaux sont des Corps composés*.

inso this form. It is a little curious that its permanency seems to depend entirely on details in the mode of formation. I have found many ways of obtaining it, but in a few months the specimens preserved changed spontaneously into normal silver. This happened even in closed tubes. The normal silver produced in this way is exquisitely beautiful. It has a pure and perfect white colour like the finest frosted jeweller's silver, almost in fact exceeding the jeweller's finest products. I found, however, one process by which a quite permanent result would be obtained. Specimens made by it in November of 1886 are now, at the end of thirty months, unchanged.

In forming the blue product which I have called A, very concentrated solutions were necessary. C on the contrary is best obtained from very dilute ones. The following proportions give good results:—

Two mixtures are to be prepared. No. 1, containing 200 c.c. of a 10 per cent. solution of silver nitrate, 200 c.c. of a 20 per cent. solution of Rochelle salt, and 800 c.c. of distilled water.

No. 2, containing 107 c.c. of a 30 per cent. solution of ferrous sulphate, 200 c.c. of a 20 per cent. solution of Rochelle salt, and 800 c.c. of distilled water.

The second solution (which must be mixed immediately before using only) is poured into the first with constant stirring. A powder, at first glittering red, then changing to black, falls, which on the filter has a beautiful bronze appearance. After washing, it should be removed whilst in a pasty condition, and spread over watch glasses or flat glass basins, and allowed to dry spontaneously. It will be seen that this is a reduction of silver tartrate by ferrous tartrate. The metallic silver formed by reduction with ferrous citrate and ferrous tartrate is in an allotropic condition; with ferrous oxalate this result does not seem to be produced.

Although the gold-coloured silver (into which the nitrate used is wholly converted) is very permanent when dry, it is less so when wet. In washing, the filter must be kept always full of water; this is essential. It dries into lumps exactly resembling metallic gold, especially the surfaces that have dried in contact with glass or porcelain. For this substance has in a high degree the property already described in forms A and B—that of drying with the particles in optical contact. When the thick pasty substance is extended over glazed paper, it dries with the splendid lustre of gold leaf, with this essential difference, that these allotropic forms of silver, B and C, assume spontaneously in drying the high degree of brilliancy which other metallic surfaces acquire by elaborate polishing and burnishing. By brushing a thick paste of this substance evenly on clean glass, beautiful gold-coloured mirrors are obtained; the film appears to be entirely continuous and the mirror is very perfect.

By continued washing the precipitate changes somewhat, so that in drying it takes on a coppery rather than a golden colour, and is rather less lustrous, though still bright and permanent.

Two silver determinations by conversion into chloride made in November, 1886, gave:—

No. 1	97.81 per cent. silver.
No. 2	97.86 " "

Recently these experiments have been repeated, and the washing was more successful. Ferric tartrate adheres very obstinately, and after a time washing with water ceases to remove it. Stronger means cannot be employed without affecting the substance itself. These last determinations gave:—

No. 1	98.750 per cent. silver.
No. 2	98.749 " "

The residue of No. 2 was examined, and consisted almost wholly of ferric citrate. M. CARRY LEA.

[NOTE.—The editor has received, from the author of the above paper, samples of the three allotropic forms of silver which he describes, and also strips of glass and paper coated with them. Mr. Lea is to be congratulated on his very important results. The coated strips, including the gold-coloured mirror made with the "gold-silver," answer fully to his description. The mirror is remarkable for its perfection and beauty.]

THROUGH JAPAN WITH A CAMERA.

CHAPTER VI.—THE START FROM AWAMORI.—JINRIKISHA TRAVELLING—JAPANESE FOOD.

FROM AWAMORI we started on our inland travels. There lay before us some six or seven hundred miles of road, all to be traversed in jinrikisha, or hand carriage. The following is the history of the jinrikisha, as I have been told it. Before foreigners were admitted into this country, some thirty years ago, the Japanese had only two modes of travelling. One was by bullock carts—a slow and tedious mode, of course—the other was by chairs or baskets suspended between two poles carried on the shoulders of two men—a method still practised when the roads are very steep. It is said that one of the earlier English settlers in Japan brought out a small carriage or phaeton with him, and that the jinrikisha is simply a copy of that on a small scale. Be that as it may, the jinrikisha or kuruma is a thing of but recent date in Japan. Its use must have spread, however, with remarkable rapidity, for it is now to be found in immense numbers all over the country.

On good roads a jinrikisha man will keep up a rate of seven or even eight miles an hour for several hours. When the roads are bad, or when a great distance is to be run, it is customary to have two men, one of whom pulls with a cord in front. In the large towns the hire of a jinrikisha with one man is 10 sen an hour (about 4d.), but from foreigners about double as much is generally expected. Not more than 1 yen (3s. 2d.) is, however, the maximum for one day, and the hire of a jinrikisha and man by the week is only 2 yen, 80 sen (about 8s. 6d.) In the main roads in the country the rate is generally according to distance, being something like a halfpenny per mile for one man, and a penny per mile when there are two.

Jinrikisha riding in the towns, or wherever the roads are good, is a very comfortable and even luxurious mode of travelling, the wheels of the vehicles being large, and the bodies of the carriages being well balanced on easy springs, but I now experienced for the first time travelling on rough and rugged roads. The roads in Japan vary from many as good as the best we have at home to mere stony paths of the very roughest nature. In the case of very many of them, the water, which has to be taken from the higher to the lower side of the road, in place of being carried in a culvert at some distance below the surface, is carried in a ditch covered with a board. This board is intended to be, and doubtless is at first, flush with the road; but very soon the wheels of the vehicles wear a deep groove at each side of it, and one goes flying over these boards with a preliminary and a final bump that is quite surprising. In travelling we did from forty to ninety miles a day, according to the condition of the roads and the number of hours that we gave to steady going. We changed jinrikisha generally at the end of every ten to twenty miles.

The three days after we left Awamori were spent in steady travelling over roads which were not particularly interesting. The heat had by this time become intense. Although we were in the northern portions of Japan, we just happened to strike what was at that time the hottest part. The thermometer rose to 95° or 96° in the shade every day, and there beat down a fierce sun that scorched and blistered the skin. I wore nothing but a white shirt and trousers. One day I opened the front of the shirt; there was a slight breeze, and I thought to get some relief. I certainly did not keep it open for five minutes, yet now, six weeks afterwards, I have a great dark streak down my breast where the sun burned the skin.

We were now fairly launched in the interior. I saw only one foreigner for a fortnight, and there was nothing but Japanese food to be had. I had been warned by all my foreign friends that I must carry English food (potted meat, &c.) with me or I should starve. Although I was told dismal tales of those who had entered the interior, depending on Japanese food only, and how they had returned after a week or two quite broken down, I determined in spite of this that I would not carry any foreign food whatever with me. There appeared to be a want of adaptability in so doing, and I felt sure that when any people ate and lived on any kind of food whatever—except, perhaps, roast missionary—I could manage to exist. I must say I felt a little nervous, however, just before leaving Hakodate. I made the acquaintance there of one of the twelve foreign residents, and amongst other things asked him how long he had ever lived on Japanese food. He smiled very grimly, and answered, "I once starved on it for ten days, but never again!"

The truth is, that most kinds of Japanese food was not to the taste of Europeans, and that, moreover, as it is almost exclusively vegetable, and at that of but a slightly nourishing nature, it is necessary to eat very largely, otherwise one is hungry again an hour or so after a meal. The following is a description of an ordinary Japanese meal, such as one gets at an average Japanese inn:—

The food is brought in on a small square tray, such as I described as used in the case of the entertainment given to us at Awamori. On this there are, as a rule, four bowls with lids and one without. Of the four bowls which have lids (sancers inverted over them) three are generally of wood lacquered, the fourth is of china. These are all fairly large, and stand in the four corners of the tray. The fifth stands in the middle. In it there are generally some slices of raw daikon. This is a vegetable looking like an immensely long white radish, sometimes as much as three or four feet long. It has a strong, rank smell, and a taste which is to me positively disgusting. Most Japanese are very fond of it, and even some foreigners can take it. In two of the larger dishes there is generally soup, in the third often fish or some vegetable compound which I am unable to describe. Meat, apparently, is never used. The china bowl is empty. It is for the rice which is to form the staple part of the meal. The rice is contained in a long wooden vessel with a lid, and is helped into the china bowl as it is wanted.

If one can manage rice in large quantities it is all right. If one cannot, he will fare very badly. For the first few days I could not manage the rice at all. It would be absurd to say, of a people whose staple food is rice, that they do not know how to cook it; but they do not cook it to suit the taste of Europeans. As it is eaten it is a clammy, agglomerated mass, generally tepid, without salt or any other flavouring. A Japanese generally finishes a meal with four or five bowls of this stuff. It simply would not go down my throat at all, and for several days I lived almost entirely on hard-boiled eggs and very sour, hard, unripe apples.

Japan, by the way, is a miserable fruit country. After a few days I got into the way of managing the rice. I observed that some of the people put tea amongst it, and I found that by making it into a sort of "hog's wash" in this manner I could get through a good deal of it; but

I soon found out a still better plan. The rice, as I have said, is not good (to my taste) alone. The soup is palatable enough, but is of the very thinnest nature; a few bits of vegetable or seaweed floating in warm water which has a slight flavour of them, but has never been near meat of any kind. But the rice, however, and the soup mixed made an excellent dish, especially when pepper and salt were available. Pepper, however, was seldom to be got, salt by no means always. The Japanese scarcely use salt at all, and often what was offered to me was so black and dirty-looking that I rather did without it than use it.

I think there can be no doubt that in very hot weather a thin vegetable diet, such as I have described, is better for the health than the heavy meals that foreigners generally eat in the East. It agreed with me most admirably. I got to like it exceedingly after a time, and were I to do the same trip again, would carry nothing with me but pepper and salt.

The meal that I have described may be taken as a typical one. At large towns it was generally rather more elaborate, there being several additional dishes.

Sometimes the people, out of consideration for me, prepared what they imagined to be foreign food, and then verily must I have astonished my internal economy by the mixtures that I poured down my throat. At one place meat was produced. I could not tell of what animal it was, but it was unmistakably meat, and as I had tasted none for ten days, I confess to having fallen to with great avidity, when the first mouthful revealed the fact that the food had been cooked with sugar. It had not received a little flavouring of sugar, but had been saturated with it.

W. K. BURTON.

EARLY DAYS OF AMATEUR PHOTOGRAPHY.

[A Communication to the Society of Amateur Photographers of New York.]

IN speaking about amateur photographers in the early days of this art-science, it would be a convenient thing if I could give you a generally accepted definition of the words "amateur photographer." In the use of the word amateur to-night I shall mean a person who works in or experiments in photography from other reasons than the pecuniary benefit which it will be to him.

On August 10, 1839, the secrets of Daguerre and Niepce were given to the world through the French Government, who, through the influence of Arago, had purchased the secrets at the price of a life-pension of six thousand francs a year to Daguerre, and four thousand francs to Niepce. In less than a year from the above-mentioned date Paris was swarming with amateur photographers. At the windows and on the balconies of the houses could be seen the little instruments adjusted with the sensitive plate waiting for the light to impress an image of some favourite object in its silent and mysterious way.

The city of Paris was thoroughly excited over the wonderful discoveries of their townsman and Niepce. The subject was on every tongue. Friends and neighbours on meeting could talk of nothing else. For a month or two the fever ran riot with business and reason; but in this short time it became an old story; the curiosity and wonder had ceased, because they had become common and familiar; so this first flourishing and prolific crop of amateurs soon passed away, and their silence became as conspicuous as had been their noise.

The fever had subsided without the administration of any drugs. Nature seemed to perfectly understand the excitable character of the French people. In Europe and this country scientists, especially chemists, became deeply interested and studied it from a scientific point of view. Professor John W. Draper, of this city, soon became an expert in making Daguerreotypes, and claims to have been the first person to make a picture of the human face, and that was the face of his wife. The last time I saw it was when Dr. Draper showed it to the members of the American Photographical Society, of which he was President. This was not a Society for amateurs exclusively, but professionals as well. This Society was organized somewhere, I think, in 1858 or 1859. In 1861 Mr. H. T. Anthony organized the "American Photographic Exchange Club." At this time amateur photographers were few, and to be one meant something very different from what it does to-day.

To succeed then meant hard work and study. You were required to know how to make almost everything connected with the production of a photographic print. You must know how to make collodion; how to coat a plate, and how to sensitise and develop it; how to construct the silver bath in which the plate was sensitised; how to make the developer; how to clean the plate; how to prepare the nitrate of silver bath for sensitising the albumen paper; to fume, print, tone, and fix the prints; how to make paste, and how to mount the prints. The amateur of those times was further required to make himself familiar with the chemistry involved in all this work; first, in order that what he did he might do intelligently and successfully, and second, to be qualified to determine with a degree of certainty what was the matter when his chemicals gave unsatisfactory results.

The negative bath was one of his most treacherous friends; he could not predict, with any degree of certainty, what would happen to the next plate by the result on the one immediately preceding it. There seemed to be a demon lurking in the dark room watching for an opportunity to get you into trouble, and, as the negative bath was the most sensitive, he would take advantage of this weak point; and if he had got into it bodily, with all the sulphur and cinders he is supposed to have adhering to his external person, and stirred it

up vigorously with his fabulous pitchfork covered with lava from the pit, it could not have made the bath worse than it would sometimes get in an incredibly short time; and this would always happen at the worst possible moment. If you had invited some *particular friend* to have his picture made—some one to whom you wanted to show what you could do and what beautiful negatives you could make, how expert you had become—then this demon delighted to get into the bath and muddle it, so that, do the best you could, nothing but fog, fog, would be the result. The amateurs of those times wished frequently that Job had lived in their times and had become an amateur photographer; they did not believe he would think a few boils of any account, or if he did he would not have taken the first premium in a competition for patience.

It was such vexatious trials which kept the rank of amateurs thin, and when one happened to be exposed and took the fever he would get over it in a year or two, and so complete would be the cure that you would never suspect that anything had been the matter. There were a few exceptions to this rule, which was when the trouble became chronic. I could point to a few examples of persons so affected; your speaker was one of that class. To him there is a fascination and a satisfaction in experimenting.

The development of an exposed plate brings one into close and intimate relation with nature. You are admitted into one of her interior sanctuaries, while she places in your hand one of her magical wands, and while you look at the white plate before you, lo! a form begins to come forth like a spectre from its winding sheet, and apparently it throws off fold after fold of its snowy environments until it stands revealed in perfection and beauty. What can there be more wonderful than this? With the market supplied with ready-made plates of great variety, so that the most fastidious can be suited, the path of the amateur has become one of comparative ease and pleasantness, and the result has been a great increase in numbers and amateur societies. There is every prospect that this state of things will not only continue, but greatly increase. Photography is one of the three great discoveries of this century—the steam engine, the electric telegraph, and photography.

In looking back through the past centuries, where can there be found three great discoveries so near to each other? There are no five centuries that can show anything like the gigantic strides in discoveries, knowledge, and general advancement of the human family as this one present century. It seems the blossoming time of all the past. These discoveries seem to be the offspring which nature gives us as the fruit of centuries of travail and pain. Copernicus, Galileo, Kepler, and Newton were voices in the wilderness preparing the way for the dawning light of the present time. It is but a prophecy of what will be revealed in the future.

The barriers that heretofore have hindered the car of progress are being forced to give way. We, to-day, are only witnessing the first faint ripples of the incoming tide. If we contrast the present civilisation with the time when men lived in caves and holes of the earth with wild animals, it will be found difficult to realise that the present can be the product of such a past. The way from savagery to civilisation has been a longer and more terrible one than we can well conceive of, with all that has been accomplished by the labour of great minds in the past. Only a fraction of the human family can be called civilised; generations upon generations will come and go, leaving scarcely a sign of advance among the semi-civilised and barbarous.

Progress in the future will no doubt travel with accelerated speed. The light and energy at the disposal of the nations in the lead at the present time are being felt as a potential force in every part of the globe.

HENRY J. NEWTON.

Foreign Notes and News.

"Is the moon inhabited?" is an interesting question that has been proposed times out of number, but with regard to which, nevertheless, nothing precise has been ascertained up to the present time, although modern investigation tends more and more to confirm the assumption that the precious "man in the moon" is the only being who dwells on that dry and barren celestial body. It now appears that the controversy raised by the subject is shortly to be decided to the universal gratification of human curiosity; for the editor of a photographic periodical has been informed, we are told, that a German prince intends having photographic images of the moon taken, and then magnified 100,000 times. Surely such an experiment cannot fail to show any living creatures that may people our satellite! The only suggestion we would make is that timely notice should somehow or other be conveyed to the population of that planet, so that they may be prepared to assume picturesque attitudes for the occasion.

A SHORT time ago a young lady of elegant appearance entered the principal Office of Police in Vienna, and requested an interview with the Commissary on duty. She explained in a troubled manner that her fiancé had disappeared some six weeks ago; he had betaken himself to his native Pest for the purpose of procuring the papers necessary for completing the marriage contract, and since then had not been heard of. She therefore concluded that Herr Joseph Psenek—that was her fiancé's name—had met with an accident. The Commissary promised the lady

to institute inquiries at Pest, and requested her to supply a photograph of the missing gentleman to serve as a guide to the police authorities. A reply was received from Pest which occasioned some surprise to the police of Vienna and perturbation to the young lady. It turned out that the photograph sent was that of a criminal whose real name was Rsooki, and who had long been "wanting" for embezzlements amounting to some 60,000 gulden. The anxiety of the lady thus led to the arrest of her lover, who will probably be shortly compelled to appear before the seat of judgment rather than before the altar of Hymen, as she had fondly imagined.

Our Editorial Table.

DIFFRACTION GRATINGS.

London: Newton & Co., 3 Fleet-street.

DIFFRACTION gratings at popular prices is the keynote struck by Messrs. Newton & Co. One which we have received from this firm containing 2000 lines to the inch, and forms a pretty scientific toy. Unlike those used in spectroscopic observation, and in which the ruled lines are straight, in this one the rulings are circular, as in the once well-known Barton buttons, which were made by placing the flat surface of glass or metal in a turning lathe, the rulings then being effected by a diamond point affixed to an automatically acting slide rest. Mr. Barton, by the way, succeeded in ruling as many as 10,000 lines to the inch.

Accompanying this grating is a little pamphlet giving popular directions concerning the observation of diffraction, and an explanation as to what diffraction means. This pamphlet, price 6d., is lucidly written

SPECIMENS of the Collotype work of Messrs. Bemrose & Sons, Chetwynd-street, Derby, are received. These comprise subjects of varying natures—portraits, drawings, reproduction of wood-carvings, and a panoramic scene suggestive of a view in the Norfolk Broads. All are brilliant and carefully printed.

MESSRS. SAMUEL FRY & Co. are now sending out their Sulphoquinone Developer in bottles containing screwed stoppers. We have received a sample, and consider it a step in the right direction.

RECENT PATENTS.

PATENT COMPLETED.

A NOVEL MEANS OR METHOD OF PREPARING PHOTOGRAPHIC AND OTHER PICTURED CARDS OR MOUNTS FOR CONNECTING THEM IN BOOK-LIKE FORMATION, ALSO IN COVERS FOR THE PRINCE.

No. 15,936. JOSEPH WILLIAM ZAHNEDORF, 14, York-street, Covent Garden.—
June 22, 1889.

THIS invention relates to a novel method of preparing mounts or cards on which photographic and other pictures are printed, pasted, or otherwise secured, so that said cards or mounts may be arranged in a superposed manner, and held by lacing cords passed through holes punctured along one edge of the card or mount and corresponding with holes punctured or eyeletted in side covers, in order to enclose the pictured cards or mounts in superposed order between them, and in such a manner that the compiled series of cards or mounts can be opened for inspection at any part without disturbing their superposed order.

According to the usual method of making up photographic and like mounts into book or album form, the paper of the mount proper is opened or separated along one edge for the reception of a guard or strip of calico or other canvas, or of leather, which when pasted or glued and fixed within the separated portion becomes fixed therein, the flaps of the paper or cardboard being cemented down and made flat. A portion of the canvas is left projecting, and on this a strip of cardboard is pasted corresponding in thickness to that of the mount. This strip of cardboard does not extend to the edge of the canvas, a portion being left in which the back of the leaves are sewn to constitute a book or album for the after application of covers formed of two side boards and a stiff back, so that when the book or album is opened the back part belonging to the side covers remains stiff, the joint being at the edge of the covers only, so that the cover can be folded back and any of the leaves also, so that the mounts appear flat when the album is open.

Now the object of my invention is to attach two strips of cardboard to the guard to form two distinct folding places beyond the inner edge of the mount, and to make one of the strips, namely, the outer one, of greater width than that of the inner one, and to perforate said larger strip so that any number of such prepared mounts can be arranged in a superposed manner to any desired height, the perforations, all of which correspond in the larger strips, serve for a cord or lace to be passed through to hold all the mounts in that superposed condition, the two folding places permitting the compilation of mounts to be open at any part without interfering with the lacing at the back, the series of mounts so laced or kept together constituting a book or album without a positive cover.

In order to preserve the series of mounts as a book, I purpose making covers in exactly the same way as that described with regard to the mounts, the covers

being of sufficient thickness to resist wear and to form top and bottom pieces, through the outer strips the cord or lace is also passed to constitute an outer covering and to preserve the enclosed mounts from dust and dirt, at the same time the side covers are slightly larger to prevent the edges of the mounts from being chafed if the album is set up on edge in a bookcase or on a shelf.

The front edge, the top edge, and the bottom edge of the covers may be secured in any desired manner, such as by tapes or ribbons.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 22	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 23	Great Britain (Technical)	5A, Pall Mall East.
" 23	Bolton Club	The Studio, Chancery-lane, Bolton.
" 24	Photographic Club	Auderton's Hotel, Fleet-street, E.C.
" 25	Burton-on-Trent	The Institute, Union-street, Mechanics' Hall.
" 25	Halifax Photographic Club	St. George's-crescent North.
" 25	Liverpool Amateur	The Lyceum, Union-st., Oldham.
" 25	Oldham	Masons Hall Tavern, Basinghall-st.
" 25	London and Provincial	

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 11.—Mr. W. Bedford in the chair.

Mr. THOMAS SCOTTON read a paper on *Various Processes for Copying Line Drawings* [see page 476], and accompanied his observations by developing several prints made by the processes in question in view of the members.

At the conclusion of the paper Mr. A. COWAN inquired what means were the best to secure absolute contact between the paper and the tracing when such large sizes as 48×36 were in question. A suggestion had been made in an American publication to wind them round a cylinder which was revolved during the exposure.

Mr. SCOTTON replied that he depended upon good workmanship in the printing frames and the use of plenty of pressure. He used two thicknesses of felt to back up the paper.

With respect to the solution employed for producing extra white lines on the blue ground of a print by the ferroprussiate process, an example of which lino had been produced by the Chairman writing with a pen dipped in the solution, Mr. A. HADDOX said that it probably consisted of oxalate of soda.

In reply to a question as to the keeping properties of the various papers, Mr. SCOTTON said that the Pellet paper would keep indefinitely, the other papers, which were all of commercial manufacture, might be depended on for three months or so.

Mr. J. TRAILL TAYLOR put a question as to whether Mr. Scotton had experimented with toning ferroprussiate prints. Ammonia had been employed but the results were evanescent.

Mr. SCOTTON said that he had toned with gold, but not very successfully.

Mr. HADDOX inquired whether the black process that had been demonstrated was capable of yielding half tones.

Mr. SCOTTON could not say. He observed, also, that sometimes paper that had been kept would not develop satisfactorily with cold water, but did so when the water was heated.

Mr. TAYLOR said that some years since he had experimented with various methods of preparing papers of these kinds. He had a weakness for the oxalate salts rather than the citrates, but had been assured that the oxalates would not keep. It happened, however, that Mr. C. J. Burnett, of Edinburgh, had given him some crystals of the oxalate—ammonio-oxalate of iron—before the year 1864, and in the year 1879 they were still quite good. The late Mr. John Williams, of the firm of Hopkin & Williams, had given him some crystals (which were not commercially produced, and which it was impossible to purchase) in the year 1883 or 1884, and they were quite good now. Another objection that had been made to the oxalates was that there was a difficulty in keeping them when in solution. It was necessary for the bottle containing the solution to be kept in the dark. With regard to solutions that would be injured by contact with air, the bottle should be kept quite full; and to ensure this as the solution was used, pieces of glass might be put into the bottle to keep up the condition of fullness.

A vote of thanks to Mr. Scotton was passed by acclamation.

Mr. Evan Cook was elected a member.

The subject for discussion on the evening of July 25 is *The Preparation of Paper from which Excess of Nitrate of Silver is Removed so as to Confer Keeping Qualities, the Sensitiveness being Restored by Ammonia Fumes whilst Printing*.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

JULY 11.—The President (Mr. Lange) in the chair.

Miss E. Carran, Miss J. M. Huddock, and Mr. J. Petrie were elected members of the Association.

Mr. J. A. FORREST read the quarterly *resumé* of photographic progress, which appeared in our issue last week, and also exhibited several films, carriers, and prints taken on Carbutt's films.

The PRESIDENT gave a brief account of his trip to Norway, and stated that, having run short of plates, he was obliged to use Carbutt's films, but the result on developing was unsatisfactory, the films being full of pinholes and scratches. He advised those who purposed using the films to try them before going away for their holidays.

Several members spoke very favourably of the Carbutt films from their own experiences with them.

Mr. F. Evans exhibited a Wray's casket lens and Rouch's detective camera. Mr. W. B. Beaton (Mr. J. J. Atkinson) exhibited several photographic novelties.

Mr. H. B. Sharpe exhibited an enlarging camera with rack and pinion adjustment for focussing, and an arrangement at the front by which the negative or transparency could be moved into almost any position from the back.

BRIGHTON PHOTOGRAPHIC SOCIETY.

JULY 9.—Mr. W. Jago (Vice-President) in the chair.

Mr. E. J. BEDFORD read a paper on *The Artistic Side of Photography*, which was illustrated by reference to several of the best-known works of Messrs. H. P. Robinson and F. M. Sutcliffe.

On August 13 Mr. J. E. Mayall will read a paper on *A Process of Colour Photography*.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

ON Thursday, July 11, thirteen members and friends, favoured by exceptional weather, took an early train for Ashbourne, and from thence by conveyance to Dovedale, the "Peveril of the Peak" Hotel being the end of the drive, where a most enjoyable luncheon was served. Thus fortified, the party, engineered by the President, started for the Dale, where an *embarras de richesses* was soon presented, for delightful scenery—river, rock, and dell—surrounded the party. Mr. Bankart, having been before, led the way to "Pickering Tor" (the Hon. Secretary coming in for his share of pointed remarks in consequence of similarity of name), and, working back to the entrance, found the utility of having a leader acquainted with the district. All the characteristic features of the Dale were secured—"Dove Holes," "Tessington Spires," "Pickering Tor," "Pulpit Rock," and the "Stepping Stones," all claimed attention, and the party were busily engaged until time for returning to the hotel for tea, after which they resumed the drive to Ashbourne, whence embarking, the train soon reached Derby, where being met by the Hon. Secretary of that Society and a few members, a walk through the town and a fraternising chat passed away the time until the train for Leicester, which was reached at a quarter to eleven, all having passed a most enjoyable day.

Fifty-one plates were exposed, with a most excellent average of successful negatives.

Correspondence.

✉ Correspondents should never write on both sides of the paper.

THE STEREOSCOPE.

To the Editor.

SIR,—May I make a few remarks on certain literature and criticism that have arisen from an article signed "F. M. S." in a contemporary of yours—*Photography*? This article treated chiefly of the art side of photography, and, if I read it aright, discussed the stereoscope from an artistic point of view. To this article we had, on May 31, a somewhat strongly worded reply in the columns of *THE BRITISH JOURNAL OF PHOTOGRAPHY*. I was not aware that Mr. Chadwick, the writer of this reply in your column to an article in your contemporary, had any other than a scientific interest in stereoscopic photography; my attention was only called to the fact later. As this literature, and the curious procedure of answering in one paper a leading article in another, caught my attention, and as I have always had an interest in the scientific aspect of binocular vision, I thought I might venture to make a few remarks on the matter as touching the artistic side of photography. I did not see then, any more than I see now, how stereoscopic photography could in any way affect art, and in your contemporary I stated my opinion. I have that article of mine before me, and I assert that throughout it I have kept closely to my record, which was, stereo-photography as artistic. I said distinctly I had "no wish to deery the stereoscope in its own sphere." I appeal to any one who has read without prejudice my article to say whether or not I have described that article correctly.

Next we have Mr. G. R. Baker changing the *venue* once more with evident allusions to my article, but as he knocks down arguments I never set up I need hardly contend with him. We have also the universal provider of information and criticism, calling himself "Junius," putting in his oar, but as I don't know his name, and am consequently ignorant of his authority, I need not trouble myself with his opinions further than to remark that he harps on the "solidity" which no one denies.

Now we come to Mr. Chadwick's brother officer in one of the most admirable photographic societies in the world, as I know from personal observation, and it is a Society, if I mistake not, to which I am personally indebted for kindness which I shall not in a hurry forget. I have all the less hesitation in protesting against such a waste of time by an office-bearer of that Society as was perpetrated by Mr. Abel Heywood, Vice-President, on June 21, as reported in your columns of July 12, Mr. Chadwick being Hon. Secretary of the same Society. Even supposing I had made every statement attributed to me by Mr. Heywood, and supposing the deductions drawn to be mine, still it would have been a sheer waste of time to ridicule without attempting to confute. We all know the effect on some minds of making a quotation and putting a point of exclamation after it, but I fancy the Manchester intellect requires a little more than that, unless it has changed since my last pleasant visit to that city. I see

in your report no sign of an attempt to argue any point I really raised; the whole speech, if correctly reported, must have been simply a tirade of abuse of poor "A. P." In point of vituperation it falls far short of some literature we have lately been treated to in your contemporaries, still it is not bad for a beginner. But comparing Mr. Heywood's oration with what I actually wrote, I can only say I hope for Mr. Heywood's sake the circulation of *Photography* is very small in Manchester. In every case he either makes me say what I did not say, or quotes phrases without their context, or supplies conclusions which I never supplied. I am not going to go into detail on these points, for my time and your space are too valuable. I am willing to present the Manchester Photographic Society with enough copies of this issue of June 13, if I can procure them. I will let the Society judge between Mr. Heywood and me. I will be glad to hear where lies the bluster or abuse of the article, where I said my article was strong, where is the absurdity of a person who does not care for a stereoscope refraining from using one, where I make any statement that can be called a shameful libel. Is it possible that I cannot express an opinion adverse to the stereoscope as an instrument for any particular purpose without uttering a shameful libel, or is this style of literature "catching?"—I am, yours, &c.,

ANDREW PRINGLE.

FILM CARRIERS.

To the Editor.

SIR,—I am surprised that Mr. J. M. Turnbull has thought fit, after his private communication with me, to resort to the correspondence columns of the *JOURNAL* to ventilate a purely private or commercial matter. I am more than surprised when I reflect that he must have known it compels me to make public one or two unpleasant truths that I have already tried to impress upon Mr. Turnbull.

On the 15th of last month Mr. Turnbull wrote to me that he had already patented my film carrier, which was only an infringement of his. I was surprised at this, for not having sent out a single one I could not see how he knew anything about its nature. However, when he closed his letter by quietly asking for particulars of it I began to understand.

In reply, I informed him that having seen his I was able to say that mine was quite a different thing; that if it were ever so similar to his any license I might have to pay would, I thought, have to go rather to the proprietor of the Samuels' sheath, of which his was an imitation, if, indeed, that were a tenable patent, which, as you, Sir, have shown in last number, is a very doubtful question.

On the 20th of June Mr. Turnbull wrote again, but the only material addition to what he had previously said was a statement that Samuels "does not in his patent make any claim for film carriers," and a little gratuitous advice upon patent law, which, like all such cheap material, is scarcely worth the price asked for it.

To this I again replied with a quotation from Mr. Samuels' specification, in which he accurately describes Turnbull's carrier, and I also called his attention to a fact I had forgotten to mention in my previous letter, namely, that, independent of Samuels, or Merritt, or anybody else, his (Turnbull's) carrier was a precise copy of Turner's "Simplissimus" carrier, which had been in the market long before the date of his patent.

If after inquiring into the truth of these statements, and after your own very clear description of the difference between our respective carriers, Mr. Turnbull still persists in calling mine an infringement, it is evidence either of singular obtuseness or of a wilful and deliberate intention to try and deceive the public regardless of truth or accuracy.

I can pardon ignorance of what has never come under Mr. Turnbull's cognisance, but there is no excuse for closing his eyes to palpable facts when brought to his notice. These facts are:—1. That my carrier being a double one, which his is not and cannot be, is not an infringement of his. 2. If it were ever so like his I am not infringing his patent, but simply copying Merritt's lapsed one. 3. Even granting that Samuels had not claimed film carriers, Turner has forestalled Turnbull, and therefore the latter has no patent to make a noise about.

In his second letter to me Mr. Turnbull patronisingly assumes a knowledge of patent law that is admirably exemplified in his dictum that "a perfectly valid patent may be held for an invention that is old if the application of it is new. I have done this" (*sic*) "by patenting the application of metal film carriers for ordinary slides." So I suppose we shall have Mr. Turnbull "coming down" presently upon Eastman, Morgan & Kidd, and, indeed, everybody else who ever made a film carrier, for *infringing his subsequent patent*. I never yet saw a film carrier that was not partly or wholly of metal.

Surely a "little knowledge (?) is a dangerous thing," especially in patent law.—I am, yours, &c.,

W. B. BOLTON.

South Norwood, July 15, 1882.

PHOTOGRAPHING IN THE FRENCH EXHIBITION.

To the Editor.

SIR,—From reading your notice on taking photographs at the Paris Exhibition, I am induced to write you a few lines. I have spent a month there and taken a series of photographs, and enclose the conditions for working there. In 1878 there was no charge or limit of time, so that

subjects could be done at the proper time. Now the hours for working are from eight to twelve or from ten to two, and the price 20.25. What the twenty-five centimes additional was for, except for stamps which were not used, I do not know. The authorities will not grant you a permit to work for the same time at any other hours than those named on the order, which I enclose. The French are noted for their orderly ways; as an instance of this, it is an everyday occurrence in the Exhibition grounds to see 500 people waiting in a line at the entrance to the Eiffel Tower: they move on at the rate of a foot a minute in the most orderly manner and without the slightest impatience.

I mention this to show you that it is innate in the police to obey orders, and they are surprised at others not doing the same. Should one be photographing beyond the specified hours he is politely requested to pack up, and if the order is not obeyed he demands the permit and reports the circumstance, which may end in a refusal to grant another. I was most anxious to take more views after the time named, two o'clock, and in doing so was several times told to move on, which I at once did to another place. I was at last challenged by an inspector, and my order taken from me. I selected the last day for this ruse, so never heard the result.

You speak of free trade: the Commissioners were anxious to make it so, but some enterprising photographers in Paris have created monopolies. They take an attractive exhibit, giving several copies conditionally upon having the sole right.

The "Street in Cairo," a most picturesque subject, I could not do. As soon as I set up the camera I was surrounded by Arabs, and if I tried to be indifferent and persisted on remaining, they had a rope across the street against which they placed planks of wood which spoiled the view. —I am, yours, &c.,

F. YORK.

87, Lancaster-road, Notting Hill, W., July 11, 1889.

P.S. The Photographic Exhibition is now complete, and the display a grand one. Lumière & Sons show excellent work taken all over the world on their films. Nearden's panoramic photographs taken on them are a great success, embracing an angle of 120° free from distortion.

To the Editor.

SIR,—I am sorry for it, but I must ask you to allow me to put things right with Professor E. Stebbing's wrong assertions in regard to the imaginary great troubles experienced by the photographer at the Paris Exhibition.

A party owning a permit for the season cannot take views until eleven p.m., as after two p.m. no more views can be taken; however, it is readily tolerated (Mr. S.'s assertions notwithstanding), as it is well understood that for some objects light is only favourable after two p.m. An infringing of hours for a one day's permit does not entail the loss of outfit. The duty stamp is not twenty-five cents, but twenty-five centimes, or twopence-halfpenny, and the tickets are now sold at fourpence, which does not entail such a large extra expense as Mr. S. seems to want to make it believed. Although the permit is issued for a certain day, it is not lost if not used, as it is readily renewed for any other day.

Having had myself several permits, and having taken views, I can speak of my own experience, which Professor Stebbing seems not able to do, from what he says about the aged photographer, that he only managed to take two views in a four-hours' *séance*. To talk such nonsense when gelatine plates are in use and an exposure of one minute is considered exaggeration is a poor compliment the Professor pays to the readers of your highly interesting and generally truthful and reliable periodical. I have taken lately six good negatives in less than one hour, and not a single policeman asked me for my permit, and I walked all over the Exhibition for that, in full view with my 10 x 12 camera; and never was I asked more than twice for my permit for one day's work. A policeman is assigned to a certain lot or ground to patrol, and one does not interfere with the other, therefore a party has not to run up and down to show his permit, when on a ladder, to every policeman passing. A policeman does not read carefully your permit all through, but only sees the date and hour and tears off one corner, if not done before by another one, to cancel permit. A policeman is almost always very polite and obliging, if you address him politely. However, I never was on a ladder, therefore of easier access; the policeman always kindly waited near me until I was through with that view to look at my permit, having told him I had one.

Nobody should or does ignore that a permit is necessary to take views inside the Exhibition grounds, and the only proof I can say for this is that no foreigner or Frenchman has attempted taking views without permit with a tripod for his camera, and all parties getting into trouble have detective cameras, and with these try to beat the Directors out of a paltry twenty francs, and run the risk for that small amount to commit perjury, saying they did not know. Then why use a detective camera? Taking views with such of moving people is the same on the street as in the Exhibition, and no risk run. To take an interesting view of a building requires focussing and exposure, hence a tripod.

To conclude, I would say that I do not think the present arrangements for taking views inside the Paris Exhibition are perfect, but as they are they are not so very bad, as they allow every one a chance to work there, which certainly should allay some dissatisfaction as compared with former exhibitions here and elsewhere, where only one firm was given the sole right. However, though I am no prophet, I will say this much, that in

the next exhibition held in London the terms will be found less liberal than they are now here. The reason why? Because I think they will find that they made a mistake in giving the right for the season too cheap, and the right for one day too dear. Time will tell. Anyhow, if you consider that with the rapid gelatine plates you can take very well twenty-four negatives in one day of any size, well twenty francs is not too much after all, as it makes about 8d. for each negative.—I am, yours, &c.,

Asnières, July 16, 1889.

E. LISK.

WARM TONES IN WET PLATE LANTERN SLIDES.

To the Editor.

SIR,—I notice, in the "Answers to Correspondents" of the last issue of the JOURNAL, Mr. J. H. Browning, of Victoria, Australia, asks, "Can you tell me how to get any warmer tone on a transparency by the wet collodion and iron development?"

In a paper I had the honour to read before the West London Photographic Society, on the 12th of April last, I described such a method, and as in the very short report sent you of the above meeting the most interesting details were omitted, perhaps, therefore, the following description of my way of working may interest others of your readers besides Mr. J. H. Browning:—

Wet plate transparencies most suitable for toning by the above method are those made with a moderately thin collodion containing a rather large percentage of bromide, or any collodion will do that will give a soft delicate transparency without much contrast.

Such an one after fixing and thoroughly washing is immersed in a bath of iodine and iodide of potassium in water (of a port wine colour) until the whole of the silver image is converted into yellow iodide, which can be ascertained by examining through the back of the glass.

After giving it a good washing under the tap for about five minutes it should be placed in a bath containing hydrosulphuret of ammonia, ten drops to the ounce of water.

The image will now become a rich chocolate-brown in colour right through the film, and it must again have a thorough washing under the tap as before, and if a warmer tone still is required it has only to be placed in another bath containing—

Chloride of gold	1 grain.
Potassium ferricyanide	1 drachm.
Nitrate of uranium	1 "
Water	20 ounces.

The transparency can be left in this until it becomes a bright Indian red, or it can be taken out before it gets so warm in colour, but when taken out it must again have a thorough good washing.

The tone now can be somewhat modified by placing in an ordinary gold or platinum toning bath for a short time.

The success of the above process depends on allowing the action of the different solutions to penetrate clean through the film, and also giving a good washing between each of the operations.

I can only add that the pleasure one feels in making a really good wet plate lantern slide far surpasses anything one can ever feel in working the dry method; in the former case the merit, if any is due, is due to yourself, but in the latter case there is always a questionable amount that should go to the plate maker.—I am, yours, &c.,

Ealing, W.

CHARLES WHITING.

LANDSCAPES WITHOUT FIGURES.

To the Editor.

SIR,—I have read with pleasure a sensible article in *Photography*, by "G. D.," on figures in pure landscapes, or rather on the absence of such. The remarks are much called for at present, for there is a large number of photographers, and the number is increasing, who think that figures in landscapes are a necessary adjunct, and if you show them a view without them you are immediately asked, "But where are your figures?" It would be well for such persons, instead of being guided by the remarks of self-created photographic taskmasters (?), that they should look at the works of painters—of those who have really studied art, and that successfully. If such be done it will be found that a large number of pure landscapes have no figures; and it should be remembered that artists have not only the power to introduce figures into their works, but also of a character suitable to the picture. But how does it fare with the landscape photographer? he has arranged his view, the light is suitable, and perhaps it occurs to him to introduce a figure, but where is a suitable one to be found for the occasion? I am now speaking of England. I am quite aware that a well-known friend of mine is most successful with the old women, who are quite the right sort of folk in the right place, and if they were not older than himself I would have said he trained them from youth for camera purposes. But if you look for a subject from the rising generation—say a country lass—you will not find such, for all now are young ladies, dressed according to the design and shape of the last number of the book of fashion as taken in by the village dressmaker.

I am at present in a delightful Swiss valley, which, however, is about 4000 feet above the sea level. It is surrounded by some of the high Alps, and the valley itself is an agreeable combination of sylvan and rural scenery, with a bright and bubbling stream to give it life. This is the Val d'Iliez, of which its chief village is Champeney, where I am located.

Here, I was informed, that in addition to the scenic attractions of the place I would find many novel figure subjects, and that women were so much to the front in the present female advance to independence that they discarded the skirt and boldly assumed *les pantalons*. But on my arrival I found the villagers dressed in the usual manner, with the exception that some of the women wore red handkerchiefs round their heads, but *les pantalons* were not to be seen. Upon inquiry I learned that in the summer time the women who wore such were so stared at by tourists that they substituted the skirt for the season; but that others, who, like Mr. O'Brien, were determined to stick to their small clothes, retired to mountain chalets to keep company with the chamois, and other such inaccessible animals. As I did not like, under a blazing sun with a camera on my back, to go in pursuit of such game, I gave up the idea of adding such to my figure subjects. But my landlord said to me, "If you do not wish to ascend the mountains we can get one to come down." I at once agreed. The next day the subject arrived, was photographed, received her travelling expenses, and retired. The next morning, when passing round the hotel, upon casually looking into an open window I saw my mountain lass washing up the dishes, and she seemed greatly to enjoy my surprise.

I am afraid I have wandered from my subject, and, speaking for myself, the quiet of sylvan subjects has been to me one of the chief pleasures of our art. There are scenes in nature where it almost amounts to profanity to introduce a human being, for if nature be closely studied it will be found that she has a life of her own; and I quite feel with Byron when he says,—

"I love not man the less, but nature more."

—I am, yours, &c., T. M. BROWNIE.
Hotel de la Dent du Midi, Champenay, July 10, 1889.

Exchange Column.

Will exchange 12x10 triplet by Dallmeyer, with adapters for using the lenses singly, for 7½x5 doublet by Ross or Dallmeyer, or for long-focus rectilinear landscape lens by Dallmeyer.—Address, W. L. c/o Watson & Sons, 313, High Holborn.

Will exchange rolling platform, six feet by three feet, orthoscopic lens by Voigtlander, ten and a half inches focus, and eighteen-inch French view lens, front stops, for printing type and material.—Address, JOHNSON, Photographer, Saxon-street, Dover.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

W. COLES, Watford.—One photograph of the Shah and suite with Prince Albert Victor and Countess Brocklow and party at Ashridge. Two photographs of Prince Albert Victor and party at Ashridge. One photograph of Prince Malcolm Khan and friends at Ashridge.

F. H. WENHAM.—Will note article referred to when published.

STUDIO.—Under the circumstances, you can print on your mounts that you are patronised by Royalty.

M. STAPLETON.—If the prints are "covered with dirt during toning" it is an indication that care has not been taken during this operation. Send a specimen and say what kind of dish you employ in toning and whether it is quite clean.

T. M. W. wishes to know whether caustic potash or caustic soda is the better substitute for ammonia.—Either will answer, but some plates behave better with the one than the other. Unless we knew the particular brand of plate we could not advise.

GEO. LAUGHTON.—You are mistaken as to the abilities of Mr. Alvan Clark, of Boston, U.S.A. His abilities lay not in the direction of the microscope, an instrument for ought we know he never touched, but in the manufacture of high-class astronomical telescopes.

W. H. T. N.—With some of those on your list we are not acquainted; but, from personal experience, we can say you will be perfectly safe and satisfied with C, E, and F. We advise you to confine your requirements to *f*-8, unless in the case of small pictures and portraiture.

B. C. D.—One of the easiest methods of levelling the cameras is to employ a spirit level. There are several different forms of small size now in the market, which may be obtained of all photographic dealers. They are effective and quite inexpensive. Either the T or circular form will answer.

S. TRIGGS.—The spots or, rather, "pits" on the plates forwarded are due to the gelatine. The only plan of avoiding them is to obtain a sample of gelatine which is free from the evil. Procure samples from different sources, and when you find one that suits secure a good quantity of it, as it will not deteriorate by keeping if kept in a dry place.

Q. writes: "Your suggestion to plate makers to mark their plates is a good one, but it would be still better if they were to number them as well. If this were done reference to conditions under which they were taken, as entered in one's note-book, would be easy for all time; now, as soon as they are out of the double back their history is lost."

T. PROTHKROE.—Forms and particulars for the Exhibition of the Photographic Society of Great Britain may be obtained by writing to Mr. E. Cocking, 5A, Pall Mall East, London; for those for the Royal Cornwall Polytechnic Society apply either to the Secretary (see advertisement in present number) or to Mr. William Brooks, Reigate, Surrey.

W. S. ANDERSON.—Our correspondent wishes instructions for making a "graph."—What does he mean by a graph?

ALF. MANSION says he has recently purchased a lens, which he imagines is of foreign manufacture, presumably French, that purports to have the diaphragms marked according to the Photographic Society's standard. So far as he can judge the largest stop, marked *f*-8, is nearly *f*-10.—This is by no means an uncommon thing. We have seen many such examples.

L. M.—1. The difference between the Euryscope and the Rapid of the firm named consists in the former being made of a larger angular aperture, that is to say, with full opening it will work much quicker than the latter.—2. To prevent the mark which comes opposite the hinge of the dark slide, scrape the leather or other hinge and give it a coating of varnish.

W. BILLINGS says he has a very powerful screw copying press, much more powerful than the general type of copying presses, and asks if with such a press it would not be possible to make Woodbury moulds up to the quarter-plate size.—Of course a screw or any other form of press would answer quite as well as the hydraulic, provided the pressure is sufficient. About five tons per square inch is required; hence, for a quarter-plate something over sixty tons is necessary to obtain a satisfactory mould. We have not yet seen a copying press of so great a power.

C. B. JENNINGS send us some of his failures in making bromide enlargements, and complains that he cannot obtain pure whites. He asks if we can suggest a reason. The reason is that the room in which the enlargements were made was not light-tight. It is clear that actinic light was present, and that during exposure, inasmuch as those portions which were shielded by the drawing-pins fixing the paper to the easel, as well as those under the masks, are quite white, while all portions are fogged. The remedy is obvious.

D. MCCLUSKIE asks if the same apparatus as was employed some thirty years ago in the wet collodion process would be available for use at the present time with gelatine plates. The reason for the inquiry is that he has recently been presented with a quantity of somewhat antiquated apparatus, and would like to try his hand at photography, seeing that it is practised by so many of his friends. The apparatus will do quite well for modern photography, but we should advise our correspondent to get one of his friends to overhaul it generally. In former days the plates were not so sensitive as they are now, consequently the same care as now was not taken in making the camera and dark slides absolutely light-tight.

J. CHESTER JERVIS asks "if black Japan varnish (Bates's) on the back of glass negatives is the best means of blocking-out in combination printing, and in the case of the film side requiring blocking-out what is the best medium? I have had no practice hitherto in combination printing, and would be very thankful for a few hints. I have left all your back numbers at my working place in the South of France, so cannot refer. You mentioned at a recent meeting of a photographic society 'that for printing from several negatives one after the other, there was the method of registering printing frames as used by Edwards and by Hemery.' Are there, then, special frames in the market for the work?"—Bates's black is the best medium for blocking-out. It can be used on the face of the negative equally as well as on the back. There are so many systems of combination printing that it would be impossible to give in this column any useful information unless we knew the character or type of negatives to be combined. Regarding the printing frames mentioned, we shall have something to say about them soon.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—5A, Pall Mall East.—Monthly technical meeting, Tuesday next, July 23, at eight p.m.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, July 24, 1889, will be on *Copying Engravings*. Saturday outing at Chigwell.

THE London and Provincial Photographic Association have chosen a subject for discussion at their next meeting (July 25) which will prove of great interest and importance to professionals and amateurs alike, viz., *The Preparation of Paper from which Excess of Nitrate of Silver is Removed so as to Confer Keeping Qualities, the Sensitiveness being Restored by Ammonia Fumes whilst Printing*.

LEWES AND SUSSEX PHOTOGRAPHIC EXHIBITION.—There is to be an exhibition as above, from the rules of which we learn that it is open only to the county of Sussex. It is believed to be the first exhibition of the kind held in that part of England. Medals are to be awarded, but no picture which has gained prizes or medals at any other exhibition will be eligible for competition. All photographs for competition must be entirely the personal work of the exhibitor, up to and including mounting. It will open on October 22, and will remain open for that and the two following days. Advice forms and regulations may be obtained on applying to Mr. E. J. Bedford, Hon. Secretary, 10, St. John's-terrace, Lewes.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1525. VOL. XXXVI.—JULY 26, 1889.

THE FRENCH PHOTOGRAPHIC CONGRESS.

As announced some time ago it is intended to hold, in connexion with the Paris Exhibition of 1889, an International Congress of Photography, of which the programme and regulations have reached us, from which we gather the following particulars:—

The members of the Congress will consist of those persons who shall, before the opening of the session or during its progress, pay a subscription fixed at ten francs, in return for which they will receive a ticket admitting to all meetings of the Congress, general or sectional. The said ticket is strictly personal and non-transferable, and confers no right to free admission to the Exhibition.

At the first sitting a Committee will be nominated, with whom will rest the direction of the work of the Congress. It will consist of a President, five Vice-Presidents, of whom two will be foreigners, five Secretaries, of whom two also will be foreigners, and it will be competent to name in addition "Presidents of honour."

The Committee of Direction will arrange the order of the day of each sitting. The work will consist of general and sectional meetings, lectures, and visits to scientific and industrial establishments. The privilege of attending the meetings and the visits arranged by the Committee, of presenting works and of taking part in the discussions, will be confined to members, though delegates from public bodies, French and foreign, will be admitted to the advantages of membership.

The works presented to the Congress in the published programme will be discussed in general meetings, those not entered on the programme will be read at the sectional meetings. No paper can be read, or form the subject of discussion, unless its author shall have communicated a *résumé* to the Committee of Organization at least fifteen days prior to the opening of the session. Several other rules are laid down with regard to the conduct and reporting of the meetings, but they are of minor importance.

The opening meeting will take place on Tuesday, August 6, at 2 p.m., at the Trocadero Palace, and, the closing sitting will be held on Saturday, August 17, at the same time and place. The remaining meetings will take place at the quarters of the *Société Française de Photographie*, 76, Rue des Petits Champs. A lecture on the work of the Congress will be delivered by M. Janssen, director of the Observatory of Meudon, on Tuesday, August 20, at the Trocadero Palace at 2 p.m. The Secretary of the Committee of Organization is M. S. Pector, Rue Lincoln, 9, Paris, to whom all applications for membership should be addressed.

A number of "questions" have been proposed for discussion by the Committee of Organization, and a summary report on

each has been drawn up and printed as a guide or suggestion as to the line to be followed in each discussion, though not in any way limiting the perfectly free treatment of the question. The following brief *résumé* of the various reports may be interesting:—

The first question for discussion is "The Introduction in Photography of a Fixed Unit of Light;" and this is subdivided into subsidiary question (A), "Uniformity in the Estimation of Luminous Intensity in Photographic Operations;" and subsidiary question (B), "Unity in the Method of Determining the Sensitiveness of Photographic Preparations," both of which are dealt with by Colonel Sebert.

In connexion with the first, the reporter (1), after alluding to the photo-metric unit adopted by physicists in accordance with the proposition made by M. Voille at the Electrical Congress of 1881, consisting of the luminous source produced by a surface one centimetre square of incandescent platinum at the moment of solidification, suggests that it will be convenient if the practical standard adopted by photographers correspond with this unit of light. In making the comparison the rays which possess the greatest chemical action are to be taken into account, and the two sources of light compared spectro-photometrically, with special reference to the rays in the neighbourhood of "G" in the blue of the spectrum. It is proposed to confide the research to a special committee continuing the work of the Congress, the choice of standards being subordinated to other practical problems requiring solution, notably the measurement photographically of luminous intensity and the sensitiveness of plates.

(2.) In what concerns the estimation of the sensitiveness of plates, the special committee appointed to study the question have been led to adopt as the measure of sensitiveness the time necessary, after direct exposure to the standard light and development by a fixed plan, to obtain an image of a grey tint forming a normal tone easy to define and reproduce. For gelatino-bromide plates as now used they are led to recommend the employment of a feeble source of light, such as that allowed to pass through a hole one-fifth of a centimetre square in a screen placed in front of an ordinary candle or similar light, the usual precautions being adopted to ensure uniformity. Preferably they recommend a spirit lamp of some kind, a special recommendation being made in favour of the acetate of amyl standard. This form of lamp, indeed, is the one it is suggested should be compared with the Violle standard.

(3.) With regard to the estimation of luminous intensity in photographic operations, it has been decided to renounce those methods based upon the measurement of chemical action upon certain sensitive surfaces by means of special photographic

apparatus, since these, in reality, measure only the functions of the sensitive substance and of the apparatus employed. Nor can it be hoped to value the luminous intensity of the image formed on the ground glass, as this intensity will represent the function of the apparatus employed, and not solely of the real conditions of lighting considered independently of the means used to obtain the photographic reproduction. These methods should be confined to the estimation of the effect to be finally obtained with a given apparatus and under determined conditions. What is required, it is pointed out, is to measure the light emitted by the objects to be photographed themselves, and not the surrounding light; in other words, to determine the brightness of those objects resulting from their mode of illumination, since it is rarely that the photographer has to deal with objects in themselves luminous. After touching on the possibility of introducing coloured screens for the purpose of arriving at correct estimations of colour value, an apparatus similar to the photometer of Mascart is suggested in conjunction with the acetate of amyl standard lamp, either under the precise conditions of Heffner Alteneck, or preferably with a fixed screen provided with a determined opening of, say, one centimetre square.

(4.) Summing up, the two principal points to be held in view by photographers are the employment of the acetate of amyl lamp with fixed screen and aperture, which should be compared as regards its action in the region of the "G" ray with the incandescent platinum standard; and where prisms or lenses are used, the adoption of glass in ordinary use in photographic optics, in order to conform to the everyday conditions of photography as far as possible.

With regard to the second subsidiary question, the determination of the sensitiveness of photographic preparations, the report commences by pointing out the difficulty of obtaining uniform results, owing to variation in the mode of development. The Committee suggest the following general method of procedure. Two or more plates or preparations to be compared are to be treated simultaneously and under identical conditions by exposure to a standard light, in order to produce after development a determined density of tint. The normal tint proposed is the grey tone formed by the mixture in equal parts of black and white, which may be obtained in a simple manner by a series of black hatchings or lines on paper, equidistant, and of a width equal to the white intervals separating them. To facilitate comparison in reading the results it is proposed to employ a scale of tints, consisting of five above and five below the normal, each tint being pierced by an aperture through which the tint to be compared will be visible when the screen is placed in contact with it. The use of a yellow or tinted pellicle is also suggested in order to destroy any differences of colouration.

The plates to be tested are exposed in a suitable frame, in portions, exposure constantly increasing by five seconds to a standard light, consisting of the before-mentioned acetate of amyl lamp, with screen and aperture, the conditions as to area of luminous surface and distance being, of course, constant. The development is, of course, to be always of a uniform character, the ordinary ferrous oxalate being recommended, though for special plates or preparations it may be needful to adopt special measures.

The final estimation is made in the ordinary manner of comparing the developed result with the graduated screen.

The second question for discussion is "Uniformity in the method of measuring the focal length of lenses," and this is reported upon by M. Adolphe Martin. After a lengthy disser-

tation on the rules underlying the calculation of the focal lengths of lenses, single and compound, and the methods in vogue for measuring them, the report sums up by recommending two methods for discussion. 1st. After focussing upon a distant object the position of the screen is carefully marked; then an object of known dimensions is similarly focussed, and the altered position of the focussing screen having been marked, an image of the object is photographed. As many times as the size of the image so obtained is contained in the actual measurement of the object, so many times will the displacement necessary between the two focussing adjustments be contained in the focal length sought for. 2nd. The second method is that proposed by M. Moessard. Fix the objective on a support capable of revolving on a vertical axis, and having focussed on a distant object, move the lens—with regard to the vertical axis—until on revolving it the image remains stationary on the screen. The point of rotation will then be the optical centre of the lens, and its focal length is obtained by measuring accurately from that point to the focussing screen.

The third question, "Uniformity in the indication of the photometric effect of the diaphragms of the lens," is reported on by M. Cornu, who fixes the "unit of photometric power," or "normal photometric power," as equivalent to "the admission by an aperture equal to one-tenth of the principal focal length during one unit of time." There is nothing new in the "conclusions" of the report, all that remains for discussion being apparently the adoption of $f/10$ as the unit and the scale of numbering the diaphragms.

(To be continued.)

ECONOMY IN THE PRINTING ROOM.

RESIDUES (*Sulphides*).

THOUGH the time is long gone by when the photographer, amateur or professional, who, instead of throwing his print washings down the sink, precipitated and collected the silver they contained, was looked upon as a marvellous genius, the fact remains that a large amount of waste occurs in a vast number of otherwise well-conducted studios, and in a few brief articles we propose again to draw attention to this waste and the best way of guarding against it.

In no part of photographic operations, perhaps, is there so much money actually thrown away as in the case of silver extracted in the fixing solutions. The subject has very often been alluded to, but the result of a number of inquiries recently instituted shows that those who make a trade of reducing silver wastes receive sulphides in very small proportion compared with the quantity of chloride sent, which appears to form the staple residue collected by the majority of photographers. The same fact is discovered when inquiries are made among photographic workers themselves, and no observation is more true than that this ineptitude displays a disregard of economy that is as blameworthy as it is foolish. "Oh, it is so easy to throw in a handful of salt and wait for the precipitate to collect, while there is such a bother with 'hypo,' with its offensive smells and general difficulty of collection." This is the usual kind of reply made when recommendations are given regarding hypo savings. We have been credibly informed that one photographer in a large way of business replied to a chemist who urged him to save hypo residues, "I understand! You want to sel-

some of your chemicals to me, but I am not to be caught." What a lamentable state of ignorance!

It is a fact that when the silver is precipitated by solution of liver of sulphur a very disagreeable odour is bound to be produced; but it should also be remembered that, in the first place, a decided excess is needed for this smell to be produced, and, in addition, that as the presence of excess is quickly shown to the eye by a milky appearance at the surface of the liquid, in the collecting out the nuisance need not be long endured.

As to the actual value of the silver obtainable from old fixing solutions, it is worth quite as much, if not more, than that obtainable from print washings, and as the solution used for fixing negatives can also be poured into the same receptacle a handsome addition to the value of the "waste tub" is easily made. It is quite true that the handling of these residues does entail a little more trouble than is needed with chlorides, but this can be minimised by collecting the hypo solution alone and rejecting the washing water. Perhaps five to seven per cent. of the silver obtainable would be so wasted; but that amount might be disregarded without compunction, unless where work on a very large scale is done. It is quite possible that a supposed addition to the bulk of the solutions to be treated, caused by collecting into the vats the first washing waters from the fixed prints as well as the "fixing" itself, may be largely accountable for the rejection of the whole plan of hypo residue collection, and if it should be so, and our suggestion to save the latter alone serve to produce a larger body of sulphide collectors, this article will not have been written in vain. It is further to be observed that the silver thrown down from solutions used for fixing gold-toned prints contains an appreciable proportion of gold also. We have been afforded an opportunity of seeing some residue credits received by a photographer who produces a large number of prints, and the prices given to him for mixtures of chloride and sulphide have varied from three shillings and eightpence to three shillings and tenpence per ounce, the last note we saw being dated June, 1889, and the silver allowed for at the higher sum named, that is to say, the metal obtained the price of fine silver, which, as is well known, is by no means usually realised by ordinary photographic waste. As to the operation of precipitation, it is just as simple as salting print washings. A quantity of liver of sulphur is purchased, and at once covered over with water to dissolve it and prevent its properties being destroyed by the chemical change produced by exposure to air. This is the foul-smelling liquid, but if kept in a corked bottle no nuisance arises. When the jar or vat is nearly full of hypo solution a little of this sulphide solution is poured in and the whole stirred. A little of the turbid liquid so produced is put into a cup and a drop or two of the sulphide added; if further dispersing of colour is produced an additional supply must be added to the vat and the process repeated. The silver will settle in a day, and the supernatant liquid may then be drawn off. If a large excess of sulphide solution has been employed, the smell of the liquid will be very strong; if a small excess only, no annoyance will be felt. If, however, this smell, owing to personal dislike to it or its proximity to the studio, should be too offensive, the best plan would be to oxidise the excess of sulphide by a little chlorine, most readily obtained from bleaching powder—"chloride of lime" solution.

In conclusion, we feel that the method of saving the silver from old hypo cannot be too strongly recommended, and if

once it is attempted as here described, the plan will be persevered in when it is seen how rich a harvest of valuable residue is obtainable, and at so little expenditure of time and material.

WHEN will the police authorities make full use of photography, or employ it under the best conditions? It is true that portraits of all prisoners are taken, but only in a very rule-of-thumb way, and usually by one of the prison officials, whose practical experience hitherto in *portraiture* seems as if somewhat limited. As a result, these portraits are often such vague or unrecognisable likenesses as sometimes to be misleading, or, if not actually misleading, such as to be of little value as a means of identification after the individual has slightly altered his appearance. If the portraits were taken by a skilled portraitist, as they are in some county prisons, instead of by inexperienced officials and after set rules, they would be of more use as a means of recognition. In the case of the portrait of a "party wanted" being published, the process employed for the production of the prints, or at least the results issued by it, are frequently quite inadequate for the purpose intended.

PHOTOGRAPHY can be made of inestimable value to the police authorities in almost every direction, but then it must be worked on a totally different footing to what it is at present. In the days of wet collodion its scope was somewhat restricted, but now the case is widely different. Though, so far as the police authorities are concerned, it is very much "as you were." Too much red-tapeism and military routine still rule in this department, so far as photography is concerned. We have had detective cameras now for many years. The name "detective" was first suggested by reason of the great utility of such cameras for detective purposes generally. They are employed in almost every direction except that of Scotland-yard.

ON the occasion of the East-end atrocities, last year, we alluded to the great service photography might have rendered had it been employed. Then we suggested that divisional photographers should be appointed in the same manner and on a similar footing to that on which divisional police surgeons now stand. If such appointments were made there is no reason why the photographer should not be on the spot with his apparatus as quickly as the surgeon. At the inquest on the unfortunate victim last week there appeared to be some doubt as to the exact position of the body, and this might eventually be of importance. Had a photograph been secured before anything was disturbed, there would have been no doubt whatever in the matter.

ANALOGIES of the subject of celluloid, which as a basis for photographic results is attracting a considerable amount of attention at the present time, it is matter for surprise that it is not employed for the production of mathematical scales. Every one knows the high cost of a really good engineer's or other scale in ivory, yet when once an accurate negative was taken a series of transparencies could be produced at a very low cost, capable of being attached to ivory, ebony, boxwood, &c., as the case might be, and the production of an intricate and elaborate scale would in practice be no more difficult than a simple open divided scale with the usual eighths, quarters, &c. For calculating scales, slide-rules, &c., it would be equally applicable, and, seeing that the original scale might be made on paper of large size, there is no limit to the accuracy and variety of matter that might be included. As to exactitude the finest details would rival those done by the most accurate dividing machine ever contrived.

CONCERNING "dark flashes," Mr. Whipple believes them to be an appearance due to the prints being taken in oblique light, and to be produced by successive reflection from the reduced silver forming the dark line on the negative and the upper surface of the glass of the negative. Professor Stokes, F.R.S., and Professor Curtis, of Harvard University, arrive independently at one and the same conclusion, viz., that the dark flash shown is really the path of a dead flash, that is, a vanished flash which has left a track of heavy nitrous oxide gas behind it in

the atmosphere impervious to the light of the flashes immediately following, and thus appearing opaque in the picture. Under any explanation a very interesting problem is thus before us.

THE FORTHCOMING CONVENTION.

THOSE manufacturers and dealers who intend availing themselves of the unusually excellent opportunity afforded of exhibiting their productions during the Convention week ought to lose no time in making application for space. Owing to the great number of members who have signified their intention of visiting London on that occasion, it is expected that the meeting will be very numerously attended.

Members who intend to read papers should at once communicate their titles to the Hon. Secretary, and the papers themselves must, in virtue of one of the laws, be in the hands of the Council so far in advance of the meeting as to enable their being got into print before the first day of Convention, which, we again remind our readers, is August 19.

COPYING WOODCUTS FOR THE LANTERN.

AT the meeting of the Photographic Club last week the subject of copying woodcuts in the different illustrated periodicals for lantern purposes was discussed. It was pretty generally conceded that the results are, on the whole, disappointing. As a rule, the slides, when projected on to the screen, appeared totally different from the originals, being both coarser and lacking in force and vigour. It was pointed out, however, that in many instances this was due entirely to the original from which the negative is taken. It goes without saying, that if the woodcut itself be roughly executed the coarseness of the lines will be rendered the more conspicuous according to the degree of amplification. The more general defect, however, is not the coarseness, but the want of force, or solidity in the lines themselves. This is not due so much to anything in the copying of the print as to the lines not being solid or uniform on the paper, but what printers term "rotten."

If an ordinary print, such as those in some of the illustrated papers, be examined by the aid of a magnifier, it will be seen that in many cases the ink on the lines is not uniform but granular, or rotten. This may be due to the block itself, but more often it arises from the printing and the paper. If the same block be printed in a fast machine on common paper, as in the case of some periodicals, the result will be totally different from what it would be if it were carefully printed in a hand press on a fine surface paper. The difference in the two prints would be still more marked if lantern slides were made from them and then thrown upon the screen.

In copying subjects such as those just alluded to, rapid plates should be avoided, as usually, unless great precautions are taken, they render the lines in the negative far from being clear and transparent. This quality is a *sine quâ non* in line subjects. Wet collodion is generally preferred for this work, but some of the slow plates specially prepared for copying purposes yield results which are in no way inferior, and they should always be employed. A MEMBER.

PHOTOGRAPHIC INDUSTRIES.—II.

THE FACTORIES OF THE LONDON STEREOSCOPIC COMPANY, LIMITED.*

CONCERNING work which was being executed during the time of our visit, and of which we made note, the following will afford some idea of the very great orders received. 200,000 handbooks, with collotype portraits of celebrities, for one of the leading advertising firms; another similar number, also with portraits, for a popular religious organization; 150,000 specially designed menu cards, for use at the Paris Exhibition; 100,000 views of a steamer, for distribution at the Exhibition (a first issue by one of the large Steamship Companies), and numbers of smaller orders all in course of preparation by this process. Woodburytype prints in great variety for advertising and publication work. Carbon opals, in sets of 10,000 of a subject, taste-

fully strutted and boxed ready for delivery for the American market, and in other sets for the home market as being issued by well-known advertising firms, were seen in course of preparation. In every corner lay piles of work in progress, all relating to large contracts which extend over months in their execution.

In Woodbury work they can readily finish and deliver 1500 to 2000 cabinets per diem, including mounting, spotting, rolling, and packing.

The staff, besides the manager, sub-manager, and staff of clerks, varies from eighty to one hundred *employés*, according to the season, and a notable feature in the Company's business is the number of old hands to be found in every position of importance. Some of the *employés* have been in the business since it started, rising step by step till they now are managers of their respective departments. Others again can record their twenty-five and thirty years' service in the same employ. The principal members of the Works staff live in the Company's houses adjacent to the works.

We have hitherto spoken only of the factory and its output. We complete this article by giving some account of the Company's two London establishments, viz., those respectively in Cheapside and in Regent-street.

The Stereoscopic Company was founded in 1850 by the late Alderman Nottage, in Oxford-street, where he carried on the business of a photographer and scientific apparatus dealer. He afterwards devoted his sole attention to photography, making a special feature of the well-known stereoscope. The present establishments in Regent-street and Cheapside were afterwards opened to meet the demands of a growing business. The old premises in Cheapside were rebuilt some ten years ago with every adjunct then known suited to the requirements of a photographic business, and are admirably adapted for carrying on the extensive wholesale and publishing business which the Company conduct from their City house, as well as meeting the requirements of their large private portrait connexion and outdoor operative work.

The building consists of a basement, with six floors above and two studios, one specially fitted for photographing trade samples and the preparation of subjects for reproduction by their photo-mechanical processes. This is considered a great boon by many of their City customers, who can personally group and arrange, it may be, a handsome suite of presentation plate, a group of feathers, or a show card of the latest thing out in bonnets. Upon entering, we find the retail sales departments for celebrity portraits, albums, &c., and in another department, amateur photographic apparatus, whilst a handsome show of photographic specimens of every style indicates the portrait department, where the first preliminaries are arranged. The Secretary's office and counting room complete the arrangements here. Special notice must be taken of the department which attends to outdoor photography, the Company having a justly celebrated name for its work in this direction. A staff of operators are constantly at work for their numerous City clients, now securing some interesting "light and air" objects, or the relics of a recent fire; again, taking the new business premises of some firm, or, it may be, a choice series of interiors or trade objects, machinery, &c., too bulky to remove to the special studios.

Ascending from the shop, we find on the first floor the wholesale and shipping publication department, and their new commercial department, each with its separate show room; in the former, stock being kept of all leading celebrity portraits, London and other views, fancy frames, opals, &c., from which orders can be executed, and town and country travellers draw their stock as required. In the commercial department will be found registers showing every process worked by the Company, either for publication or for trade purposes, and the samples being taken from actual orders executed are, naturally, more interesting than if specially prepared for show. A staff of draughtsmen are always at work preparing original designs and suggestions for their clients, a leading feature being the preparation of special photographic novelties for advertisers; numerous samples of large orders of this class which they have executed are to be seen. By the combination of lithography with their special processes an almost endless variety of style in artistic publications is obtainable. Special attention is given to the requirements of country photographers, who often have inquiries they cannot carry out for specialities in process work. The new photographic calendars for the ensuing

* Concluded from page 472.

season are specially worthy of notice. The shipping department for filling indents for photographic apparatus, chemicals, &c., meets with all due attention. The floors above are devoted to handsomely furnished reception, waiting, and pressing rooms. The board rooms and general manager's office, artists' and operatives' rooms, &c., each specially arranged for its specific duty, with an efficient staff in every department. As now arranged all the official work of the Company and all matters of a commercial character or wholesale transactions are conducted from the City house.

At the West-end establishment of 108 and 110, Regent-street, we find a totally different class of business, conducted in keeping with the requirements and tastes of a West-end aristocratic *clientèle*. The present premises, although not specially built for a photographic business, are well adapted for the multifarious requirements of the Company, their show-window being one of the recognised features in this popular thoroughfare, for here is displayed the "very latest" thing out, whether it be the last picture of a Royal Princess and her spouse elect, the popular actress in her latest character, or the last new aspirant for literary fame—all appear in their turn in the ever-changing kaleidoscope of their show window. Beyond stating that we found the premises in splendid working order, we shall not enter upon a detailed description, for we were informed that we should shortly have an opportunity of describing the new premises about to be erected by the Company, which in facilities for conducting business and comforts for their clients would surpass anything hitherto attempted. In order to accommodate their increasing West-end trade, the Company have secured the adjacent corner block, and will immediately proceed to pull it down and erect thereon a handsome building of six floors, fitted with every modern appliance, including American patent elevators to every floor and studio, electric lights for all purposes, and the latest scientific and artistic adjuncts in their studios. We may not at present enter more fully into this projected works, but hope before Christmas to be able to speak from actual inspection of the new premises. The business carried on here, as we have said, is chiefly with the aristocracy and West-end families. It is here that all the portraits of celebrities are taken which the Company publish from time to time, and if their studio walls could speak, some interesting reminiscences might be gained of how this and that "Royalty" behaved, what members of Church and State were most easy to photograph and which were the worst sitters, which celebrated beauty had the most negatives taken and which leading actor or actress looked best in their make-up, and what queer oddities in the way of little men, big men, fat men and lean, have been seen to pose in these studios. To look around their walls is like glancing at contemporary history—the familiar and noted faces of the celebrities of the age are so numerous. We were much interested in the direct life-sized heads which by the aid of a 30×24 camera the Company are making a speciality of. They are truly admirable.

Upon entering the premises one is struck with the range of enormous albums displayed. These are found to be classified. Collections of all the published portraits of celebrities issued by the various photographers. And probably the largest collection of views of any one place ever taken are the Company's London series taken by their own artists. The choicest novelties in photograph frames are there in profusion, from the tiny midget to the largest size used; whilst of albums for the drawing-room table, or presentation wedding gifts, and choice mementoes to tempt the tourist visitor, there is no end. Their private portrait business is on a par with that of their celebrity publication, and of equal importance is the Amateurs' Photographic Department, which from its rapid growth is the cause of their needing extended accommodation.

Commenced a few years ago by their throwing open the secrets of the profession to all who cared to read, and offering free lessons in photography to every inquiring amateur, this branch has grown under the Company's fostering care till it probably excels that of any other high class business in London. By a liberal system of exhibitions, in which prizes both in cash and medals were given by the Company, an enthusiastic interest was aroused, and a constantly increasing connexion formed.

We must on no account forget to mention the Amateur Photographic Department of the Stereoscopic Company, which, since its origin six years ago, has been under the management of Mr. Butler

Humphreys, and which has, we believe, grown year by year until now it is one of the largest depôts in England for supplying every conceivable requirement to amateurs and others. It is quite impossible to give any adequate idea of the variety of photographic cameras, lenses, instantaneous shutters, hand and detective cameras, &c., &c., made and sold by this firm, but even a cursory glance at their two-hundred-page list, noticed a fortnight ago, will at once convey an idea of the immensity of the business. There is not the slightest doubt that much of the popularity of amateur photography is due to the enterprise of the Stereoscopic Company, who have now for several years had a large studio and a suite of comfortable dark rooms specially reserved for amateurs, where they can not only develop their own plates, but can receive very practical instruction in any branch, from the most elementary to the most advanced, which is given by a gentleman retained specially for that purpose. These lessons are, in nearly all cases, free, charges being made only in the case of non-customers. These courses of instruction are, we understand, given by appointment only, and so great has been the demand upon the Company during the present season that would-be learners have, in many cases, had to make appointments weeks in advance.

The Company's well-known trade mark of the "Black Band," which encircles their lenses and dry plates, is now a recognised standard of excellence, although when glancing round the well-stocked cases and shelves we noticed that the Company does not by any means confine themselves to their own products, but keep a large supply of plates, &c., by all makers.

We were particularly struck with some very fine specimens of negatives taken on the new Carbutt films, which were shown us by Mr. Humphreys, who stated that the demand had been so enormous that Mr. Carbutt found it quite impossible to supply them in sufficiently large quantities.

The affairs of the Company are now conducted by a Board of Directors, of which Mr. Howard J. Kennard is Chairman, and Mr. Charles G. Nottage Managing Director. The practical control and working of the Company's three establishments is under the care of the General Manager, Mr. J. Lillie-Mitchell, to whose courtesy we are indebted for conducting us over the works.

PORTRAIT PAINTING AS APPLIED TO PHOTOGRAPHY.

[A Communication to the Birmingham Photographic Society.]

It is with great pleasure I meet you again after the elapse of another year, that I may be able to add my mite towards helping you, if not with photography pure and simple, at any rate with regard to art in connexion with photography. It will be understood by all that the treatment of so large a subject in so small a space of time as this paper must necessarily be, can only be regarded as suggestive. Since promising this paper I have had misgivings, viz., to make it interesting to you and its practicability, for without some previous knowledge of the art of painting I don't really see how you will be able to apply it, but some good may be obtained if I can only make it clear, so as to guide you in recognising good work from bad. Again, this paper which I am about to read to you this evening is devoted entirely to oil painting. Water colour, pastels, black and white, will have to be left for a future occasion.

Now art, i.e., painting, unfortunately with regard to photography has not kept pace in proportion as science has done, and quantity is but a poor substitute for quality. We have had, and are having, quantities of the so-called portraits painted in oils, frame included, for 25s. Now, what are these paintings? Why, no paintings at all. They are only photographs smeared over with a little dirty oil somewhat tinged with a little pink for the cheeks, and a little brown for the hair, and so on; and all this so that the *photographs* may be seen through, because the perpetrator of this vile rubbish is incapable of keeping a portrait if he had to paint it legitimately. Further, when the painting, or rather I should say the so-called painting, is completed, it is framed. Ah! and in such a frame (German gilt), which at the expiration of twelve months it will be no doubt as black as my hat.

Now this one fact alone suffices to show how photographers themselves have degraded their own art. Some photographer may say, We have got to live, and we find a ready sale for these so-called oil paintings. Well, I think the sale would have been just as good, if not much better, had a good enlargement been made carefully finished in black

and white, neatly mounted in a white mount, and finally framed in a plain oak frame with a gilt bevel inside. I feel sure the demand would have been just as great, if not greater, besides which the public taste would have been elevated instead of being debased. And what has resulted from all this? Why, artists standing apart, they have watched with sullen jealousy its progress, and marked with satisfaction its deficiencies in some of the essentials of their art. Meanwhile, scientific men have devoted themselves to simplifying the processes and improving the machinery requisite for the practice of photography. Competitive commerce has contributed its quota in cheapening the materials and apparatus, and fascinated by the facilities thus afforded of securing pictorial representations of anything and everything animate or inanimate, thousands of votaries have given themselves up to the new study with an ardour and enthusiasm which has only been equalled by their utter ignorance of true art or its requirements.

I have somewhat strayed from my subject, but will at once lay before you the principles of harmonious colouring. To produce good results in colouring, it is not simply necessary to possess the technical skill to imitate with some success the colour of the original; but a first requisite in the education of the painter is a knowledge of the value of his colours, of their relations and harmonies, and of their effects in combinations and juxtaposition.

As in music, an utterly inexhaustible world of beauty and delight results from the varied combinations and sequence of seven different notes, so in painting, a source of beauty scarcely more limited results from the combination and arrangement of three primary colours. Again, in painting as in music, the beauty does not consist in any one colour any more than it does in any single note, but in the relation it is made to bear to others.

It is true that the province of the portrait painter is, perhaps, more limited in this respect than that of the painter of works of fancy and imagination, as in the case of historical or classical painting, or that of the landscape painter, whilst the scope of the colourist of photographic pictures is *most limited* of all. Still, without some knowledge of the principles of harmonious colouring, he can scarcely hope to even approximate to the best results. And whilst in portraiture in many points the painter is bound to reproduce as nearly as possible the colours inherent in his model, yet in the choice of colour for draperies, background, &c., more latitude is admissible; and here he will avail himself of such analogies or contrasts of colour as that whilst producing a harmonious whole give value and effect to the colours of the complexion.

Straying from my subject, I leave colour to comment upon character, which should be one of the greatest aims when painting portraiture. Did you visit the Art Gallery when we had exhibiting there that splendid collection of portraits by our great painter, George Fredk. Watts, R.A.? If so, you must have been struck by the individuality of each portrait. What marvellous character! You felt you were standing face to face with the individual himself; you could read in those portraits the lives of the men. Allow me to say that this is portrait painting, portrait painting of the highest order. It is this that Tennyson has so gloriously described in *Lancelot* when he says:—

"As when a painter, poring on a face
Divinely thro' all hindrance, finds the man
Behind it, and so paints him that his face,
The shape and colour of a mind and life
Lives for his children, ever at its best and fullest."

Now my object for speaking upon this subject is the fact that photographers have a propensity for obliterating all character; they want it to look clean and nice, and this must be done at the expense of character if necessary, and in most cases is necessary, and must be sacrificed for the *l. s. d.* Now this should not be, for all of you remember Cromwell's words when about to have his portrait painted. He said, "Paint me as I am, *warts, wrinkles, and all.*" Yes, and that is right, but of course there is the other extreme which care must be taken to avoid, not to exaggerate anything, because if you do, you at once launch out into caricature, for the caricaturist avocation is to exaggerate—for example, a man has a large nose, make it larger; a slight cast in one of his eyes, give him a good wholesome squint, and so with the warts, wrinkles, &c.—you must not make them into wens and furrows, but still they should be there; you have no right to obliterate them. This brings me to the matter of retouching. Now retouching is a very great adjunct to the photographer when legitimately used, but when we see photographs of individuals which have the appearance of having been taken from an inanimate statue of carved yellow soap rather than from the living individual, one regrets that the art of retouching should ever have been known to photographers. "Use and not abuse" is the moral to be here applied.

The source of all colour is light, and a beam of white light is divisible into three separate rays—blue, red, and yellow. These constitute the three primary colours, and by their combinations every possible hue is attainable. White light when decomposed by passing through a prism gives what is called the solar spectrum, which consists of the seven colours seen in the rainbow arranged in the following order:—Violet, indigo, blue, green, yellow, orange, and red, and hence it was at one time supposed that each of these was an elemental colour. Subsequent observation has shown, however, that all but blue, red, and yellow were formed by the overlapping of each other.

These colours in their varied combinations are called hues. These hues when weakened by admixture with white are called tints, and when deepened by admixture with black are called shades. The various gradations of tints and shades of one colour form a scale. The presence in happy proportions of the three primary colours or their combinations in a picture produces harmony. Any two primary colours mixed in certain proportions produce a secondary colour which is complementary to the remaining primary colour; thus the mixture of blue and yellow produces green, which is complimentary to red; the mixture of yellow and red produces orange, which is the complimentary of blue; the mixture of red and blue produces purple, which is the complementary of yellow. These combinations may be carried to an almost unlimited extent with similar results. Thus the combination of any two secondary colours will produce a tertiary, which is complementary to the remaining secondary. For instance, the mixture of orange and green produces citrine, which is complementary to purple; purple and green produce olive, which is complementary to orange; purple and orange produce russet, which is complementary to green; and so on.

This statement of the relations of colour is not arbitrary, nor the result of taste or fancy, but is based on absolute inherent principles. They exist as a physical necessity of the organs of vision, as may be ascertained by a few simple experiments. Who amongst you haven't tested this by trying to obtain the 1000*l.* reward offered by Pears if you can prove this principle to be incorrect by looking at those discs—red, blue, and yellow?

This principle applies to every variety and combination of tint; if a red inclines a little to yellow as in scarlet, then the complementary green will incline a little to blue and become a bluish green. If, on the other hand, the red inclines a little to blue, as in crimson, the complementary will incline a little to yellow and become a yellowish green. These combinations may be so multiplied by gradations so delicate that it is impossible for me to enumerate them. But if any of you would like to test the above statements, I am sure you will find it very interesting and can be carried out at a very moderate cost. Procure then a box of wafers of varied colours and a piece of white cardboard. Place one in the centre of the cardboard, look at it for about half a minute, then transfer the sight to the clear part of the cardboard, when its complementary will appear. If you find it does not, don't rush off to Pears for the 1000*l.*, but take it for granted that you are colour blind. If you do see it—try it on a Sunday afternoon after dinner—you will find nothing so soothing and conducive to a quiet Sunday afternoon's nap. Each pair of colours, consisting of a primary and its complimentary secondary also, presents special contrasts peculiar to themselves. Thus blue is the coldest colour, and is also the most retiring; orange, its complementary, is the warmest colour, and the most advancing. Every combination of colour as it approaches to orange or blue is warm or cold in its effect, and has the appearance of approaching the eye or receding from it.

Yellow is the brightest colour and most allied to light, while its complementary, purple, is the darkest of colours. Red is the most positive and exciting of all colours, whilst its complementary, green, is the most soothing of all colours. Complementary colours in juxtaposition mutually enrich each other, and produce what is called the harmony of contrast. Thus purple and yellow of equal purity and intensity become each brighter from contact with the other, the yellow becoming intensified by the extra yellow rays reflected by the purple, and the purple gaining an accession of richness from the purple rays given out by the yellow. From the same cause neutral tints placed in juxtaposition with full hues appear to be tinged with the complementary colour of such hues. Thus, grey placed in juxtaposition with red will assume the appearance of greenish grey, green being the complementary of red.

Colours not complementary to each other are mutually injured by contact. Thus blue and purple placed together are both injured, the blue becoming greenish from the yellow rays emitted by the purple, and the purple assuming a russet tinge from the orange rays reflected by the blue. Besides the effect produced by contrast of hue, that resulting from contrast of intensity is to be considered. If two tints

of the same colour, but of different degrees of depth or intensity, are placed side by side, the deep tint will appear still deeper, whilst the light tint will appear still lighter, the difference in intensity appearing greatest at the points of contact. I have said before that the laws which regulate harmonious colouring are not dictated by fancy, but are based on inherent and absolute relations.

In conclusion, I will here remark that if you will carefully observe nature, it will afford you many pleasing illustrations of harmonious colouring. A striking illustration of the harmony of analogy is seen in the beautifully blended and graduated colours of the rainbow; and again in almost every landscape, where the blue of the distance blends with the cool greens and greys of the middle distance, and these merge into the warmer greens, yellows, and browns of the foreground; or, again, view another landscape when the sun is setting and is flooding and beautifying the whole scene with its golden light—what are its shadows? Have you ever reflected when beholding them? They are purple. With instances of the harmony of contrast nature teems in every garden, field, and moor, as the damask rose with its yellowish green leaf, the scarlet holly-berry and its deep green foliage; and where is the man who has ever crossed a common who has not seen the almost unvaried mingling of yellow gorse and purple heather?

A proper understanding of these principles which I have briefly indicated will enable the colourist, whilst preserving fidelity to nature in the points absolutely inherent in the model, at the same time to so manage the draperies, background, &c., as to give value to the complexion and produce a perfect and harmonious picture.

G. J. SEUSCHALL.

INSTRUCTIONS FOR TAKING PHOTOGRAPHS OF LIGHTNING.

At the meeting of the Photographic Club, on July 10, I was requested to draw up some instructions for taking photographs of lightning, so that photographers, professional as well as amateur, might, in the event of a thunderstorm, be prepared to obtain some really good photographs.

If the following brief instructions be complied with the photographs of lightning will possess scientific value:—

1. The camera should be focussed during the daytime to some distant object, and a mark made on the camera, so that at night it may quickly be adjusted when a storm is approaching.
2. A rapid rectilinear lens with full aperture should be used.
3. The camera should be directed to the part of the sky where the lightning is most likely to occur.
4. The camera should be firmly screwed to the tripod stand.
5. It may be necessary to tilt the camera slightly, especially if the lightning be mostly in the zenith. If this be done a note should be made of the inclination.
6. A portion of landscape, roof, chimney-pot, &c., should, if possible, be included on the plate. If this cannot be done the top of the plate should be carefully marked before it is removed from the dark slide.
7. The exact time of each flash, the interval in seconds between the lightning and the thunder, and the point of the compass in which the flash appeared should all be carefully recorded.
8. It is desirable that there should be only one flash upon each plate.
9. If circumstances permit, two cameras should be used—one fixed on the tripod stand and the other held in the hand—and two separate photographs obtained of the same flash.
10. It would be very interesting and valuable if two or more photographers could obtain pictures of the same flash from different points of view; by this means it might be possible to determine accurately the distance of the flash, and also its movements in the atmosphere.

The Royal Meteorological Society (30, Great George-street, Westminster) will be glad to receive copies of all photographs of lightning that may be taken; even apparently poor ones often contain useful evidence.

WILLIAM MARRIOTT, F.R.M.S.

COPYING PAINTINGS AND WORKS OF ART.

IV.

SUFFICIENT has been said as to the modes of treating oil pictures which have to be copied, but a few lines may be devoted to the treatment of water-colour work. Much could be said here of the excessive differences in manner and style of the modern school of water-colour artists, and there is no greater test of skill and judgment on the photographers part than that of rendering equally well the works of such men, say, as David Cox or Sam Bough, in landscape, of the deceased artists, or of such living

men as Sir John Gilbert, Burne Jones, or Mac Taggart. Everything about the work of all those true artists is so different the one from the other; not only in the methods of doing their work, but in the entire feeling, which is got in as many different ways as there are men. The very texture of the paper on which they were painted contributes to assist the finished result, and yet we photographic copyists must so attune our efforts to theirs as to produce the most perfect similitude, and show the difference of the work of each artistically.

I recollect copying the original study in black and white on grey paper of the late Sir George Harvey, P.R.S.A., for his famous picture of *The Castaway*. This was done the same size and on similar paper, and printed in carbon. When the proprietor, an artist himself, was shown the original and copy together, he had the greatest difficulty in distinguishing the one from the other. These examples are only stated with the purpose of showing, or trying to explain, that the same quality of negative which would suit, say, one of the delicately washed beauties of David Cox would be utterly valueless for one of Gilbert's or Burne Jones. Each person may make his negative in his own way, but there must be that difference in quality which will distinguish the handling as well as merely represent the subject. With framed drawings they may have to be taken as they are, and, if so, the same rules would apply as in the case of oil pictures; but if the drawings are in folio or loose, then the handiest and best way, where practicable, is to put them into a printing frame larger than the picture to be reproduced, which must be supplied with a clean spot and speckless plate glass, against which the water colour can be pressed quite flat. This mode applies as well to all drawings on paper as it does to photographs and other things of that nature; it at once preserves them from all chance of damage, keeps them quite flat, and renders them much easier to handle. It is probably the next best to getting them into optical contact with glass, a thing which cannot be done with water-colour paintings or drawings. If this method is impracticable, then, if unframed, the next best way is to stretch them on a drawing, or other flat board, with thin laths, through which tacks may be driven without them touching the object which is being copied; this method also helps to keep the drawing flat. Where, however, the picture can be so treated without injury, if it be damped on the back and glued or pasted on the board round the edges only, it will strain as tight and flat as can be desired after it dries. Absolute flatness is a *sine qua non* for perfection in this kind of work; this, however, would be better done by a professional mounter.

A few notes may also be put down as to the lenses beyond what has been said. To show that this is necessary, it need only be mentioned that I was shown the copy of a design the other day, taken by one of our foremost firms, which was excellent in every respect, but that it was not true in the straight lines which bounded it, a defect which the producer did not see until it was pointed out to him, and even then could, with difficulty, be made to understand that with the longest focus portrait lens, which was the character of instrument he used, the production of perfectly straight and square lines was an optical impossibility. That tool, the square, had to be resorted to, in order to prove the truth of the objection, which, of course, it quickly did, and the subject being one necessitating absolutely straight and square lines, it was found necessary to use another—a symmetrical doublet—constructed for such-like purposes. Our tools for copying have no judgment—we must supply that; they can only help us in the purely mechanical part of the work; we must supply all the skill and reasoning powers.

In the case of statuary a totally different rôle must be adopted. Take the case of an object, a figure, say, or a group in marble or bronze. With marble the whole effort must be directed to get such a quiet, subdued tone over the white colour of the material that the most delicate shadow of a shade shall be represented in addition to getting out of it—if it be a portrait, figure, or a bust—that particular view which shall most perfectly display the likeness and character of the personality represented in mimic form, always keeping in view the fact that the marble representation is not like a living figure. In one respect, at least, it cannot assist you, in the choice of the best light and shade, as its animate prototype may do. That is the especial duty of the photo-artist to ascertain, and if it be borne in mind that shadows and shade have the principal part to play in bringing out the character and beauty of the object, the high lights appearing only as points compared with the mass of semi-tones, it will be found that to produce the effect the sculptor wishes to convey is quite as difficult a bit of work as can be attempted. It is, indeed, very similar to the efforts of the engraver, who, by drawing and using a series of lines, or dots, or stipple, or by any of the many ways which they adopt to translate the form and colour of a painting, or other work of art, into a representation of the object in another medium, which shall at the same time be not so much a mere triumph of his skill, but rather a near transcript of the

work of art sought to be represented into another artistic language—that of light and shade apart from colour—and yet conveying the painter's meaning rather than that of the engraver.

It is almost futile to attempt to get this kind of detail or effect on sculpture in the open air; there we must be content with what can be got in the best time of the day to suit the subject, and it will be found, as a general rule, that a quiet, grey day is much better suited for such work than a bright or sunshiny one, the delicate qualities of the work being more easily recorded in the duller light; the bright or sunny light has a strong tendency to produce patchiness, causing the high lights to become too pronounced, while the deficient quality in the shaded portions becomes painfully visible. In the studio all this may be avoided by a careful disposition of that light which is wanted to produce the effect desired, and the exclusion of all the rest which would go to spoil the appearance of the finished copy. The sculptor himself knows this so well that he spares no time or trouble to place his work in his own studio in the most effective position, and in practice the best results which have been attained in this direction have been those taken in the sculptor's own place, with an extemporised or arranged background; but of course this is not always practicable, conditions of space generally interfering with the possibility of the camera seeing as the human eye does.

The darker colour of bronze statuary necessitates a considerably different treatment, photographically, to bring out the effects aimed at by the sculptor, which are rarely so delicate as are those in marble; strength, stability, stateliness, and vigour seem more adapted to be expressed by the sculptor when he chooses to present his ideas represented in this noble metal, combined with a certain feeling of grandeur which marble rarely shows, at least in this country. It may be different in the sunny South, but it is more with work in our own islands that we have to do in these papers. To give, then, the true effect to works of art in bronze, a slight sacrifice of the delicacy insisted on for marble may be accepted for the former, and stronger and more effective lighting may be displayed in the resulting photographic copy. A greater breadth of light and broader and more effective shade tend, with this class of art, to bring out what is attempted to be shown in those more massive and effective works which are modelled for "creation in ever-during bronze," which, when left, as it ought to be, in the natural colour it assumes on exposure to the air, is in its own way a magnificent medium to convey the sculptor's thoughts, ideas, and sense of it—maybe the sublime, or only the beautiful, but, still, his conceptions as nearly as possible with the materials he has to work with, for it is certain that no artist in the true sense of the word was ever yet satisfied with his own production. He always sees something which he could have done to make it nearer his ideal. I said when left in the natural colour; in saying so, it was with no wish to decry the opinion of those having different tastes, but having in view one of the prominent London monuments where the bronze figure is gilded, by which treatment what might have been a noble memento is almost reduced to the level of a piece of showy gingerbread. Compare any of the marble groups or bas-reliefs around the base with the central figure, and there will be seen the difference between true and meretricious taste and art. That, however, has little to do with the copying of them as works of art, but it has something, for while those subsidiary portions of a great national monument can be beautifully reproduced, the main and central figure is hopelessly out in the cold, so far at least as photographic representation is concerned.

In dealing with those productions of the sculptor which are not in the round, as it is technically called, but in slight or fuller relief, from a ground generally named as *bas* and *alto-relievo*, using the Italian phraseology, a considerable difference in treatment is necessary. In the *bas-relievo* we have but a slight, and in the case of some of the finest of such works an extremely slight, rise above the level of the marble slab on which the work has been carved, so delicate in some instances, such as in a head by Donatello, to seem more like a shaded drawing than the labour of the chisel and mallet. To give the true effect to such pieces of refined skill requires almost as great delicacy in the photographic copy as exists in the original, and it is here that a knowledge of the value of shade comes in. Such a work, if treated in the studio as a picture would be, and as it has been shown necessary to do, would be simply destroyed. The only way by which the effect the artist wished to convey can be had is to get the object so placed that the light shall come from behind and from the side; if it is anything like the Donatello head rather from slightly above, so that the image is limned in shade as delicate as the work itself. This may be taken to be the correct method of treating all works in low relief where the human form divine is represented, for with any other it is impossible to catch the drawing of the face or figure. It will be seen at once if a flood of light is let loose on the profile or body of such work that it becomes almost invisible from the want of shadow, and further, in these examples in slight relief, the shade should rather be

accentuated than diminished; this can only be done by careful treatment of the light, as suggested above, and shutting off all that tends to destroy the effect sought to be gained; by so doing a most careful and perfect copy can be had from such works of art, and in no other way.

With works in high relief a different kind of treatment must be adopted, but one which the character of subject will govern to a large extent. The forms exhibited in such cases are more pronounced from their higher relief, and the consequent resulting shadows tell their own tale in a more marked degree. In the studio the arrangement of the lighting becomes a very easy task, the principal care needed being that of securing an absence of spotty high lights, and, in exposure, to see that the lens, so to speak, probes the depth of the deepest shade and records it. Out of the studio, in the open air, the getting of perfect reproductions is often a matter of considerable difficulty. Two of probably the finest pieces of such work by any English artist I had occasion to do, and they can be taken to illustrate the remarks; they are by the late Alfred Gatlley, of Chester, I believe. The slab of marble on which each is carved is about twelve feet by seven; the subjects, "The Song of Miriam" and "The Destruction of Pharaoh and his Host in the Red Sea;" these are situated on a mausoleum or tomb in the open air, and are about a dozen feet from ground to lower edges, and situated about due north and south. To get the proper effect here with the one looking south it was found necessary to take the negatives at about an hour and a half after sunrise, and about the same time before sunset. At any other time the effect of the magnificent carving was almost lost; we might call that arranging the light in nature's studio. On the north side similar precautions were necessary; we shall say nothing of the scaffolding, &c. This is quoted only to show the care necessary in copying works of art.

W. H. DAVIES.

JACK AND I IN NORWAY.

VI.—IN THE ROMSDAL ON TO VESTNAES.

WHEN prowling around Fladmark on the Sunday we came upon some immense ant hills, and it was very interesting to watch them hurrying along in their never ceasing toil. They don't seem to have any Sunday off, or if they have it was not the same as our Sunday, for here they were at it as hard as they could pelt. Jack told me a good story about a friend of his, who, when touring once in Norway, by mistake sat down on one of those ant heaps to eat his lunch. He was not long finding out that he was in rather a hot place, for hundreds of these busybodies scrambled away up the legs of his trousers, and he began to feel so uncomfortable, that he naturally looked round for the cause, when he observed the mistake he had made; then jumping up he stamped along the road to the station (as he was going by rail to Bergen), thinking that a vigorous walk would free him of the pests. He felt rather better as he took his seat in the train—two gentlemen only were in the same compartment with him. By-and-by the legion of imps were adding torment, at last it became so intolerable that after explaining the matter to the gentlemen he asked them to allow him to take off his trousers, to see if he could get rid of the ants by shaking his garment out of the carriage window. Permission was readily granted, when down went the window and out went the trousers, but, alas! when fluttering in the breeze they got caught in the telegraph wires and out of his hands they were torn. Aghast he stood panting without his pants. Although the case was serious, an audible smile from his companions could not be resisted, the situation was so ludicrous. By good luck he had in his traps an ulster which came down close to his heels, with this cover-all he disguised himself until he got to his hotel.

One of the gentlemen playfully remarked that if any of his friends recognised him in his present condition they would certainly think he had been to his *uncle's*, and would never dream for a moment of the *ants*.

They were adding a new part to the inn here at Fladmark. This gave us an opportunity of studying their method of building, which was very interesting. The house proper was all built of wood, and dovetailed together with not a nail used in the structure until they got up as far as the eaves, where nails are used for the overhanging work; in some parts where the wood must be bound together wooden pegs are used. The crevices in the wood are all carefully packed in with dry moss. The foundation of the house, and for half a story above ground, is built of stone, the upper part being left open to hold odd things, much the same as a cellar would be used by us, only it is arched and without any doors, and over this the wooden house is erected.

To make the roof, the bark of trees is first spread all over, they then cover this with soil, and sow seed upon it, so that most of the roofs one sees here are thickly covered with grass. They say that a roof so made keeps the house cool in summer and warm in winter. On many of the older houses we saw fir trees growing, some of them as high as five and six feet. They had evidently sprang from the stray seed that had been blown on to the roofs and left to vegetate there.

We photographed many of these houses as types of the Norwegian homes, a variety of which we found ready to be taken all along the valley.

Stones that the tempest had torn from the face of the mountains o rock and precipitated into the vale a long time ago lie scattered over the flat in thousands. They are of such dimensions that in the distance many of them could be mistaken for good-sized houses. The road in many places twines out and in between these boulders that stand twenty or thirty feet high, wearing green caps of moss and grass, with here and there a fir tree standing up by way of feather. We got some picturesque photographs of these rocks, with a figure or two grouped at the base showing the height by comparison. The Government have utilised many of these rocks to some purpose by using them as telegraph wire supports, so that for miles the wires are fixed from one stone to another, thus dispensing with the use of posts.

The roads in this valley are well kept and fairly flat. When once the authorities cut a road and put it into perfect order, it is then by law left for the farmers in the neighbourhood to keep it in order and repair. All along the way is to be found wooden posts about the height of ordinary milestones, on which is marked the farmer's initials, and the part of the road that has been set aside for his special care.

Waterfalls in the Dal are to be seen every few hundred yards, and that for miles on end, rushing from the top of almost perpendicular mountains three, four, and five thousand feet high. These falls are fed from the snow that lies thickly bedded on the top. So thin in volume are many of these streams of water that they get blown away into prismatic spray during descent, and long before they reach the bottom. The perpetual swish of these falls is heard for miles and miles as we drive along.

Up till now the weather had been beautiful, but on our last day in this, the most romantic of spots, the rain came pelting down, and heavy mists capped the mountains, moving on under the pressure of a strong wind, changing form and tint every minute. We caught some of these effects as they chased along, but the weather was not propitious for anything like well-lighted pictures.

The weather got to be too bad for anything, so we packed up and made straight for Naes through a pelting storm that lasted all the way, but thanks to our waterproofs and rugs it never reached further than our faces; in fact, we felt the spanking through the elements more exhilarating than otherwise.

We had no sooner reached Naes than out came the sun and all was bright again. With the exception of this one day's wind and rain we had uninterrupted fine weather during the remainder of our stay in Norway.

We had promised the landlord of the Bellevue to take a negative of his house on our return; this we did along with one or two other general views of the places from Naes to Vestnaes on our way to Söholt.

The distance by water from Naes to Vestnaes is some twelve or fourteen miles, and we reached the latter at nine o'clock in the evening. Our programme was to cross the hills to Söholt that night, a distance of twenty English miles. On leaving the boat we had a ten minutes' walk up hill to the station-house. We found it rather a better class place in appearance than any of the inns we had yet visited (not including the regular hotel). It looked like a good-sized farm built in the form of a square, with so many doors to it that we were puzzled which was the one intended for tourists. We walked all round investigating, and not a living soul came out to direct or make it more easy for us, and they must have seen us from the windows. We hammered at door after door till we got an answer, and then we found the apartment that was set aside as the public room. On our entrance two young ladies were sitting there (we found this a usual custom), they no sooner saw us than they hurried from the room without saying a word. We were rather astonished at this, for we were usually greeted by the female portion of the household at the stations, and in most cases they had a little English to smooth the way for us. In this case the young ladies were peculiarly English-looking in dress, arrangement of hair, and general appearance, and we thought it strange that in the most civilised house of the class that we had visited we should be treated with the least civility.

But it seems that the keeping of stations and the hiring out of horses and conveyances is a business that the farmers would rather be without, for they are bound to run at fixed rates as arranged by Government, and these rates are very low for the distances to be travelled. The authorities, however, have decided where the stations shall be situated best for the convenience of travellers, and the inhabitants of the district must supply or see that the necessary horses and conveyances are supplied. The *faste*, which means a fixed station, must keep a certain number of horses. When you come to such a station they will at once produce their day-book; by reference to it you will see how many horses are out. If all are away you will have to await the return of one; but there are usually horses at the station, and you get supplied at once. You then enter your name and destination in the book with number of horses, &c., for the information of the next comer.

As no one about seemed to be able to speak English at this place, we arranged by signs, as much as anything else, to get a very comfortable meal in the shape of a meat tea before starting. Then, in the midst of a most unintelligible series of orders and directions to the boy, who did not seem to understand a single word, out came the two young ladies who had disappeared so suddenly on our entrance, and in the most fluent English said that the road we were going was very rough, and that we had better stay till the morning, as it would take the greater part of the night to reach Söholt.

Jack explained that we had to catch up a boat at Söholt on the morrow, and, thanking them for their courtesy, said we were forced to go to-night.

But I could not help thinking that if our young friends had only come forward a little sooner, and had not been so tardy with their English, it would have been easier for us, and it would not have done them much harm.

MARK OUTE.

COMBINATION PRINTING.

FROM time to time we have questions sent to us by our correspondents asking for some method of making a combination print from two or more negatives. As the matter is of some importance, and as the most pleasing artistic effects can oftentimes be produced by such combination printing, it may not be out of place to describe briefly the methods followed and the mistakes that are to be avoided. This class of printing is alike useful to both professional and amateur photographers. A landscape may be taken in which some part of the picture is not agreeable or will not print correctly from lack of ability to focus or otherwise. A fine view of a river, with hills beyond, might be marred from the fact that in obtaining a good focus of the distance the foreground is indistinct, and the printing of it produces nothing but a blurred appearance. Under such circumstances, if two negatives are taken, one of the distance and another of the foreground, they can be combined in printing, and a harmonious picture will be obtained. Again, a pretty landscape may be utilised as a background for a figure portrait or for a group, and some of the most artistic and attractive pictures we have seen have been made by just such combinations.

The beautiful effects of printing into landscape clouds from negatives specially taken for the purpose must have been noted by every one interested in the artistic side of photography. Indeed, a landscape picture without cloud effects is lacking in just that feature that makes such views most attractive to the eye, and these effects cannot often be obtained at the same time that a good negative of the landscape is secured. In such cases double or combination printing is one of the most desirable resources of the photographer. By using a yellow glass screen in front of the lenses the superior actinic effect of the sky can be modified, and clouds that would give over exposure under ordinary circumstances can often be obtained on landscape negatives, but, as a general rule, landscape negatives taken without special precautions give perfectly white skies in the printing. Furthermore, it often happens that when the clouds are particularly beautiful, the light effects of the rest of the landscape are unattractive and commonplace. It is, therefore, almost always best to print clouds into a landscape from specially prepared negatives. But one very important circumstance must be considered in all cases of combination printing: the lighting of the objects in both negatives must be from the same direction. If this is not carefully considered the most inharmonious and startling effects will be produced in the prints from the combined negatives.

The method of making these combination prints varies a little according to the particular combination to be made. When clouds are to be printed into a landscape, the negative of which is cloudless, the first thing to consider is the direction of the light in each negative in the combination. A print of the landscape is now made upon albumen paper, and then carefully cut at the skyline of the print. That portion of the print which covers the landscape section of the negative is now fixed to the cloud negative, the albumen side to the film, and when exactly in position is fastened with mucilage in two places at the lower corners. The portion of the cloud negative left uncovered should be suited to the character of the landscape, and also arranged to produce an artistic effect. In cutting the landscape print to form the mask, care should be taken not to cut into the sky portion. If a little of the landscape part is cut away, when used as a mask, it will allow the cloud negative to overlap the landscape portion in the printing, and this is not easily noticed, but if the landscape section overlaps the skyline the defect is readily noticeable. Having arranged the cloud negative with its mask, make a print, in the ordinary way, from the landscape negative, which gives a white sky in printing. When the necessary details are out in the landscape, remove the print from the negative and place it under the cloud negative, very carefully adjusting the skyline to overlap (just a trifle) the landscape. In printing, shade the horizon a little in order to produce a lighter impression at that point in the print, for it will be noted that this portion of the sky usually appears slightly less dark than the rest.

The principle above described (masking out) can also be applied to the arranging of a figure, or even a group of figures, in a landscape. Taking the case of a single figure, a print is made from the negative containing it, and the figure is carefully cut out with a sharp penknife,

in such a way that both the figure and the surrounding part of the print are carefully preserved and will fit each other. In this way two masks are obtained—the figure, to use with the landscape into which it is to be printed; and the surroundings, to be used to cut out all but the figure in the negative from which it is printed. The figure (with its masked surroundings) is printed first, and then the landscape negative (with its figure mask) is adjusted to make the composition. Great care is necessary to make the masks register neatly, and if there are any defects in this regard they can usually be remedied by re-touching the prints with India ink. By a series of steps similar to the ones we have indicated, three, four, or even six negatives can be used to make combination prints. But, to quote Mr. H. P. Robinson in *Silver Printing*, "A photograph produced by combination printing must be deeply studied in every particular, so that no departure from the truth of nature shall be discovered by the closest scrutiny."

—Anthony's Bulletin.

ON ALLOTROPIC FORMS OF SILVER.

II.

In the first part of this paper were described certain forms of silver; among them a lilac-blue substance, very soluble in water, with a deep red colour. After undergoing purification it was shown to be nearly pure silver. During the purification it seemed to change somewhat, and consequently some uncertainty existed as to whether or not the purified substance was essentially the same as the first product; it seemed possible that the extreme solubility of the product in its first condition might be due to a combination in some way with citric acid, the acid separating during the washing. Many attempts were made to get a decisive indication, and two series of analysis, one a long one, to determine the ratio between the silver and the citric acid present, without obtaining a wholly satisfactory result, inasmuch as even these determinations of mere ratio involved a certain degree of previous purification which might have caused a separation.

This question has since been settled in an extremely simple way, and the fact established that the soluble blue substance contains not a trace of combined citric acid.

The precipitated lilac-blue substance (obtained by reducing silver citrate by ferrous citrate) was thrown on a filter and cleared of mother water as far as possible with a filter pump. Pure water was then poured on in successive portions until more than half the substance was dissolved. The residue, evidently quite unchanged, was of course tolerably free from mother water. It was found that by evaporating it to dryness over a water bath, most of the silver separated out as bright, white, normal silver; by adding water and evaporating a second time, the separation was complete, and water added dissolved no silver. The solution thus obtained was neutral. It must have been acid had any citric acid been combined originally with the silver. This experiment, repeated with every precaution, seems conclusive. The ferrous solution used for reducing the silver citrate had been brought to exact neutrality with sodium hydroxide. After the reduction had been effected, the mother water over the lilac-blue precipitate was neutral or faintly acid.

A corroborating indication is the following:—The portions of the lilac-blue substance which were dissolved on the filter (see above) were received into a dilute solution of magnesium sulphate, which throws down insoluble allotropic silver of the form I have called B (see previous paper). This form has already been shown to be nearly pure silver. The magnesia solution, neutral before use, was also neutral after it had effected the precipitation, indicating that no citric acid had been set free in the precipitation of the silver.

It seems, therefore, clear that the lilac-blue substance contains no combined citric acid. Had the solubility of the silver been due to combination with either acid or alkali, the liquid from which it was separated by digestion at or below 100° C. must have been acid or alkaline; it could not have been neutral.

We have, therefore, this alternative. In the lilac-blue substance we have either pure silver in a soluble form, or else a compound of silver with a perfectly neutral substance generated from citric acid in the reaction which leads to the formation of the lilac-blue substance. If this last should prove the true explanation, then we have to do with a combination of silver of a quite different nature from any silver compounds hitherto known. A neutral substance generated from citric acid must have one or more atoms of hydrogen replaced by silver. This possibility recalls the recent observations of Ballo, who, by acting with a ferrous salt on tartaric acid, obtained a neutral colloid substance having the constitution of arabin, $C_6H_{10}O_5$.

To appreciate the difficulty of arriving at a correct conclusion, it must be remembered that the silver precipitate is obtained saturated with strong solutions of ferric and ferrous citrate, sodium citrate, sulphate, &c. These cannot be removed by washing with pure water, in which the substance itself is very soluble, but must be got rid of by washing with saline solutions, under the influence of which the substance itself slowly but continually changes. Next, the saline solution used for washing must be removed by alcohol. During this treatment the substance, at

first very soluble, gradually loses its solubility, and when ready for analysis has become wholly insoluble. It is impossible at present to say whether it may not have undergone other change: this is a matter as to which I hope to speak more positively later. It is to be remarked, however, that these allotropic forms of silver acquire and lose solubility from very slight causes, as an instance of which may be mentioned the ease with which the insoluble form B recovers its solubility under the influence of sodium sulphate and borate and other salts, as described in the previous parts of this paper.

The two insoluble forms of allotropic silver which I have described as B and C (B, bluish green; C, rich golden colour) show the following curious reaction. A film of B spread on glass and heated in a water stove to 100° C. for a few minutes becomes superficially bright yellow; a similar film of the gold-coloured substance C, treated in the same way, acquires a blue bloom. In both cases it is the surface only that changes.

Sensitiveness to Light.—All these forms of silver are acted upon by light. A and B acquire a brownish tinge by some hours' exposure to sunlight. With C the case is quite different, the colour changes from that of red gold to that of pure yellow gold. The experiment is an interesting one, the exposed portion retains its full metallic brilliancy, giving an additional proof that the colour depends upon molecular arrangement, and this with the allotropic forms of silver is subject to change from almost any influence.

Stability.—These substances vary greatly in stability under influences difficult to appreciate. I have two specimens of the gold-yellow substance C, both made in December, 1886, with the same proportions under the same conditions. One has passed to dazzling white, normal silver, without falling to powder or undergoing disaggregation of any sort, the fragments have retained their shape simply changing to a pure frosted white, remaining apparently as solid as before; the other is unchanged, and still shows its deep yellow colour and golden lustre. Another specimen made within a few months and supposed to be permanent has changed to brown. Complete exclusion of air and light is certainly favourable to permanence.

Physical Condition.—The brittleness of the substances B and C, the facility with which they can be reduced to the finest powder, makes a striking point of difference between allotropic and normal silver. It is probable that normal silver, precipitated in fine powder and set aside moist to dry gradually, may cohere into brittle lumps, but these would be mere aggregations of discontinuous material. With allotropic silver the case is very different, the particles dry in optical contact with each other, the surfaces are brilliant, and the material evidently continuous. That this should be brittle indicates a totally different state of molecular constitution from that of normal silver.

Specific Gravities.—The allotropic forms of silver show a lower specific gravity than that of normal silver.

In determining the specific gravities it was found essential to keep the specific gravity bottle, after placing the material in it, for some hours under the bell of an air pump. Films of air attach themselves obstinately to the surfaces and escape but slowly even in vacuo.

Taken with this precaution, the blue substance B gave specific gravity 9.58, and the yellow substance C, sp. gr. 8.51. The specific gravity of normal silver after melting was found by G. Rose to be 10.5. That of finely-divided silver obtained by precipitation is stated to be 10.62.*

I believe these determinations to be exact for the specimens employed. But the condition of aggregation may not improbably vary somewhat in different specimens. It seems, however, clear that these forms of silver have a lower specific gravity than the normal, and this is what would be expected.

Chestnut Hill, Philadelphia, May, 1889.

M. CAREY LEA.

—American Journal of Science for July.

THROUGH JAPAN WITH A CAMERA.

CHAPTER VII.—AKITA, JAPANESE BELLS, A PRIVATE HOUSE.

SEVERAL days of travelling brought us to a town called Akita, where we stayed several days. Akita is a fair sample of a considerable Japanese town, but I don't think I have anything to say of it that would be particularly interesting to readers. For one thing the thermometer still kept going up to 95° in the shade every day, and what energy was left me was all taken up in attending to business. Let me say, however, that the 95° temperature of Akita with dryness was not nearly so oppressive as 85° in Tokio with the dampness that I wrote of at the beginning of these papers.

There is a very fine old castle at Akita, which I might have photographed had the weather been cooler, or had we been less busy, but I am glad I did not, for the castle we afterwards saw at Shirakawa was quite as fine, and much more photographable—of it more hereafter.

I made two exposures towards the evening from the roof of the hotel we stayed at. The bell tower will form an excuse for a few words on Japanese bells. There is at least one of these in every town of considerable size; there are many of them in very large towns. They are often elaborately ornamented with figures, &c., but the great beauty of them is in the sound they give. There is nothing of the metallic clash

* Watts' Dict., original edition, V. p. 227.

about it. At a little distance it comes as a clear, booming musical note of the extremest purity and sweetness. The tone is attributed by many to the fact that the bells being religious institutions, the people mixed gold and silver with the baser metals when they were cast. I do not doubt the existence of a small proportion of gold and silver in the composition of the bells; but I would need some proof to make me believe that the minute percentage likely to be present has any material effect on the sound given out. I cannot help thinking that the shape of the bells, and the fact that they are struck with wood, not metal—the wood consisting of a bank of timber suspended after the manner of a battering ram—has a good deal to do with it. When a bell is struck with a metallic clapper, a deal of noise, produced by the contact of the metals, is sure to accompany the true musical note of the bell.

We left Akita one morning very early, having a long day's drive before us. The road the first day was not particularly interesting, but the second it was very beautiful. We had again a long distance to get over and the making of any exposures was out of the question. Seeing how badly my plates had turned out I am not sorry, but I have a note in my note-book, on the suggestion contained in which I intend to act next summer, if circumstances permit. Here it is.

"We travelled almost the whole day through almost the most lonely valley that I have ever seen. The road is by the side of a deep gorge with a river flowing along its bottom. It is to be noted that it would be well worth while to spend a week between Yokoto and Midzusawa with a large camera; and Nagasaki-san mentions the road between the former of their two places, and Yamagata as still more wonderful, especially at Nozomi."

At the end of our second day's journey from Sendai we arrived at a large village, or small town, which was the birthplace of my travelling companion, Dr. Goto. Here we stopped as guests at the house of a friend of his, and as it is the first and only time that I have stayed in a Japanese private house, I give a short description of it.

Nokote-san, our host, is a merchant, or, as we would say, a shopkeeper. The shop faced the street. There was a passage at the ground level, between the two raised platforms forming the floor of the shop. This passage led to the private part of the house at the back. In the large room the whole family (three generations apparently) lived. The room was capable of being partitioned off by screens, so as to form a number of small rooms, as much separated from each other as Japanese rooms ever are. There was a large square hole in the floor with a fire burning in it, over which all the cooking was done. In the "guests room" we were lodged. Except for the posts supporting the roof, it was in the daytime quite open to the living rooms on one side, and to the courtyard on the other. We were told that when the Mikado had passed through the town he had lodged in the same room, the house being the largest, and the owner of it the richest man in the village. Certainly this room would, in its perfect simplicity of beauty, have put to shame the drawing room of any shopkeeper or even merchant prince at home.

The grandfather of the household was brought in and introduced. He was positively over-powering from his extreme civility and from the number of times that he saluted. His eldest son, the head of the house, also appeared to make his respects. He also was very civil, although not to the embarrassing extent that the old gentleman was. His eldest daughter waited on us, a pretty girl of some sixteen years. She spent the winter months, he told us, at a school in Tokio, where she studied English, amongst other things. She was too shy, however, to speak it with me—a most unusual fault with Japanese girls.

At night our room was closed in on the two open sides by a series of sliding doors or panels.

W. K. BURTON.

Foreign Notes and News.

HERB PAUL BALTIN writes from Potsdam, in reply to numerous inquiries or formulae for permanent concentrated hydroquinone, to recommend the following:—

In 500 c.m. of water, warmed in a flask sufficiently large to allow of convenient shaking, are dissolved—

200 grammes, chemically pure, sodium sulphite, or better,
100 grammes of Kahlbaum's anhydrous sodium sulphite.

After complete solution of the sulphite, 25 grammes of hydroquinone are added and dissolved by shaking.

In a second flask are dissolved 300 grammes of pure carbonate of potash in 300 c.m. of distilled water.

When both solutions have become perfectly clear, they are mixed together and introduced into flasks with patent stoppers, which are so constructed as to prevent any air standing above the fluid. The developer when thus bottled will last for any period of time; but the bottles when once opened must be used up in a week or a fortnight. For actual use this developer must be diluted with five times its volume of water; three to six plates may be "brought out" consecutively in one bath of the solution.

Since the formation of the Photographische Institute for instruction and research in Vienna, such a large number of works have been produced

that it has been determined to hold, at the end of the school year, an Exhibition of all the prints and drawings that have been finished in the Institution. The Exhibition will comprise portraits, landscapes, reproductions, coloured prints, orthochromatic-photography printing, photolithography, &c., together with the work of the pupils in drawing and retouching.

M. BOUILLAND states, in the *Moniteur de la Photographie*, that the method he employs for developing instantaneous plates is as follows:—

Carbonate of soda	250 parts.
Sulphite of soda	60 "
Water	1000 "

Dissolve hot, and then add after filtering—

Hydroquinone	10 parts.
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If the time of exposure has been too short, one adds to the ordinary developer 30 to 50 per cent. of a developer composed as follows:—

Carbonate of potash (pure)	500 parts.
Sulphite of soda	60 "
Water	1000 "
Hydroquinone	10 "

If the exposure be very much too short, this latter developer is employed alone. The image appears almost instantaneously. With large doses of the carbonates the degree of sensibility attainable hardly appears to have any limits.

CAPTAIN HINDLY recommends the addition of yellow prussiate of potash (potassium ferrocyanide) to the hydroquinone developer as a means of gaining "depth" in the negative. He advises the addition of a few drops of the prussiate solution (30 parts to 100 of water) to the developing solution. This acts in a similar way to bromide of potassium, but has this advantage, that it does not exercise the restraining action of that compound.

DR. EDER, who has been recently studying zircon, recommends this substance strongly for employment in photo-micrography. The zircon is secured in platinum discs, and is said to improve by use. If any fragments of zircon are broken off, they are pulverised in a mortar and compressed back again into their platinum frame.

DR. EDER has also been experimenting with Brenzcatechine, and gives the following receipt as productive of good results:—

A.	
Brenzcatechine	1 part.
Sodium sulphite	4 parts.
Water	40 "
B.	
Potash	4 parts.
Water	40 "

One volume of A is mixed with two volumes of B. This developer acts much more rapidly than any similarly composed hydroquinone developer, produces as much or rather more sensibility, and the negatives attain the required degree of strength quicker.

ACCORDING to Dr. Carl Arnold, although pyrocatechine is actually many times dearer than hydroquinone, it can nevertheless be employed without increasing the cost of developing, as its action is about fifteen times more powerful than that of the cheaper substance. Dr. Arnold states that to develop a 18×24 plate one-twentieth of a gramme of pyrocatechine with five grammes of carbonate of soda, and a proper quantity of water, is quite sufficient. For travelling he prepares his developer as follows:—To a solution of the alkali of the desired degree of concentration is added a small pinch of pyrocatechine, which is dissolved by shaking. This solution, amongst other of its advantages, may be employed for developing bromide paper and transparencies. Doubtless, when the employment of pyrocatechine has become more general, its price will not be long in coming down.

DR. EDER has recently pointed out the fact, which is perhaps not universally known, that both pyrocatechine and brenzcatechine are compounds isomeric with hydroquinone of the formula $C_6H_6(OH)_2$.

Our Editorial Table.

NEW CATALOGUE.

By MARION & Co., Soho-square.

This Catalogue of ninety large pages is one specially prepared for amateurs. The selection of articles here catalogued has been made

with judgment, for we cannot discover anything whatever conducive to amateur practice, from books of instruction to complete outfits, apparatus in whole or in part, that has been omitted—view finders, levels, plumb indicators, flash lights, stands, lenses, cameras, printing frames; but it is impossible here to enumerate a tithe of all that is to be found in this goodly work, which is profusely illustrated and, we may add, admirably printed on fine thick paper in the best style of the book-maker's art. Catalogue-making seems to be becoming elevated into an almost fine art.

THE EIKONGEN DEVELOPER.

WE have received from Messrs. Marion & Co., Soho-square, the sole agents, a sample of this newly discovered developer, which is now introduced into this country. Following the directions sent with the package, we dissolved the eikongen and developed not only negatives but transparencies and bromide prints most successfully. Although our trials have been too limited to warrant our saying much concerning it at present, we are safe enough in stating that we are quite charmed with it.

A NEW WASHING TANK.

By PERKEN, SON, & RAYMENT.

THIS tank is one of the "nattiest" we have had the pleasure of using, and it answers equally well for prints and plates. It is square in form, and is made of stout japanned tinware. There is a false bottom a little distance above the real one, and this false bottom has a divisional aperture in the centre running from end to end, immediately below which is a perforated tube through which the water is admitted in small jets, by which the prints (when it is devoted to print washing) are kept in a state of constant motion. The waste water is drawn off through a tap placed at the bottom, which is slightly V-shaped. The whole is so constructed that even with the slightest admission of water a like quantity can be drawn off after it has done its work, the quantity in the tank standing at any height determined upon.

For washing negatives, a light portable frame with adjustable grooved ends and sides is inserted in the tank, and the water keeps up a constant flow through them.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,354.—"An Improved Coin-free Apparatus for Automatically Photographing Persons and Objects, and for Developing and Delivering said Photographs." Communicated by J. SACCO. I. JOEL.—*Dated July 15, 1889.*

No. 11,416.—"Improvements in Photographic Cameras and Shutters for use in connexion therewith." B. J. EDWARDS.—*Dated July 16, 1889.*

No. 11,555.—"Improvements in Apparatus for Coating Photographic Dry Plates and other Plane Surfaces with an Emulsion or Viscous Liquid." J. H. SMITH.—*Dated July 19, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN FRAMES AND STANDS FOR PHOTOGRAPHS AND OTHER PICTURES.

No. 12,340. CARL SCHUBÖ, Offenbach-on-the-Main, Germany.—*June 29, 1889.*

THIS invention relates to frames and stands for photographs and other pictures, and has for its object to enable any person, without possessing any previous experience in the mounting of pictures, to place a picture in the frame or stand and remove it again in an easy and convenient manner.

According to the said invention, the frame or stand is not a firmly connected whole, but consists of two parts united by a spring hinge.

The improved stand constructed according to this invention can be made in the form of an easel. With its lower part is connected, by means of a hinge, a support which enables the stand to be put in an upright or inclined position.

A cross piece arranged on the said lower part forms a kind of channel in which the photograph or other picture and the glass plate for covering the same are placed. The upper part of the stand, which is connected with the lower part by the spring hinge, is turned backwards when the photograph or other picture is to be mounted with a glass plate.

After the picture has been placed in the channel formed by the aforesaid cross piece, the upper part of the stand is simply released so that it is moved back to the original position through the medium of the spring hinge, the upper edge of the picture and glass plate being covered by an upper cross piece provided on the upper part, thus giving the picture the necessary hold.

In another arrangement the upper cross piece of the frame or stand for the picture is connected with the lower part by means of two spring hinges, arranged at suitable points so that it can be turned back. The vertical frame parts are made hollow at their rear side, so that, with the cross piece to which a support is attached, a groove is formed into which the picture and the glass plate are slid. This having been effected, the upper cross piece is released, whereupon it is caused to move back to the original position by means of the spring hinge, which completes the framing of the picture.

In frames which do not possess the cross piece for the support, I provide, in the vertical frame parts, grooves into which the picture and the glass plate are slid in lieu of the said channels.

Frames and stands constructed as above described have the advantage of enabling photographs and other pictures to be mounted and dismounted by any person, and readily exchanged.

IMPROVEMENTS IN DARK SLIDES FOR PHOTOGRAPHIC PURPOSES.

No. 12,438. FRANCIS BEAUCHAMP, High Cross, Tottenham, Middlesex.—*June 29, 1889.*

IMPROVEMENTS in dark slides for this purpose. I provide the dark slide with one or two rollers with pinions fixed thereon, working into a rack; the said rollers are provided with a blind to wind up or down automatically, or by hand or a push piece, which by pressing unrolls the blind and covers the plate, and when released the blind rolls up and the plate is exposed; the said push piece is provided with an ordinary catch, or a cord to take the place of the push piece to answer in the same manner. I sometimes use one or two doors or flaps to open or close inside the camera, by moving a lever or button connected to the door or doors at the side of the dark slide, it enables the operator to expose or cover the plate instantaneously, thus dispensing with the inconvenience of drawing the dark slide to expose the plate, which must be done with the one now in use. This arrangement entirely prevents any light from entering the camera. The dark slide can be made to carry one two or more plates.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 31	Barnley	Bank Chambers, Hargreaves-street.
" 31	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
August 1	Leeds	Philosophical Hall, Leeds.
" 1	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 1	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 2	Sheffield Camera Club	

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JULY 23,—Mr. Leon Warnerke in the chair.

MR. A. COWAN showed some plates that had been equally exposed under a sensitometer and developer for an equal time with different re-agents, one of which was the substance called Eikonogen, and the others respectively ferrous oxalate, pyro with meta-bisulphite, and hydroquinone. The highest number was obtained with the Eikonogen. An advantage with the new developer was that it did not oxidise after the addition of the alkali. For chloride plates the developer was too energetic unless restrained with bromide, when the result, an example of which was shown, was very satisfactory, both in colour and purity of the transparent portions.

MR. W. E. DEBENHAM thought that the Eikonogen-developed plate looked more pushed than the others, and inquired whether if the pyro-developed plate had been kept longer in the solution, or the meta-bisulphite of potash had been omitted, as high a sensitometer number might not have been obtained as with the Eikonogen.

MR. COWAN considered that the developers were fairly tried. He also showed bromide prints developed, one with ferrous oxalate, and the other with Eikonogen. The surface colour given by the latter was brownish, and, he thought, the more pleasing colour of the two. He next showed two prints on opal developed on gelatino-bromide; one print was toned with gold, and the substitution was so complete that the picture might be regarded as permanent. The toning had been accomplished with acid chloride of gold, and had taken a whole night.

MR. E. CLIFTON, referring to a suggestion that the Eikonogen developer consisted essentially of pyrocatechine, inquired whether the solution was of a brownish colour.

MR. COWAN replied that it was perfectly green.

MR. CHAPMAN JONES said that the substance had been stated to be a derivative of naphthaline.

MR. CLIFTON inquired how many plates could be developed in the same solution.

MR. COWAN replied that he had tried eight successive plates in a quantity of solution so small that he could scarcely get it to cover the last plate; nevertheless, that plate came out like the others, except that it required three times as long to develop.

THE CHAIRMAN inquired whether any of the members knew of a system of toning bromide prints so as to resemble the colour of albumen gold-toned prints, and, receiving no reply, said that he had done it by first converting the image into a chloride by means of a solution of chloride of copper; then, after well washing, it was developed in the light with a weak iron developer such as was used for chloride printing, or, better still, with hydroquinone used very weak. This proceeding gave a red image that was amenable to the ordinary gold toning. He had also used a solution of bichromate and hydrochloric acid for converting the image into chloride, but it was not easy to wash out all the bichromate, therefore he preferred the chloride of copper.

MR. ARNOLD SPILLER recommended soaking in alum to get rid of bichromate.

MR. COWAN inquired what gold toning bath had been used.

THE CHAIRMAN said that he had used the old combined toning and fixing bath, but got best results with Obernetter's formula, containing sulphocyanide with hypo, &c. He thought it likely that the acetate bath would answer.

THE CHAIRMAN, referring to the Photographic Congress to be held in Paris, said that the promoters of it completely ignored the work that had been done

by the Photographic Society of Great Britain. Their method of proceeding, too, he criticised. First, he said they sent him an invitation to attend the Congress, but if he wished to avail himself of it he found that he must notify that by June 1, and send a fee of ten francs. This he had done, and received a ticket which mentioned that the French nation was exceedingly hospitable; nevertheless, he could not obtain admission to the Congress without paying for admission to the Exhibition. They managed things differently in Moscow, where delegates to the number of three hundred were entertained free of charge at the hotels, and twelve large carriages were placed at their disposal for visiting various places of interest. At Paris there was nothing of that kind. There was to be a banquet certainly, but the tickets were charged thirty francs each. He had yesterday received a programme of the questions proposed by the Committee of Organization of the Congress, and read some of the recommendations therein contained. The first was, that for the standard of unity of light the acetate of amyl lamp should be selected, and reasons given were that the acetate of amyl could be found everywhere, which was not true, and that the lamp could be found everywhere, which was also not true.

Mr. SPILLER said that he had used the acetate of amyl lamp, and found the light given to equal 8 of the English standard candle. Mr. Rawson had found the light to be 78, which was close to the same result. The lamp worked fairly with care, but the difficulty was that acetic acid was given out, which corroded the lamp; and it ought, in fact, to be made of porcelain throughout instead of metal. He thought the Pentane standard to be preferred. The lamp for this was formerly very expensive, but was now very much cheaper. Pentane was a very light paraffin, lighter than benzoline. The next point, Mr. Warnerke said, was the unity of mole of determining the sensitiveness of photographic preparations. This question it was proposed to solve by using various shades printed on paper, a plan which he certainly did not think highly of. Then came uniformity of measuring focal length of lenses. What did it matter what method was adopted for this purpose? Then came uniformity in the indication of the photometric effect of diaphragms, for which the recommendation was to take the focal length of the lens divided by 10 as unity, a number which several of the members considered too high, and preferred the Society's standard of one-fourth of the focal length. Then there was uniformity in measuring the speed of shutters, and means of adapting different lenses to different cameras; and a uniform set of sizes for photographic plates, some of the sizes being, in centimetres—9×12, 12×18, 18×24, 24×30, and 36×48.

It was pointed out by several members that these sizes did not bear a common proportion, but that whilst for certain sizes the proposed sizes were narrower than the usual proportion, others were broader, and that it would be better to have a set of sizes having a common proportion, or to have two sets, one broader and the other narrower throughout.

The next point was unity in expression of photographic formulae, for which the decimal system was recommended.

Mr. T. Bolas said that for weighing out quantities the decimal system was very bad, one of the worst. If any quantity had to be divided by four, three figures were at once required.

On the proposition that for unity in the denomination of photographic processes these should all commence with "photo" and end with "graph," leaving the intermediate letters to describe the particular method, the members considered that it would be too cumbersome.

On the last question, that of property in the negative, Mr. DEBENHAM thought that with regard to portrait negatives, the understanding that generally existed—namely, that the property in the negative was the photographer's, but the right to use it was joint, that is, it could only be printed by mutual consent—was a fair and just understanding. This view met with general approval amongst the members present.

Mr. Spiller had recently been shown some photographs by Dr. Eder which were produced by the application by photography of a protective coating to a sheet of flashed glass. The coat of colour was then etched away by hydrofluoric acid where not protected by the image, and the result was very good.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 18.—Mr. A. Mackie in the chair.

A communication from the Photographic Convention of Great Britain was read, which contained an invitation to the Association to send delegates to the Conference to be held from the 19th to the 24th of August next, and Messrs. A. Haddon, A. Cowan, and Thomas Bolas were accordingly appointed delegates.

Samples of a powder for developing, called Eikonogen, were distributed amongst the members. Mr. Cowan, who had experimented with the substance, spoke highly of it.

Mr. Cowan next showed some pairs of bromide prints on opal glass; one of each pair had been toned with gold. To show that the toning was a complete substitution, rendering the photograph, in fact, a permanent gold one, a toned and untoned plate were placed together in a dish of slightly diluted nitric acid. The image of the untoned plate disappeared almost immediately, whilst the toned image remained unchanged until the acid loosened and dissolved away the gelatine itself. Mr. Cowan's method of procedure was to first clean the gelatine off the film by the application of dilute hydrochloric acid—five or ten per cent.; the plate was then laid in a solution of chloride of gold, one grain; water, four ounces; and hydrochloric acid, four minims. The toning was slow, in order to ensure its thoroughness. He left the plate in for twelve hours, but he believed the toning was complete in four or five hours. If taken out before completion the image would be partially dissolved by nitric acid and could not be relied upon as permanent. After toning, the plate was again passed through the fixing bath to dissolve the chloride of silver, which would otherwise darken in the course of time.

Mr. Haddon said that he had experimented with some prints toned by Mr. Blanchard's plan, and found that they did not resist the re-agents which distinguished silver from platinum prints. The toning appeared to be superficial, and there was no such thorough substitution of platinum for silver as to confer permanence upon the photographs. He had used as tests sulphuric acid, nitric

acid, hydrochloric acid, solution of hyposulphite of soda, and solution of common salt. In the three acid solutions the image almost disappeared, whilst even a continuance in the hypo solution was nearly as bad. He then produced a bottle of chlorine water and immersed in it portions of a true platinum print and of one of Mr. Blanchard's toning. The latter almost entirely disappeared, whilst no change was noticeable in the platinum print.

Mr. ANDREW PRINGLE had found that platinum prints might be left in these testing solutions *ad libitum* without fading.

Mr. HADDON said that he could not very well reconcile these results with Mr. Levy's statement that the toned image contained sixty per cent. of platinum. The tests he had used were mostly similar in kind to, though stronger in degree than, those actually likely to affect photographs. In places by the sea there would be at times a certain amount of salt deposited, in houses where gas was burned sulphuric acid was formed, whilst prints were liable to contain hypo from imperfect washing.

The CHAIRMAN would like to know the resistance of gold-toned prints to these tests.

Mr. PRINGLE said that the action of gold toning was not perfectly understood, one party holding that there was an electrolytic action, whilst another party maintained that it was a substitution process. He understood Mr. Blanchard to say that in his method the action was one of substitution.

Mr. W. E. DEBENHAM said that there was no doubt that in such examples as those shown by Mr. Cowan the action was a substitution one very thoroughly effected, and that the image then became a gold one and was permanent. With gold or platinum used thus the image was permanent, but when either metal was deposited superficially, as in ordinary toning, so as merely to change the colour of the image, there was not enough deposited to confer permanence. It appeared, however, from some experiments made by Mr. W. K. Burton that it was possible to carry the ordinary toning process so far as to deposit enough gold to render the image permanent, and that without causing the print to become grey and cold, as was generally the case when toning was carried beyond the usual stage. An essential condition insisted upon for this result was that free silver should be thoroughly removed by washing before the print was put into the toning bath.

Mr. PRINGLE had followed Burton's experiments, and his results were in perfect accordance therewith. If a print is red before commencing toning you can go on further with the deposition of gold before it becomes blue. A strong toning bath by acting rapidly gave blue tones, but with a weak one the action may be carried on until much more gold is deposited before a blue colour is obtained.

Mr. DEBENHAM said that the silver deposit in certain cases took on a colour somewhat similar to that of a gold-toned print without any gold being used at all. He had found this notably the case with citro-chloride gelatine plates printed out on opal glass if the plate had been kept for some time before being printed. That the colour was due to the keeping of the plate was shown by the fact that plates prepared with the same emulsion gave when fresh the ordinary red image unless toned. He would ask whether Mr. Cowan had noticed the same peculiarity in kept plates.

Mr. Cowan had found the same effect as that described by Mr. Debenham.

The CHAIRMAN had found that ready-sensitized paper when very old, toned with difficulty but gave more intensity, so that much thinner negatives could be printed with it than with the same paper used fresh.

Mr. PRINGLE would have expected the contrary. When using old paper he always added more alkaline carbonate to the fixing bath to get purer whites.

Mr. S. G. B. WOLLASTON adopted the same practice.

The CHAIRMAN would like the opinion of the members as to whether there was a characteristic colour, as sometimes stated, in prints toned with gold solution neutralised by the various salts used for the purpose, such as borax, carbonate of soda, &c.

Mr. PRINGLE thought that the characteristic of borax was to give a warm brown, and of carbonate of soda was a purplish colour, but with acetate any colour could be obtained.

The CHAIRMAN said that he had used borax, carbonate, tungstate, and acetate of soda, and if each was carried on to the same degree he could never detect the difference. He wished to call attention to the extreme inaccuracy of the literature of photography on the subject of the toning bath. When several formulae were given it was said of some of them that they were ready for use at once. The fact was that no toning bath was ready for use at once. With different adjuncts different times were necessary for the bath to get into condition, and if that condition was required quickly it could be much hastened by heat. The gold should be in such a state that the yellowish colour of the solution was giving way to a purple, and then it was ready for use. The gold should not have precipitated but be on the verge of precipitation.

Mr. DEBENHAM's views were, generally speaking, those of the Chairman. He had, however, found that a gold bath had passed the ripe stage and entered on a condition of refusal to tone without having precipitated; the metal was in the solution but not in a condition to tone.

Mr. P. EVERITT then read a paper on *The Right to the Negative*, in which he took the view that the negative belonged to the sitter both by law and right, and that the photographer ought to give it up when required.

Mr. DEBENHAM maintained the view which he had expressed in a recent controversy, that the property of the negative was the photographer's, but the use of it was joint with the customer. According to this view, which was in accordance with universal or almost universal practice, neither photographer nor sitter could use the negative without mutual consent. If there was any injustice in this arrangement, as implied by Mr. Everitt, he would like to have it pointed out. As to the exposing of a print as a specimen, that being so much the practice, he thought that consent of the sitter might be assumed unless, as was sometimes done, a wish had been expressed to the contrary. Of course, in assuming the sitter's consent, the photographer should be bound to withdraw the specimen at any time it required to do so.

Mr. F. A. BRIDGER said that the custom of the trade was for the photographer to retain the negative, and that was the understanding upon which he fixed his charges.

Mr. Cowan added that when a sitter stated, to begin with, that he required

to have the negative, the photographer made an extra charge to compensate him instead of relying upon the supplying of duplicates.

The CHAIRMAN followed on the same side, and the meeting was adjourned at rather a late hour.

It was announced that on August 8 Mr. Friese Greene would exhibit and demonstrate his process of photographing upon opal cards.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JULY 16.—Mr. W. T. Coventon in the chair.

The HON. SECRETARY read a letter from the Secretary of the Convention, and distributed copies of the conditions.

Mr. M. C. Wood showed a photograph on opal which had streaks across the film; this was thought to be caused by a deposit, and was partially removed by rubbing. It was recommended to put it in the hypo bath again and well wash it.

Mr. J. Oakley showed some local views which he had purchased for sixpence a dozen, and which were apparently by a mechanical printing process.

Mr. J. Carpenter showed a negative on a ground glass plate in which there was a distinct halation on the roof of a church.

This led to a discussion on halation, in which several members took part.

Mr. OAKLEY showed a photograph of the interior of a church which at first had the bars of the window obscured by halation, but on rubbing gently with methylated spirit it showed every detail in the window. He considered that these parts were so much over exposed that they were blocked up, and did not think it to be due to reflection from the back of the plate.

Mr. W. BISHOP considered that the particles in the atmosphere absorbed the light and an overlapping of rays took place.

The HON. SECRETARY called attention to the case of a church steeple with the sun directly behind it; the part near the sun would frequently appear narrower than the other parts close by, thus proving that there is sometimes an overlapping of rays of light.

Mr. A. C. COSSON found a difficulty in getting even results when reducing halation by rubbing with methylated spirit.

Mr. OAKLEY thought that this was due to there being more spirit on the rag when the rubbing was first commenced, and it reduced this part quicker.

The HON. SECRETARY advised a brush charged with bromide of potassium or other restrainer for treating windows after they were sufficiently developed, as a much finer result could be obtained in this way.

It was resolved that the Saturday outings should be continued, and an excursion was arranged to Elstree for Saturday, July 27. Trains from Moorgate-street Station at nineteen minutes past two, or St. Pancras at three minutes past three.

The next meeting will be on August 6, and will be a general technical meeting.

LEWES PHOTOGRAPHIC SOCIETY.

JULY 16.—The President in the chair.

Two members were elected.

A resolution was carried in favour of the adoption of the metric decimal system by photographers.

The Hon. Secretary was appointed the delegate to represent the Society at the forthcoming Convention to be held in London in August.

The HON. SECRETARY then read a paper on *The Artistic Side of Photography*, which was supplemented by a collection of photographs by Mr. H. P. Robinson, Mr. F. M. Sutcliffe, and the Hon. Secretary, and by a few etchings and engravings.

A discussion followed.

Work was shown by members who had attended the excursions held on June 19 and 22.

On the 22nd the members of the Brighton Society visited Lewes and were conducted to the principal places of interest in the town, including the Castle and Priory ruins. The party afterwards adjourned to the Glee Room, where they were met by other members and friends, and witnessed a lantern slide entertainment.

The next excursion will take place at Sheffield Park and Fletching on Friday, August 2.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JULY 18.—Mr. W. J. Harrison, F.G.S., in the chair.

The HON. SECRETARY read a letter from Mr. George Bankart, awarding the prize for the best picture (taken on the excursion to Shakesperian villages) to No. 9. On the sealed envelopes being opened the winner was found to be Mr. E. C. Middleton.

Excursions were announced for the half day to Alton Towers on August 10; to Stratford-on-Avon on August 24.

The CHAIRMAN, as leader of the excursion to Warwick, read his report; it showed that thirteen members attended and eighty-five plates were exposed, principally Hford and Thomas's.

The HON. SECRETARY reported that he had received copies from the editors of *The Lantern and Entertainer* (Mr. J. Hay Taylor), and *Photographic Review* (Mr. Thomas Bolas), which had been placed on the tables of the Club Room.

Mr. G. S. SERSCHALL delivered a practical and theoretical paper on *Portrait Painting as applied to Photography, with Illustrations, &c.* [see page 489].

The paper for August 15 is by Mr. G. Edmonds, on *Light, Lenses, and Stops.*

MANCHESTER PHOTOGRAPHIC SOCIETY.

JULY 11.—Mr. T. R. Copley in the chair.

Minutes read and confirmed.

Mr. J. H. Orrell was elected a member.

Question box:—"Has any member tried the new 'water developing plates'?"

No reply.

"Does the sodium hydrate developer affect the skin?"

Reply from several members:—Not to any serious extent.

"What is the best way of holding back the high lights when using sodium hydrate and hydroquinone as a developer?"

Several members replied to this, giving various opinions; the discussion, however, soon drifted.

Mr. HEYWOOD said chloride of lime was a capital reducer.

"Why should not this Society possess an enlarging lantern or enlarging camera to lend to the members on payment of, say, two shillings per week?"

Here a lengthy discussion took place as to the conditions and regulations for lending such apparatus.

The HON. SECRETARY (Mr. W. I. Chadwick) quite approved of the Society not only possessing enlarging apparatus but many other things, if they were provided with a dark room and other conveniences at the home of the Society, and to be used there; and, indeed, he did not see why such conveniences could not be provided. It was simply a question of expense. If the Society could not at present afford permanent rooms, for his own part he would say dispense with the teas at the monthly meetings, and the thing is done.

It was resolved that the Council take into serious consideration the advisability of purchasing suitable enlarging apparatus for the use of the members.

Mr. W. H. Farrow exhibited some exceedingly interesting specimens of "pin-hole photography." In the lid of a cardboard box, about $4\frac{1}{2} \times 3$ inches, twelve holes were made by the point of a needle. The box inside was divided into twelve sections by strips of cardboard, and a sensitive plate placed at the back or the bottom of the box, which was about two inches deep. The exposure in a bright north light for four seconds produced a very fair portrait; distance from the sitter, about six feet.

Mr. H. Smith exhibited some negatives which he had taken in Paris, using a Kodak and stripping films. Although the results were not satisfactory, they were interesting. One of the negatives Mr. Smith had expanded by hot water, and managed to get a fairly good printing negative about 4×3 inches; but this method of "enlarging" was not always a success. Hydrochloric acid helps it a good deal, and the negatives must be very dense to begin with, for they lose much of their density in the stretching process. Another interesting result was a stereoscopic slide made by the Kodak. After the first exposure had been made, the instrument was held steady; Mr. Smith then moved to the right a short distance, "pulled a string and touched a button," and the thing was done so far; the rest he did at home.

The Hon. Secretary exhibited six negatives to illustrate various methods of development. They were all on the same brand of plates; the subject, exposure, and general conditions were the same. No. 1 and No. 2 were both developed by pyrogallie acid, to which had been added meta-bisulphite potash in the proportion of four to one of pyro, the only difference being in the alkali—for No. 1 ammonia was used, and for No. 2 carbonate of potash. There was not very much difference in the result; the members considered, however, that developed by ammonia to be the best.

The next four negatives were all developed by freshly mixed pyrogallie acid without any preservative, the difference alone being in the accelerator used. For No. 3, ammonia was used; No. 4, carbonate potash; No. 5, sodium carbonate; No. 6, potash and sodium carbonate together in equal quantities. In this case, as in the former, No. 3 (ammonia) was considered the best negative.

Mr. ABEL HEYWOOD, jun., called attention to an exceedingly good paper by Mr. John Brett, published in the *Camera* of last week.

Attention was called to the outdoor meeting to take place on July 20 for Trentham.

Mr. H. SMITH, the leader, said it was important he should know the number of members who intended going.

Mr. BLAKELBY also called attention to the Bank Holiday trip to "The Dukeries," of which he was leader. Unless fourteen members could decide to go, it was little use taking any further steps. Several, however, gave in their names.

Mr. W. B. WOOD humorously remarked he always found Bank Holiday at such places as photographers liked to go to a capital time for "figure subjects;" if they were not all artistic, there was at any rate variety.

Correspondence.

Correspondents should never write on both sides of the paper.

FILM CARRIERS.

To the Editor.

SIR,—I see in your issue of July 19 a letter from Mr. W. B. Bolton, in which he, instead of replying to anything contained in my letter to you, goes out of the way to give erroneous replies to a letter I sent to him. He asks the reason I wrote to you; I think the reason must be apparent to any one who has read the letter, except to Mr. Bolton himself. I need not here again repeat the beginning of my letter in your issue of July 12.

When Mr. Bolton's advertisement first appeared, giving a description of the Double Carrier, I wrote and told him that I had already patented this form of carrier. He replied that "his was quite different," which is not the case; and he does not, in the face of my last letter even, offer to contradict this. The advertisement also stated that on receipt of "a penny stamp" particulars would be sent. I enclosed a stamped envelope and my own circulars, but Mr. Bolton has not had either the common fairness or business tact to send these particulars to this date. He then quotes a few words from my letter to him, saying that Samuels "does not in his patent claim film carriers." But he quite forgot to

add the following few words, "except in combination with his changing back."

I said in my letter of the 12th, that "Neither the single nor double carriers are new;" the fact being that they date long previous to Samuels' patent. In your leader of the 12th, you draw attention to Merritt's patent of 1854. I had the curiosity to look it up, and find it is for a changing back, à la Samuels, with a silver bath and frame for dipping the plates in the bath. But this has very little relation to the carriers now under discussion, which are not for that purpose; neither has his two pieces of glass with the sensitive paper gummed at the edges to keep the glasses together anything in common with metal film carriers for ordinary double backs.

In 1873 the late Mr. Aird invented a camera on the changing-back principles with plate carriers, as claimed for Mr. Samuels. In the early part of 1875 he, at my request, read a paper before the Edinburgh Photographic Society descriptive of his camera. This paper was fully illustrated with drawings and sizes of parts. The paper, with drawings and descriptions, was published in THE BRITISH JOURNAL OF PHOTOGRAPHY at the time, and will be found in the volume for 1875. From these drawings M. Jonte, of Paris, made, shortly after, an improved "Aird's Camera," with several additions; for instance, an additional part which indicated, by puncturing a strip of paper, the plates that had been exposed, showing also the number of the plate exposed. Mr. L. Warnerke had one of these cameras, a beautifully made one, for plates 9 x 7, and showed it at the Photographic Exhibition in Edinburgh, 1876. The original camera by Aird was also shown there, and both will, I think, be found in the catalogue, of which I have a copy. Should any further proof be required as to the existence of these cameras and carriers, the original camera made by Mr. Aird is still in existence, and in possession of one of his friends, who, I have no doubt, will show it to any one interested. Further, several cameras were made at the time on both Aird's and Jonte's principle, and I have in my possession at the present moment one of the Jonte principle made in 1877, which I can show at any time. I may here say, further, that there are several detective cameras at present in the market with carriers and without double backs, which, if not exact copies of Aird's camera, are at least very near it.

What Mr. Bolton further writes about his carrier is not worth notice, and I have already disposed of it in my former letter. But what I wrote about patent law he evidently does not relish, it being a too solid and indigestible form for him; and what he quotes as to "a valid patent, &c.," is perfectly sound. Though he may think it "cheap," this and more Mr. Bolton may have "cheap," in fact for "a penny stamp" in many of the patent agents' pamphlets. Surely he will admit these men know something of their business.

In conclusion, whether any of these patent claims be good or not, I do not look on "film carriers for ordinary double backs" as of any great importance, as if the use of films becomes general, as I think it undoubtedly will, the use of double backs for plates will correspondingly go out of use, and films be exposed either in thin film slides expressly made, or in changing backs carrying a quantity of films; or if celluloid can be made thin enough, as I already hear it is, roller slides will come more into use. But whatever form it may assume, it will, without doubt, be governed by the universal law of the survival of the fittest.—I am, yours, &c.,

J. M. TURNBULL.

6, Rose-street, Edinburgh.

DISCOVERIES.

To the Editor.

SIR,—I have just read the following, over the signature Henry J. Newton, in the last number of the JOURNAL. "Photography is one of the three great discoveries of this century—the steam engine," &c.

Does he really mean to say that the steam engine was discovered during the present century, or does he mean the locomotive?—I am, yours, &c.,

J. E. G.

Westward Ho! July 22, 1889.

[We must leave Mr. Newton to "cash his own paper." But we imagine that more than three great discoveries have been made during this century.—Ed.]

MR. ANDREW PRINGLE AND THE STEREOSCOPE.

To the Editor.

SIR,—Mr. Pringle proposes to distribute copies of his article on the stereoscope among the members of the Manchester Photographic Society, so that they may judge for themselves as to whether I have garbled him or not. I could wish for no better plan. I contend, however, that such extracts as I gave require no context to modify them; what I represented the character of the paper to be, so far as it referred to the stereoscope, that I believe it to be. The "Pharaoh's serpents" business and such-like are not modified, and cannot be modified, by any context.

A slipshod, misleading paper, such as that of "A. P.," with just a substratum of fact in it, and nothing more, if applied to an individual

would be a libel; it is no great stretch of figure, then, to designate the article a libel on the instrument treated of.

So far as I understand Mr. P., he complains that I did not criticise his notions on art. Although I believe those notions (if the article in question at all represents them) to be just as shallow and as vulnerable as his opinions on binocular vision and the stereoscope, the subject is Mr. Chadwick's, not mine, and I leave him to deal with it.

It is refreshing at my age to be taken for a beginner; I fancy I began this life long before "A. P.," and was a photographer when he was in petticoats, but, as I have never seen Mr. Pringle, I may be misinformed as to this.—I am, yours, &c.,

ABEL HEYWOOD, JUN.

Higher Broughton, Manchester, July 20, 1889.

To the Editor.

SIR,—I ask you to give me space for a few words in reply to the letter of Mr. Andrew Pringle, published in THE BRITISH JOURNAL OF PHOTOGRAPHY last week. I confess it is sometimes inconvenient for readers to follow an argument or a controversy conducted in two different newspapers. Mr. Frank M. Sutcliffe published an article in your contemporary, *Photography*, on the "Influence of the Stereoscope," to which, it will be remembered, I replied through the columns of THE BRITISH JOURNAL OF PHOTOGRAPHY, at the same time giving, I believe, sufficient quotations, context, and argument of Mr. Sutcliffe to make my reply understood; Mr. Pringle then took up the cudgel for Mr. Sutcliffe in your contemporary, to which Mr. Heywood replied at the meeting of the Manchester Photographic Society, June 21, 1889. Until we met at that meeting I had not seen Mr. Heywood for over a month. I did not know he had read a line of the correspondence that had taken place until the day before that meeting, when I received a short note from him, stating that if there would be any time to spare at the meeting, he wished to say a few words in reply to Mr. Pringle on the "stereoscope." Personally, I did not consider it worth my while to reply to Mr. Pringle, having already done so to Mr. Sutcliffe, indeed I have not the time or inclination to reply to all the foolish things one reads.

Mr. Pringle's remark that he "was not aware that I had any other than a scientific interest in stereoscopic photography," should be taken as a compliment to me, for any one to have read my articles on "Stereoscopic Photography," or the stereoscope, without detecting the slightest trace of anything but "the pure scientific interest" was just my intention.

But one wonders now if when Mr. Pringle read the last communication to photographic literature by Mr. Dallmeyer, if he (Mr. Pringle) was aware that that gentleman sold photographic lenses. I assure you, sir, that I never made the same mistake when reading the name of Andrew Pringle—not even when it was printed "Andrew Pringle, Esq." You know the old proverb, "People who live in glass houses, &c. &c." Before concluding, I must acknowledge the compliments which Mr. Pringle has paid to the Manchester Photographic Society. I do not remember that we made any special fuss of him, and he need be under no particular obligation. We endeavour always to treat our visiting brethren with the same kindness, hospitality, and friendship as was accorded to Mr. Pringle, and which, I assure you, would be extended to him again should he choose to visit us.—I am, yours, &c.,

W. J. CHADWICK.

THE FRENCH EXHIBITION.

To the Editor.

SIR,—I read in THE BRITISH JOURNAL OF PHOTOGRAPHY of July 19 a most unfounded, unwarranted, and, above all, uncourteous attack on your Paris correspondent by one Mr. E. Lisk, of Amières.

I have not the intention to enter into a polemic with that personage, who shows as great an ignorance of photography as he does of the use of refined language. I only need draw the attention of the enlightened readers of THE BRITISH JOURNAL OF PHOTOGRAPHY to a letter published in the same number, that of Mr. York (a gentleman known to all). This letter bears out fully the truth of my assertions.

As to the twenty-five centimes, Mr. Lisk must be very unacquainted with printing not to see that it was a printer's error.

I will not deign to refute the multitude of errors he has thrown into print. I will rectify one lest some person (having confidence in his word) desires to make the twenty-four negatives of which he speaks from eight to two o'clock (a day). I warn that person that it is not twenty francs, but forty francs fifty centimes he would have to pay.

Moral: Before correcting others be sure not to make "wrong assertions" yourself.—I am, yours, &c.,

PROFESSOR E. STEBBINO.

196, Rue Legendre, Paris.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, July 31, 1889, will be on a paper to be read by Mr. C. Ray Woods on *Photographic Experiences at the Cape*. Saturday outing at Richmond. Bank Holiday outing at Godalming.

Exchange Column.

*. * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

A banjo, seven strings, machine head, nickel hoop and rim, for half-plate camera and slides.—Address, J. J. BAYFIELD, 5, Upper Hill-street, Richmond, S.W.

Wanted, photographic apparatus in exchange for gentleman's eighteen carat single stone diamond ring, cost eight guineas.—Address, G. I. TUKERMAN-street, Blackburn.

Will exchange Sandringham Club tricycle (Coventry Machinist Company) for full-plate camera, three double backs.—Address, W. ATKINSON, Photographer, Barnard Castle.

Wanted, modern work on chemistry or electricity in exchange for Burton's Photographic and Photo mechanical Printing.—Address, C. FARLOW, 9, Malvern-terrace, Barnsbury, London, N.

Wanted to exchange, Kershaw's instantaneous shutter and pneumatic tube for posing chair with two or three backs. Difference adjusted.—Address, B. H. GIDNEY, Artist and Photographer, London-street, Basingstoke.

Wanted, whole-plate camera with rapid rectilinear lens, tripod, and double back, first-class condition, in exchange for two dissolving-view lanterns in case, by Milliken & Lawley.—Address, A. J. TILLY, 33, Briggate, Shipley, near Bradford.

Wanted, 12x10 modern portable camera, three double backs, tripod, and rapid rectilinear lens, or anything useful in photography, in exchange for first-class modern tricycle complete, also bicycle. Offers invited.—Address, ROBERTSON'S STUDIO, Morcambe.

Will exchange 15x12 rolling press, steel plate between rollers; embossing press by Marion, two cabinet, two C.-D.-V., oval, and cushion-shape dies; Entekin's cabinet-size burnisher. Any one of the above for balustrade by good maker, Optimus half-plate Euryscope, or Optimus wide-angle half-plate, or rapid rectilinear half-plate.—Address, J. EDGE, 380, Stretford-road, Manchester.

Answers to Correspondents.

*. * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co., 2, York-street, Covent Garden, London, W.C."

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

Messrs. Mackintosh & Co., Kelso.—Groups of the celebration of the Ter-Jubilee of the Secession Church, also groups of the ministers who conducted the same.

SAM BEEVERS.—See article by Mr. Thomas Seaton in our last issue.

GRAMME.—Metric weights and measures may be obtained from those who supply chemical apparatus.

H. T. YOUNG.—There are now no makers of such plates, but to a clever photographer their preparation will not entail any difficulty.

W. P. ADAMS wishes the address of a firm making celluloid for negative films. He is anxious to obtain samples unemulsified for experimental purposes.—Perhaps some one will respond.

W. RICHARD.—Mix the colour with albumen and apply in the ordinary manner. Lubricate the prints with a weak solution of Castile soap in alcohol and the colour will not come off in the burnishing.

STUDIO.—You may use the term "Patronised by the Queen," and every member of the Royal Family collectively and individually, if they have patronised you; but beware making use of the Royal Arms.

A. J. C.—The Euryscope of the makers named will, with full aperture, work quicker than their rectilinear, but when stopped down to equal the latter in rapidity there will be no difference in their working.

J. BRUCE.—If you cannot get the prints flat and even enough for copying, the best plan will be to take the book to a bookbinder and get him to remove them, then take the copies and afterwards have them replaced.

BETA.—It is illegal to put the word "patent" on an article which is not patented, and the offender subjects himself to heavy penalties for so doing. It is also illegal to mark a picture "copyright," when no copyright exists.

R. STEWART.—We cannot, for fear of libel, publish your letter of warning against the individual advertising. People who buy second-hand apparatus from strangers ought to take such steps as will protect themselves other than post-dating money orders.

IN A FOC.—If the toning bath becomes discoloured and turbid, it shows that the gold has been precipitated. A dirty dish or bottle will cause the reduction, so will impure materials. Some kinds of paper are prone to cause a spontaneous reduction of the gold.

A. E. BULL.—Blue glass is seldom, if ever, used nowadays for glazing the studio. It was employed to a limited extent many years ago, but has long since been discarded. There is nothing better for the purpose than the ordinary sheet glass of commerce.

BRAZIL.—You cannot do better than place yourself entirely in the hands of the firm you mention. You can rely on their things being good.

FILM.—Celluloid and xylonite are similar compounds. Inquire of the British Xylonite Company, Homerton; they will probably make the articles to your order. We expect, however, you will have to order a large number at a time or they will not undertake the manufacture.

CAUSTIC.—The best plan will be to precipitate the silver in the metallic state by immersing a few pieces of pure zinc. Then well wash and redissolve in nitric acid. By the addition to the bath of nitric acid, a large proportion of nitrate of ammonia would be produced which would be very undesirable in the solution.

F. E.—If the white lac has become as brittle as you describe, it will be of no use for making negative varnish. If bleached lac is kept long in a dry condition it becomes "perished," and is then worthless. To preserve it in good condition, white lac should always either be kept in water or in a jar with a little water at the bottom.

NOVICE.—Let the proportion of bichromate to gelatine be such as will not allow the former to crystallise. Precise proportions are immaterial. Use hot water for development. Acetic acid will also answer. If you have access to our volume for 1883 you will find such optical articles as will probably serve your purpose; if not, write again and enclose envelope for private reply.

R. J.—You are clearly in the wrong, for you are not only exhibiting the portrait without permission, but against the wish of the sitter, as expressed at the time of sitting. That you have not yet been paid for the portraits makes no difference, as you can sue for the amount in the County Court. It looks like a case of obstinacy on both sides. But as, according to your own showing, you promised not to exhibit the picture, the proceeding is any thing but honourable.

W. DE FRERE says: "I have just purchased a set of cutting shapes and a Robinson's wheel print trimmer. This cuts the prints *cushion shape*. I am now told that pictures with the corners rounded off are not artistic, and if sent in to an exhibition for competition they would be condemned at once if trimmed in this manner, however good the subject might be. Is this a fact?"—Different exhibitions have different rules, but we do not remember any set rule that prints with the corners rounded off were inadmissible.

T. Y. HANSTOCK writes: "Can you tell me of any cement, or anything we could mix, for wooden tanks which hold hydrochloric acid, thirty Twaddle. I have tried tar, pitch, and oakum, but the tanks leak yet."—If pitch fails, which we should scarcely have expected had it been properly applied, try marine glue or paraffin. A great deal depends upon the tanks being well made in the first instance. Unless the wood be well-seasoned and carefully joined, it is next to impossible, with any cement, to prevent leaking when they contain acids.

T. J. writes: "Can you tell us the cause of the silver prints blistering? They are all right when we take them out of the soda fixing, but when we put them into the water for washing they go all over little blisters. Most of them disappear when they are burnished, but in many cases the prints are spoiled."—These blisters are often produced when the prints are suddenly transferred from a solution of one density into that of another; or from one of a certain temperature to that of a different one. Keep the fixing solutions and washing waters at the same temperature. Instead of taking the prints direct from the fixing bath and putting them into water, dilute the bath—say to one half strength—and allow them to remain for a few minutes before transferring to the water. Or when taking them out of the hypo, put them in a solution of common salt for a short time prior to commencing the washing.

BLISTERS writes: "Can you inform me how to prevent albumenised paper blistering? I have been sorely bothered of late with paper blistering; it generally occurs during the night in the washing. I have tried salt, ammonia, &c., but all to no avail; the prints blister up as large as walnuts. Can you also suggest anything to prevent the paper from stretching? I get great unevenness in the length of some prints."—This kind of blister is more prevalent in hot weather than in cold. Primarily, they are due to the paper itself, for it will be found on examination that it is not only the albumen that has separated, but that the fibrous surface of the paper has come away with it. If the paper be kept for a longer time before it is albumenised, the defect will most likely disappear; so, doubtless, it will if the albumenised paper be kept for some months. These particular blisters may usually be avoided by completing the washing in a short time. Long soaking enhances them. With regard to the stretching of the paper, all paper stretches when it is wet, but the expansion is always greatest in the width of the web. Longitudinally, it is very slight indeed. There is no way of avoiding this if the prints be mounted wet, but if they be cemented and allowed to dry, and the mount be moistened and the print rolled in contact with it, stretching may be practically avoided.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1526. VOL. XXXVI.—AUGUST 2, 1889.

PORCELAIN PAPER.

ARISING out of the discussion which took place at the last reported meeting of the London and Provincial Photographic Association, on the occasion of Mr. Haddon having explained certain experiments, was the subject of a comparatively little known porcelain paper which, several years ago, flashed upon us with unwonted brilliance, obtained admiration wherever seen, and was withdrawn suddenly from public observation, owing to commercial unpleasantnesses, almost immediately after its introduction. This paper was pure and white, totally free from gloss, and by keeping the print on its extreme surface imparted a degree of brilliance otherwise unattainable, unless with paper coated with albumen. The shadows, consequently, were rich and deep, the whites and middle tints being delicate. From the fact of the surface resembling finely-ground porcelain, it almost naturally received the designation given it at the time—"porcelain paper."

Although the surface is hard and the texture firm—these to such an extent as to prevent the photographic image from sinking in—yet is it not so repellent of water as to prevent its being easily amenable to the action of the sensitising, toning, and fixing baths.

All those difficulties which operated to knock it on the head at the time of its introduction, and which, as we have said, had reference to a commercial disagreement, being now non-existent, and, moreover, the public taste being now cultivated into a preference for, or, at any rate, into a sympathy with matt surface prints, we see no reason why the porcelain paper should not be once more brought into public notice. Just at first, those who may care to try it will have to prepare their own paper, but as the operation is so easy and certain, and, unlike the preparation of sensitive dry plates, can be effected in a well-lighted room, we doubt not that those who do try will succeed perfectly.

While we write this we have not access to all the notes we made at the time when we last prepared paper according to this system, which, if not invented, at any rate was perfected by Mr. Brinckerhoff of New York, and who, when we last saw him, was getting into the evening of life. Still, sufficient will here be said to enable its nature to be well understood.

A sheet of any good quality of plain Saxe, Rive, or other photographic paper is coated with a warm solution of gelatine holding in suspension sulphate of barytes or finely-powdered kaolin. Upon raising the paper from this emulsion it is suspended in the air until dry, when it is immersed in a solution of alum, tannin, or any other substance by which gelatine is rendered insoluble. The body of the paper is thus imbued with the gelatine and its surface has a fine texture, the pores being all filled up.

When the paper is to be used it is salted by floating it upon a bath of chloride of ammonium and water, about four grains to the ounce of water. In this state it will keep well for many months. It is sensitised by being floated upon a bath of ammonio-nitrate of silver. An ounce of the nitrate is dissolved in sixteen ounces of water and strong ammonia added drop by drop, with constant stirring, until the dark precipitate at first thrown down is just redissolved. Although the way here described is that by which the singularly fine specimens alluded to were prepared, yet results indistinguishable from these may be produced by sensitising on a plain nitrate of silver solution, provided that after the paper is dry it is well fumed over ammonia, by which a great degree of richness is imparted to the tone.

After removal from the printing frame the proofs are washed first in plain water and afterwards in water containing a little chloride of sodium, say a grain to the ounce. Then follow toning and fixing, the prints acquiring a fine purple in the gold bath. On removal from the hyposulphite of soda it is recommended to wash the prints in three changes of warm water, followed by a prolonged immersion in cold water.

THE FRENCH PHOTOGRAPHIC CONGRESS.*

On the fourth question, "Uniformity in the mode of measuring the time of admission of light regulated by shutters," Colonel Sebert is again reporter. He commences by stating the necessity of setting on one side all efforts at measurement in which outside influences prevail, such, for instance, as photographing moving objects in which the actual value of the light passed through the lens is not given. The method to be adopted must be based solely upon the geometrical valuation of the different parts of the shutter, and on the mechanical determination of the law of its motion under different condition of regulation and with different diaphragms or openings. It is pointed out that it is not sufficient to measure the total time during which the shutter is open, but that it is necessary to take into consideration the constantly varying conditions of lighting that prevail during opening and closing, and to compare these, in so far as the actual light admitted is concerned, with an ideal shutter opening and closing *instantaneously*. The result of this comparison it is proposed to call the "co-efficient of utility," and to represent it by means of a figure always less than "1" and limited to one or two places of decimals. The total period from opening to closing of the shutter, if multiplied by the coefficient of utility, will then give the

* Continued from page 456.

absolute time-value of the exposure, and will render it easy to calculate with any kind of plate what stop to employ or what regulation to apply to the shutter. It is also proposed to require in future all makers of shutters to mark them not only with the "time of exposure," or total duration, but also with the coefficient of utility.

The additional remarks on the practicability of the suggested reforms, and on the purely mechanical methods of measurement, contain nothing novel or interesting.

The fifth and sixth questions are "A uniform and easy means of adapting different lenses to different cameras," and "Uniformity in the dimensions of plates," and these are dealt with by M. Franck de Villecholle.

The first part of the report deals with the dimensions and thread of the screw employed for attaching the camera to the tripod, but as the details suggested are still to be discussed, it is scarcely worth while to go into them prematurely. With regard to lenses, after mentioning the various modifications that have been proposed in connexion with flanges, mounts, and fronts, the report states that the Committee have decided to recommend a series of standard flanges, the diameter and threads of which are mentioned, but need not be discussed here. A system of adapters is also suggested for existing lenses—in fact the proposals are, in a general way, identical with those of the Photographic Society of Great Britain, and it only remains to be seen whether the details will agree.

In connexion with camera fronts, it is also proposed that these be made subject to some definite rules; that they be made square and without rebates, so as to be interchangeable from one camera to another, and that, like the flanges, they may be constructed of standard dimensions.

Concerning the question of "Uniformity in the dimensions of plates," it is proposed to adopt sizes whose dimensions are 3 : 4, these shapes being considered the most generally useful and pleasing. Nothing, however, is said with regard to the adoption of any international standard of measurement, which seems to be the greatest difficulty.

The seventh and eighth questions fall to the lot of M. Leon Vidal to report upon and deal respectively with—"Uniformity in the expression of photographic formulæ," and "Uniformity in the denominations of photographic processes." In the first case, the question of a uniform system of weights and measures is, of course, mentioned, but no definite proposition made beyond the suggestion that, in all formulæ, "solids shall be expressed by weight and liquids by volume." With regard to nomenclature, it is proposed, "especially in photographic works and catalogues," that "chemical terms be employed in place of the abbreviations which constitute purely a studio jargon."

Turning to processes, it is to be attempted to establish a definite system of terminology, in order to distinguish and describe different processes. Thus "type" and "typie" are to be confined to processes for the production of relief blocks, while "graphic" is to be confined to the description of such processes as "photo-cellographic," photo-lithographic, "photo-zincographic," &c. "Photogravure" is to be divided into *en creux* and *en relief*, to distinguish the two methods, but "helio," as a prefix, is to disappear, as being an unsuitable adjunct to the name of a process in which the *sun's* light may be, and generally is, dispensed with. "Platinotypie" "autotypie," "collotypie," "phototypie," and a host of similar names, are to be suppressed.

The ninth question, "Custom House formalities for the circulation of sensitive preparations," is treated by M. Bordet.

The Committee, in this case, content themselves with expressing a wish that in all countries a dark room may be provided at every Custom House, in which packages containing sensitive materials may be opened, and, further to facilitate the passage of such goods through the Customs, that senders will make them readily recognisable by means of a distinctive label bearing inscriptions in the language of the sender as well as of the receiver.

The last subject for discussion is the "protection of the artistic property in photographic works," and the report is from the pen of M. Perrot de Chaumeux, himself a lawyer, who sums up the conclusions of the special committee in terms of which the following is an abridgment.

The Congress expresses a wish that photographs will be protected by the same laws as those which protect artistic property. Among the special questions to be submitted will be the ownership of the negative. Is it the photographer or the sitter who can claim it? The Committee have unanimously adopted the view that, failing other special agreement, the negative belongs to the photographer. In the case of a portrait, the sitter, or his representative, possesses the right to "the image," and the photographer remains proprietor of the negative. The sitter cannot compel the photographer to deliver up the negative, no matter what price may be offered, but may demand its destruction upon payment of an indemnity.

It has been unanimously decided that the words, "The sitter is proprietor of the image," signify that the photographer cannot print any proof of the negative without the consent of the sitter or party concerned. The same rule will apply to all photographs ordered.

With regard to the right of reproduction, the Congress will propose the following resolutions: Every photographer who shall desire to retain the exclusive right of reproduction of his work will be required to register it. Each photograph, in such case, must bear the name and address of the photographer, or the imprint of the publisher, and, in addition, the announcement "Registered" (*Deposé*). Every photograph sold, or offered for sale, without these formalities having been complied with, becomes public property (*tombe dans le domaine public*), except so far as regards the right of third parties.

Our *resumé* of the various reports has occupied so much space that we must reserve our own comments until next week.

NEGLECTED PROCESSES.—THE POWDER PROCESS.

The powder process, or as it is frequently termed the "dusting-on process," is one that has numerous useful applications, for there is scarcely any department of photography in which it may not be made available. Why this process should be such a neglected one, seeing how useful it may be, is a matter of surprise to many. Although its actual employment is limited, it cannot be classed as an obsolete process, for every now and again some new adaptation of it is being brought forward. Still the fact remains that, in this country at least, it is not at the present time, nor ever has been, worked to any very material extent.

Quite recently, however, the oldest application of the dusting-on or powder process has formed the subject of a patent, and was demonstrated in London before the non-technical press a short time back as a new invention. The "new invention" in this instance is for the production of pictures on ceramic ware. Curiously enough, the first practical application of the

process was for the same thing. Many of our older friends will remember the burnt-in pictures shown by M. Joubert, then of Porchester Terrace, when he read a paper before the Photographic Society, so long ago as the year 1862, on the process for which he had taken out a patent a couple of years previously. Obernetter, in 1864, also patented an application of the dusting-on process for ceramic work.

The powder process consists essentially in coating a glass or other surface with albumen, gum, dextrine, sugar, or analogous substance, mixed with a hygroscopic one, such as honey, glucose, glycerine, or similar compounds, together with an alkaline bichromate. The principle of the process is this: The action of light hardens the film, while those portions which are protected from it remain more or less "tacky," according to the protection afforded by the *cliché*. After the exposure, pigment in a fine state of division is dusted over the film and gently manipulated with a soft camel-hair brush, when the powder adheres to the tacky portions and is rejected by the hardened ones.

From the above brief outline of the process it will be seen that, to obtain a positive image, a transparency must be employed, while for a negative one a negative is necessary. The results obtainable by this process are exceeding fine, while of course any pigment—vitreous or otherwise—can be used. In fact, any material in the form of an impalpable powder is equally available.

Somewhere about twenty years ago the late Mr. Window worked the powder process, commercially, as a means of obtaining carbon pictures on canvas, so as to avoid the intervening layer of gelatine—always an element of suspicion in oil paintings. The same gentleman also patented an application of the dusting-on process to photo-lithography. In this case the powder used was powdered resin, and, after the image was obtained, it was rolled in contact with a heated lithographic stone, upon which it "set off." The principal use to which the process has been put commercially is, perhaps, in the production of burnt-in photographs on enamels, but here, of course, its application is the same as for porcelain. In this direction, however, it is now largely superseded by the substitution process, which is said to yield results possessing greater vigour, unless the image is afterwards reinforced by hand work.

Mr. Cowan, Mr. Faulkner, and others have employed the dusting-on process, commercially, for producing pictures on opal glass. For this work it is eminently adapted, inasmuch as there is great scope for producing a variety of effects, as the pigments can be applied locally, and only where they are required. Therefore, better results in many ways—in vignetting, for example—can be obtained than by any of the other methods of making "porcelains." Of course any colour pigment can be used, and its tint may be further modified by the local application of one of another hue. Some years ago Mr. Werge published a method of introducing backgrounds into negatives by the powder process, and produced some excellent results by its aid.

For the improvement of negatives the process is of great value. The method of using it in this direction has frequently been referred to in back volumes. With it we have often converted into good printing negatives those which were so thin that they would not yield to any other method of intensification. The method is this: The back of the negative is coated with the sensitive mixture and exposed to light through the front; then the powder—in this case plumbago—is applied in the ordinary

manner, so that, in the end, a second negative is obtained on the back of the original one. And, what is more, as the plumbago can be applied locally, we have the means of increasing the density in certain portions, while others, if necessary, may be left untouched.

One of the most useful purposes of the powder process is in the reproduction of negatives which are required to be reversed, as they are in several of the photo-mechanical processes. Here we have the means of obtaining just what is wanted, direct in one operation, without the intervention of a transparency, so that the utmost possible sharpness, so essential in these processes, is secured.

Ere this, many of our younger readers have doubtless exclaimed, If the powder process is such a valuable one, and its applications so multitudinous, how is it that it is so little practised? Well, there is a little difficulty in the way, except, perhaps, for small sizes, and that is in the ever-varying climate of this country. As the process is dependent upon the hygroscopic condition of the film, it follows that its composition and the manipulations have to be modified to suit the prevailing humidity of the atmosphere at the time of working. Conditions which would yield excellent results one day, when the atmosphere is dry, would totally fail on the next, if it happened to be damp and humid. Nevertheless, when these conditions are thoroughly understood and compensated for, there is no difficulty whatever in the process.

WE understand that the Jurors of the Photographic Section at the Paris Exhibition, of which Mr. W. England was chosen Vice-President, are getting near to the end of their duties. The task of examining the exhibits has been very heavy, as the exhibitors in the French section alone are nearly 300, and added to these are those of foreign countries and the French colonies, therefore our readers may form some idea of the amount of work the Jurors have had to do, and which has employed them several weeks. However, as a little relaxation to their labours, they have had invitations to the President and to the British Embassy, and no end of dinners, and a special invitation to Jurors only was given to a programme at the opera. We may add that we have every reason to believe that the British exhibitors will have every reason to be quite satisfied with the awards, which will soon be published.

WHO, among all the British dames, would behave as nobly as Miss C. W. Bruce, of New York, has done in the interests of science? This lady has presented a sum of over ten thousand pounds for a telescope and appliances to be exclusively devoted to the photography of the heavens at the Harvard University, Boston, U.S.A. Such generosity deserves to be placed on record in every place throughout the globe.

THE employment of chlorophyll for the production of colour sensitive-ness in gelatine plates has been thoroughly worked out by Mr. Ives, who recommends the leaves of blue myrtle as a source of this chemical. It is unfortunate for the use of this particular colour sensitiser that it is of rather indefinite nature, authorities being divided upon its preparation, its properties, its composition, and, indeed, as to what should properly be included under the term. In a recently published treatise by Dr. E. Schunck, he looks upon it almost as do Messrs. Oelletier and Caventon, as "simply the substance, or, it may be, the mixture of substances, to which the green colour of ordinary healthy leaves and other vegetable organs is due."

OUR chemist obtains his chlorophyll in a particular method, which Dr. Schunck condemns, seeing that it is readily soluble in water; indeed,

he believes that it has not yet been obtained in a state of purity, the method, by the aid of alkalis, for example, giving a substance which is rather a modified chlorophyll. His process for making an approximately pure solution is fairly simple. He mixes alcoholic extract of grass with twice its volume of water and agitates with ether. The ether takes up chlorophyll (and other substances) and leaves certain yellow colouring matters behind. The indications of its solutions under spectroscopic examination are very interesting. Like the more familiar eosin compounds, they are fluorescent, and it may be noted that the writer of the treatise believes that the bands of absorption at the blue end of the spectrum shown by chlorophyll solution are due not to that body, but to some other substance. The whole work is very interesting, and deserving of attentive examination by all who take any interest in such topics.

It is remarkable that so little interest is taken at the present time by photographers generally in the subject of orthochromatic plates, the fitful zeal in experimenting that characterised photographic literature a year ago being apparently quite exhausted. And yet good, substantial work is undoubtedly being done in many directions. Quite recently our transatlantic contemporary, the *Photographic Times*, called attention to the work done in New York in this direction. As in this country, ready prepared plates are to be bought, but more particularly is attention drawn to the employment of azaline, which is not a particular chemical compound, but a mixture of cyanine and ehinoline red. It is stated that this sensitiser is used by Mr. Kurtz in his extensive reproduction establishment, and that the results are most successful, embracing the correct rendering not only of green in its various shades, but of scarlet, crimson, and even the pigment vermilion in true value.

THE use of compressed oxygen has almost revolutionised magic-lantern work, so useful and handy are the cylinders over the familiar, cumbersome gas bags. To the successful working of the Messrs. Brin's process of preparing oxygen much of this is due, and every development in the direction of improving the manufacture, and so cheapening the product, is to be welcomed. Mr. Arthur Brin has lately patented a new piece of apparatus—a rotary retort of special construction—which he anticipates will greatly improve the manner of production so as to obtain the largest amount of oxygen in the least time, and with the least expenditure of mechanical work.

WE have not yet arrived at the time when oxygen is laid on from the main, like coal gas, for illuminating, though it was promised some time ago by some sanguine inventors that very shortly oxygen should be so laid on, and at as cheap a rate as coal gas. But even apart from such luxuries of science as oxygen turned on at will from a tap, it cannot be doubted that the further cheapening of oxygen would be likely to thoroughly revolutionise existing systems of illumination in the studio. Coal gas alone has been tried and abandoned; every one can gauge the capabilities of magnesium; but an oxyhydrogen light, even by the aid of cylinders, ought to be able to be so utilised as to become a thoroughly efficient and cheap method of "lighting" the sitter. If a suitable system were devised, and the best burner adopted to give a light both strong and actinic, it is very probable that electricity would be "played out," so cheap would a light thus produced be found in comparison with the cost of working a dynamo.

HOUSE agents and others who utilise photography for advertising purposes are evidently becoming fully alive to the fact that prints on albumenised paper cannot be relied upon for permanence in exposed situations. Hence many, as their windows and different railway stations testify, are now having their work executed in platinotype, or on bromide paper. They also find it is to their advantage, as we recommended years ago, to secure pictures of a more artistic character than they did formerly. A well-lighted picture taken from a well-chosen point of view produces a far more favourable idea of a house or an estate than does a haphazard photograph taken, often, under adverse conditions.

FOR rapidity of production photo-mechanical processes have a keen competitor in gelatino-bromide paper. Here is an example. A thousand portraits from one negative were required in twenty-four hours. The order was accepted, completed, and delivered within the prescribed time. The prints were uniform and excellent in quality, and a far larger number could have been supplied if required. By what mechanical process could a like number of prints be obtained in the time, may we ask? In all mechanical processes a printing plate or mould has first to be made, and this often entails the reproduction of the negative. With bromide paper, however, the prints are printed direct from the original negative by artificial light, at the rate of two or three hundred an hour.

WHEN the weather forecast for the day prognosticates "thunder locally," some fine cloud effects may generally be anticipated. This has been well exemplified on several occasions lately. Last week there were some glorious masses of heavy clouds about with a strong sun shining behind them, giving some portions the brilliancy of molten silver. Excellent studies might have been secured in most parts. Such cloud effects as those alluded to are only useful as studies of clouds, and are not suitable for printing into ordinary landscapes. They may, however, frequently be employed in seascapes with excellent effect, particularly when the waves are in a somewhat turbulent condition.

How very unseasonable often are the specimens shown in photographic show cases. At the present time every person one meets is clad in light summer attire, yet in a large proportion of the pictures exhibited in show cases the sitters are in winter costume. Portraits of ladies in furs, velvets, and other heavy clothing, look as much out of season during the dog days as do muslins and summer garments at Christmas.

ON THINGS IN GENERAL.

OH, sulphite of soda! how many sins are committed in thy name? Such was the thought that passed through my mind when in "Foreign Notes and News" I read that Herr Paul Baktin recommends, in reply to numerous inquiries, the following formula for concentrated hydroquinone:—

"In 500 c.m. of water, warmed in a flask sufficiently large to allow of a convenient shaking, are dissolved 200 grammes, chemically pure, sodium sulphite, &c."

Now, not to dwell on the fact that a flask thin enough to allow of being heated is about the last thing in the world to drop crystals into without risk of a smash, which catastrophe, failing the placing of crystals within it, would be almost sure to follow the slacking of crystals, I should like to know what would be the value of a solution so made! Sulphite of soda dissolved in little more than twice its own weight of water! This is possible in hot water, but when the solution cooled, crystals would be found to fall out in large quantities. This is not the first time by many that this absurdity has been recommended: I trust we may have seen the last of it, but I felt I must protest. Sulphite of soda softens the film, hardens it; slows the development, accelerates it; does not do the negative one bit of good, is invaluable for the production of first-class results; the commercial salt will answer perfectly, none but the purest should be employed: and so on, *ad nauseam*, are we told and contradicted by a lot of formula mongers who neither know anything about the substance itself nor have any experience of its use. Even metabisulphite—what a pretty name!—where do we find it in chemical literature? Will some one please tell me of his own knowledge and practical experience whether, if he were supplied with a solution of this salt and another solution made by dissolving a mixture of the salts commonly known as sulphite and bisulphite of soda, he could tell one from the other by any observation of its action in a developer? I don't know if I possess a special infirmity of temper, but I do always feel angry when I see these impossible feats of solution mentioned.

The meeting of the Parent Society last week was rather interesting, the subject of ownership of negatives again coming to the fore.

Personally, I cannot see any possible stand being made for the morality of the claim for the sitter to have possession of it; if it be admitted that when a sitter previous to sitting announced his intention of claiming the negative to be made, he would be uniformly told that an extra charge would be made in that case. Leaving this point for decision as a matter of polemics, I commend to every one taking an interest in the topic Mr. Debenham's pithy statement of the case: it embraces the whole point in discussion, and gives in a few words a logically and morally correct position to take with regard to the subject—"The property in the negative was the photographer's, but the right to use it was joint." If these words were placed upon every picture sent out their justice would be self-evident, the public would see the real rights of the artist and would not be afraid of undue advantage being taken of them.

At the same meeting, too, the objections to the French sizes selected for presentation to the Congress of Photographers as a topic of discussion must be felt to be quite just; the nearer they are to square the better, for though it is easy enough to trim a print to size when it is almost as broad as long, there are occasions when a narrow plate would be actually useless through its failing to include a particular portion of the subject. Let us turn to the catalogues of the fine-art material dealers, and look at the sizes of canvases on stretchers: we find almost all proportions set with a leading distinction between the so-called portrait and landscape sizes, the latter being the narrower in proportion to length than the portrait sizes. The moral to be drawn from this is to adopt a proportion that will cut to any size, such an one, for example, as 12×18 being very unreasonable. The plan of having two sets, a broad and a narrow, would lead to too much variety. Let prints be cut exactly to a size that suits them, but keep the negative sizes as few as possible.

The eternal ten per cent. question is cropping up again, and once more a new rendering is given, Mr. Haddon recommending that an ounce of the required substance should be dissolved and the bulk made up to measure 4375 minims, that is to say, a little under nine fluid ounces. This is confusion worse confounded, and is ten per cent. in no way. If any one wishes to compound a ten per cent. solution—I suppose there are such brave men still living—my recommendation would be to dissolve one ounce of the required substance and make up the bulk to ten (not nine) fluid ounces. Then, if an ounce of the substance was needed ten ounces of the solution would be measured; if half an ounce were required, ten half ounces—i.e., five ounces—would be measured, and so on. Contrariwise, whatever number of measured ounces was taken would contain one-tenth of that number of ounces of the substance dissolved. But, as Mr. Bolas very properly observed, a decimal system is very bad, one of the worst for weighing out quantities. Unfortunately, it has seized hold of the scientific mind, and it looks as though in the end every one would have to bow down to it—for a time. "For a time" I say advisedly, as I hold a very strong opinion indeed that both decimal and metrical systems are a complete mistake for practical use; they are cumbersome, awkward, and incapable of neat and expeditious expression in practical operations. What a nice difficulty we are building up for our descendants in the distant future, who when they build up a new and practically useful system will wonder how their forefathers with a duodecimal system partly in use could with open eyes adopt so awkward a mode of measuring as doing it by tens!

FREE LANCE.

ON THE COMPARATIVE VALUES OF IMPRESSIONS FROM WOOD-BLOCKS, STEREOTYPES, AND ELECTROTYPES, FOR REPRODUCTION BY PHOTOGRAPHY.

[A Communication to the Photographic Club.]

MR. FOXLEE having at the last meeting stated that he had been successful in getting, with the requisite degree of sharpness, photographs from woodcuts in the earlier numbers of *Punch*, and referring to me as being able to furnish some particulars in respect of engraving upon wood, I felt, on the spur of the moment, somewhat embarrassed how to treat the subject without too much diverging from the point in discussion, which I take to be the most successful means of obtaining by photography duplicate copies, with equal clearness of line, of the originals from the line engravings of the present day.

Now it seemed to me, being acquainted with the changes that have taken place in the reproduction of duplicates from wood-blocks, that

the original question was still in abeyance, for, although Mr. Foxlee may have been successful in the instance mentioned, at a time when the illustrations were printed direct from the woodcuts, it was inapplicable in this respect—that at the present day electrotypes of engravings upon wood are used and not the woodcuts themselves, which are carefully stored away until the wear of the electrotypes necessitates a fresh re-casting, thus ensuring a clear impression of the illustration as occasion may require. Engravers allow that sharpness of line is most perfectly given by the lines engraved in relief upon boxwood, and that it allows of greater brightness and depths in the blacks; implying, of course, direct contact with the material upon which they are impressed—the paper.

Like other descriptions of engraving, although a large number of impressions could be taken from the wood-block, it had necessarily a limit from the wear exerted on the lines by the repeated press upon its surface serving to thicken the lines, and so render the cut useless. When such was the case—I am now speaking of its earlier history—it became necessary for a fresh drawing to be made, and the whole subject re-engraved. If not too much worn, and rescued in time, a facsimile could be obtained, and a saving of expense effected by a transfer taken in the following manner:—The block having been carefully washed and cleaned, it was again charged with ink, and a proof impression taken from it. So far, it was done with. A boxwood block of the same size was then procured, the face of which was charged with a wash of cyanide of potassium; when it had become sufficiently dry to be only just damp, the proof impression was laid upon it, over which was laid a thin piece of millboard, and the impression rubbed down upon the surface by the aid of a burnisher. It was then placed in the hands of the engraver, who was thus enabled to engrave it facsimile—line for line. Much about this time came the several inventions to improve upon the art, all of them mechanical, and all, from a certain mealiness or rottenness of line, failing ignominiously. Then came the first important change—the reproduction of the block by the stereotype process, and afterwards the electrotypes process. The first required careful examination from the frequency of microscopical air bubbles between the lines, which had to be cleared away by use of the graver; the latter process was free from this objection, and for the better class of illustrations has entirely superseded the other. [Some woodcuts were then passed round with direct impressions, illustrating the superiority in fineness and solidity of line of a direct impression from the wood.]

WALTER RAY WOODS.

PHOTOGRAPHING INTERIORS.

THE great difficulty encountered in the photographing of interiors by daylight is in the securing of harmonious illumination: certain portions adjacent to the strong light streaming in from windows opening on the street or courtyard receive the allopathic dose of light, while others get the homœopathic thousandth dilution.

I say nothing about the windows themselves, since photographers who have had much experience can alone do justice in the denunciation of the great enemy of interior photography—halation. I know all about the various devices which have been suggested to overcome both irregular illumination and halation, but these remedies demand the wholesale sacrifice of light—just what is needed most of all in an interior—and the consequent loss of time, the greatest count to the practical photographer. Good exposure on interiors with daylight is often out of the question if one wishes to have a soft, pleasing picture; but thanks to the march of improvement we are independent of the sunlight, who never seemed to care to work for us satisfactorily when we wanted him to come in out of doors and scour around the corners of dark rooms. Since the introduction of the new magnesium light it is possible to shut up all the windows and yet produce results quite equal, and in many cases far superior, to anything obtained by daylight. Minutes, or rather seconds, will now do better work than formerly was secured by exposure of hours' duration.

I remember in the days of wet photography being sent to photograph an exhibit at the Centennial Exposition. After preparing the special collodion necessary for long exposures, that is, treating it to as much water, drop at a time, as it would carry, I coated a plate therewith, and started for the scene of action. The situation of the exhibit was in a rather dark corner, and I calculated that it would take at least an exposure of half an hour. My camera was set up—not a very easy task (a 20×24 size)—the focusing accomplished by mounting a step-ladder, the holder placed in position, and the slide drawn. I now determined, while the chemicals and the lazy light were doing the work, that I might rest from my labours and let my works follow me, the time being near the close of a warm summer day. Either monotony of the exhibit (piles of chesses, arranged by some æsthetic

eye in columns and arches) or the odour arising therefrom, or weariness, or all combined, caused me to fall into a peaceful doze. How far I had travelled in the land of dreams I know not; all I knew at the time was the call to consciousness by the rough salute of the guard, that closing time had come, and the certain feeling that my exposure was either ruined by over time or the drying of the collodion film.

My traps were soon in order, and my march made double quick for the dark room. Thanks, this time, to the slow light and the slow plate, I found I had a most beautiful negative, only regretting that *technique* had not expended itself upon something more beautiful. Had I possessed the means at present so abundant for securing exposures in dark corners, I might have made my exposure and afterwards taken "my rest at my ease in my inn."

The facility with which exposures on interiors may be made with magnesium light ought to make it more popular with practical photographers, but they seem to have such an enormous share of conservatism that they are afraid of anything championed by the enterprising amateurs. The only objection to magnesium is in the fumes; but these are not serious, and the householder seldom or never objects. Pure magnesium in powder may be used, or the flash-light compounds. The latter have the advantage of accomplishing the work in a much shorter time, a fraction of a second being sufficient to secure a beautifully exposed negative with a single charge of powder. Generally, when pure magnesium is used, two or more charges are necessary, and, of course, it would be impossible to secure figures in the picture without showing signs of motion.

The addition of figures adds very much to the life and beauty of photographs. A domestic scene, consisting of the family at their usual pleasures or tasks, takes away the idea of desolation which the average interior picture conveys.

It is true that several simultaneous charges of pure magnesium could be ignited in different parts of the room and so augment the quantity of actinic influence, but the conflicting shadows so produced, cross-shadows as they are called, give a very unpleasant, not to say unnatural appearance to the picture. So I generally make use of the blitz-pulver compound, which requires less material and is more brilliant, though more noisy in its work.

It requires some judgment in determining where to locate the source of illumination so as to properly light up the objects and to cast the shadows in the right direction. I have found it advantageous to place the source of light rather high up, so as to avoid the formation of lengthened shadows on the floor.

Care must be taken that the flash is not so placed as to cause violent reflection from polished objects, and special precaution observed to keep mirrors from reflecting the light into the lens. The reflections from china and glass are most beautifully rendered by the magnesium flash, and if the source of illumination is properly managed, the reflection in the mirrors of the objects in the room adds much to the effect.

By the use of the magnesium light it is possible to obtain in the picture the view of other rooms through doorways, &c. Vista after vista may be secured with very little additional trouble. An exposure is first made upon the principal room, the cap placed on the lens, and a smaller diaphragm used to secure the proper definition in the outer room; the cap is then removed, and a charge of powder ignited in a part of the outer room where the light will not flash in the lens. In this way several exposures may be made upon the same plate.

I have obtained some very pretty effects by first securing views out of the window of the surrounding landscape, with hills, fields, and cottages, then drawing the curtain and exposing the room by means of a flash. Of course, a very small stop is used in getting the landscape, so care must be taken to remove this and to substitute a larger one when exposing for the interior.

The lens I employ is a Ross portable symmetrical, a most excellent instrument for interior work, and especially for flash-light interiors, combining considerable angle with great rapidity and perfect definition.

Some difficulty will be encountered in focussing interiors by reason of the faint illumination. I always make use of a candle to illuminate a printed page of a book or newspaper. By getting the type sharply defined, I am sure that the objects in its plane are also sharp. The lighted candle is also very useful in determining the limits of the picture; by moving it to the right and left it is easy to see just where your picture stops. I also have an assistant move it along the base line of my picture on the ground glass, and when it moves along without any eclipse I am sure that nothing in my foreground will come too obtrusively into the view. When the image of the candle disappears, I know that some object is in front which ought not to be there, so its removal is at once effected.

A word about the groups in a picture of a room. The figures should always be so arranged that the impression is given of life and animation. All set-posing, as if the people were lay figures, must be avoided.

The figures are best arranged in groups of two or three, as if engaged in conversation, or occupied with some amusement. In this way I have disposed of ten or a dozen people in one view, and the effect is much more pleasant and picturesque than when the arrangement is in the form of a pyramid, or any other set artistic disposal. W. R.

—*American Journal of Photography.*

ON THE DETERIORATION OF DRY PLATES.

I.

THERE can be no question about the fact that much, if not, indeed, the entire popularity which now attends the practice of photography by so many ladies and gentlemen is due to the advent of the dry plate, and much of this popularity depends on the belief that any one can proceed to a dealer and there procure a stock of some favourite brand of plates they have been recommended to use, which will keep either before or after exposure for any length of time, provided certain due precautions be observed, such as exempting them from damp, certain fumes of sewer or other gases, light, &c.

But is it the case that a gelatine plate, no matter how carefully stored or placed away, will keep indefinitely? Such a question as this, I feel, must be of considerable interest to the vast army of amateurs who now look upon photography as a balm for no end of business worries, and also one of the most tangible and pleasant occupations they can engage in. I therefore propose to relate a few of my experiences.

So far back as the spring of the year 1880 I determined to set about investigating this subject, and with a view of coming to no sudden or rash opinion. I commenced the inquiry by placing away several brands of plates under varying conditions of packing. From time to time I used up these different plates, at the same time closely observing their behaviour under varying circumstances. At the present moment I have beside me plates I acquired so far back as 1881, and this week I have been using some I bought in 1884.

I am aware that this subject opens up a wide field for thought, and that closely allied with the matter in consideration is the question of packing, and, as I sometimes also think, the unpacking. For with most amateurs (not so much as with professionals) the breaking into a fresh box or package of plates means very frequently the bundling up of a portion of them again, either with the same wrappers, or it may be filling a set of slides, and there allowing the plates to remain for an indefinite period. Or it may be that with some workers the belief prevails that when a fresh box of plates is opened the best means to employ is to place those not required at the time into some grooved box.

During the course of the last nine years I have studied carefully the behaviour of numerous plates so stowed away, and at last I have formed a pretty strong opinion that the best way for an amateur to keep odd lots of plates is by placing them face to face, and putting them into a metal box of such dimensions that they do not move about when same is lifted or used. I have long given over the use of grooved boxes for stowing away plates, but on this point I may have more to say later on.

From about the years 1880 to 1882 I must confess having a decided opinion that, under careful keeping, a gelatine dry plate would respond to and yield a good negative at any time after long keeping, and I was strengthened in this belief by a series of tests which I applied to a number of Wratten's plates, ranging from 1880 to 1885. In the month of June, 1880, I acquired from a dealer in Glasgow three dozen $7\frac{1}{2} \times 4\frac{1}{2}$ Wratten's plates, two dozen of these were ordinary, or, as some term them, slow plates, the other dozen were what were then and now termed instantaneous.

The first portion of this parcel which I determined to try was the slow plates, these were exposed at the time and yielded splendid negatives. The remaining box I placed away unbroken, and never touched them till the month of May, 1886. This box was placed inside a wooden box in my dark room, and was frequently handled and tumbled about during the years between 1880 and 1886, but not opened. In May, 1886, I determined to put to the test the keeping qualities of these plates, and proceeded to expose two of them on a well-lit landscape (time, 6 p.m.), with plenty of low shadows; at the time I exposed on the same view a plate from an ammonia formula which I had kept from September, 1884. I developed them with the

same developing solution, namely, Wratten's formula. Result: the slow landscape of Wratten's came out most beautifully, yielding one of the best negatives I have in my collection, while, on the other hand, the ammonia plate fogged up and was utterly worthless.

The remaining ten of these plates I placed away face to face in a metal box, which was stowed inside another white wood box, and last year I used these up with equally satisfactory results.

So much for the slow landscape plates. Now as to the behaviour of the instantaneous ones.

The first portion of these I placed in my slides (six plates), and proceeded in the month of July, 1884, to expose some of same on steamers calling at Craigmore Pier. Three of these plates were exposed in good light on the pier. I used stop; I think it was about $f/10$, at any rate it was the widest stop that Ross at that time issued with his rapid symmetricals, and before the introduction of the new series of standard stops. On development I judged the plates somewhat under exposed, and on forcing up I got a fair dose of green fog. The remaining three plates were taken out of the slides and placed away in a mahogany grooved box along with a few other ammonia plates which I placed in the box along with them.

I find from my jottings that I exposed two of these (Wratten's) in May, 1885, with the same result—green fog on development. The remaining seven plates I have beside me still, and shall proceed to test them with a different developer very shortly.

Now, during the years 1880 to 1882, I used many gross of Wratten's instantaneous plates and got uniformly good results therefrom. Many of these plates I must have had beside me from one season to another, hence my forming the opinion that a gelatine plate under certain conditions of storing would keep almost indefinitely.

With the introduction, however, of plates of more exalted sensitiveness, I soon found a change coming over the spirit of my dream, and in 1884 I came to the conclusion that several brands of plates which were then being placed in the market would not stand on the same footing as regards keeping with those which the public had first offered to them.

About this time I became connected with a plate-making company, and I had through this circumstance, perhaps, as good an opportunity as any one of forming an opinion as to the merits of a boiled *vernus* ammonia emulsion. It will not be telling tales out of school when I say that I soon came to the conclusion that an ammonia plate would not keep for any length of time, either in a packed or unpacked state. I must, however, confess that perhaps the best negative I have in my collection is one made on a plate coated with an ammonia emulsion, but this plate has a history which were I to relate might interest many.

Being a Director of a Dry Plate Company, I was asked one day by the manager to accompany him in testing a fresh batch of plates coated with an emulsion that he had specially prepared for a large firm of photographers.

I remember well taking my empty slides and having them filled direct from the drying cupboard; a few hours later on these plates were exposed; results, splendid. Several of these negatives have been a joy to me ever since. Now, being so satisfied with the results, I at once got a supply of plates from this same batch. Knowing the emulsion was A1, judge of my surprise when not very long afterwards, I don't think it was beyond six weeks, I was startled with nothing but absolute failure when exposing some of what were said to be the same batch. I found these plates to yield nothing but fog and black edges. I took care to make inquiries as to their being from the same batch, and have every reason to believe such was the case.

I tried to account for the breakdown by some action of my own, but failed to account for the rapid deterioration in any way.

So much for tests applied by me to Wratten's and a plate by another maker, which I have termed an ammonia plate.

In September, 1883, I determined to make further tests by placing away some 5x4 Gray's plates; these I placed in their regular boxes and wrappers, and they lay quite undisturbed in a parlour cupboard, which is quite free from damp, until last week, when, cogitating over this article, I determined to put them to the test of time. I was most agreeably surprised to find them develop up with Wratten's ammonia formula into fine bright negatives. Not so with a supply of Bennett's plates, which I have kept from, I think, early in 1881; the latter on development gave signs of insensitiveness, and would stand no degree of forcing.

At present I have beside me a supply of Nelson's plates which date from 1882 to 1883; they are untouched, and packed as they left the works in wooden boxes. In the course of a day or so I mean to place these along with a supply of ammonia plates made by a local maker to a fair test side by side, and in my next I hope to give results of the

same, and also to detail in a somewhat full manner the deterioration a plate is likely to show by careless packing or keeping after being opened to the influence of the atmosphere. T. N. ARMSTRONG.

COLOURED PHOTOGRAPHS.

IV.

NOTWITHSTANDING the beauty and excellence of so many of the photographs produced by our leading photographers, I think we must all concede that as *correct portraits* they are in many and very remarkable cases defective. By this I wish to say that a *plain* photograph (even aided by the skilful and artistic retoucher) may be perfect in all its mechanical and chemical details and yet be wanting in that strong resemblance to nature which is absolutely essential in order to make it a life-like portrait. The cure for this trouble is to be able to skilfully and artistically apply colour to it. This done successfully a life-like portrait will result.

I am sure all those who have practised photography for any time will easily recognise the truth of all this; who, with any lengthened experience, will not have had to operate upon subjects, that, owing to the chemical peculiarities of photography, cannot be rendered in any form which pretends to truthfulness, and will never be faithful portraits until they are coloured. Such pictures must ever be imperfect and untrue as depicted in the monotint of photography. A most skilful operator may have produced them, with every care and attention, artistically posing the subject, judiciously balancing the distribution of light and shade—indeed, realising what may fairly be considered a *picture* (and a successful one), yet as a *portrait* it is valueless. All this may be traceable to the chemical peculiarities of photography, but there the defects remain and no excuses can take them away. Besides, there are very many subjects that would be impossible to depict in a portrait picture without colour. Colour is an essential to them. It is their colour which first appeals to you, and must, consequently, be an all-important factor in the production of a portrait.

To colour photographs then, with any degree of success, one must have a thorough knowledge of what they are going to do. That manipulatory skill which enables one to apply colours to a photograph, with more or less success, must not be considered as sufficient for what we have before us. This might be all very well for what we may call a *tinted* photograph, but not for one that is *coloured*. To carry out my idea, therefore, that a portrait full of style and merit can be painted on photographic base, we must try to lay in a store of knowledge quite equal to the artist who might not deign to use a photographic foundation for his work. Without having a sound primary knowledge of the natural value of colours our work will always be weak as regards treatment and devoid of style. The natural weight of the photograph, too, will assert itself, and also detract from the value of the painting.

In studying the art of colouring, whether on photographic base or otherwise, our first endeavour should be to acquire a thorough knowledge of the natural value of colours, their various relations and harmonies, their many effects and balances, if I may so say, either in combination or juxtaposition. It may seem strange that, although we have a somewhat limited number of colours to start with, by their skilful combinations we can produce an almost endless variety. The *primary* colours are only *three* in number, but how many various tints can be produced by their skilful blending I cannot really say. In a picture this is not all, even; for many of its most striking beauties may not be so much the brilliancy or attractiveness of the absolute colour as the delicate harmony produced by the *combination* of such colours and tints as mutually lend a charm.

In landscape, one is more likely to observe the endless variety of colours presented to the eye than in any other form of painting; nature being, I might say, exhaustless in its variety of tints. So, too, in fanciful or imaginative portraiture one will find more varieties than in portraiture where nature pure and simple has to be imitated. I do not mean by this to say that even the human head does not possess very many and delicate colours. On the contrary, it is just in the keen appreciation of these delicate tones that an artist of more than ordinary capacity will show himself. Where a very ordinary colourist would be satisfied with a warm or pinky colour for the general tint of the skin, the skilful artist would employ a number of delicate tones to carry his colours over the head and give it life and roundness, which his less gifted rival might even fail to appreciate. Needless to say, in photographic colouring there is not such a vast range open to an artist as where he has to produce all effect himself. Nevertheless, works of very great merit can be produced, and it is

really marvellous the difference observable between the pictures produced by the common or garden photographic colourist, who has never made a study of harmonious colouring or the fundamental rules of art, &c., and those painted by an artist who keenly appreciates all the delicacies of light and shade, relief, &c., and who also benefits by the knowledge he has acquired in skilfully blending and arranging his tints in such manner as to impart a further charm to his work. Yes! the work of the one is simply valueless, while the other's may be well worthy to be considered a work of art. This, too, notwithstanding the primary help that photography has lent him.

In portraiture, as in poetry, an artist can claim a certain license, a freedom of treatment. Although there will necessarily be certain colours which *must* be faithfully reproduced, the artist can almost have *carte blanche* as to choices of colours for the draperies and backgrounds, &c. This liberty may not appear to be of any great importance to one who does not know and does not think, but all the same it is of very considerable value to the *portrait painter*. In this way he is enabled, by a skilful arrangement of colours and tints, to enhance the value and beauty of his *complexions*, and yet not in the least interfere with the general harmony of his picture. An appearance of transparency, too, may be realised which, had this liberty been denied the artist, he could not hope to secure.

Light is the source of all colour, and without it there is none naturally. A beam of pure white light can be divided into three distinct rays of different colours—red, blue, yellow—these being the three *primary colours*. By the various blendings of these three colours every conceivable hue and tone can be obtained. White light, when decomposed by passing through a prism, produces a scale of the most beautiful and varied colours; this is what is known as the *solar spectrum*. In this spectrum there are seven colours, the same as are to be seen in the rainbow—namely, violet, indigo, blue, green, yellow, orange, red. The belief at one time was—founded on this fact—that each and every one of these colours were elemental. Later and more careful examination, however, proved this theory to be a fallacy, and resulted in the establishing of red, blue, and yellow as the *real* and *only primaries*. All the other tints were simply the result of these primaries overlapping each other, and so producing a distinct colour, as would their mixing upon a pallet.

General harmony in a picture is traceable to the artist's success in happily disposing of these three primary colours and their various combinations. At the same time I may say that this quality is one of, if not absolutely the most essential one that a picture can possess.

The mixing in certain proportions of any two of the *primary* colours produces what we term a *secondary* colour. Now this secondary will be found to be *complementary* to the remaining colour. To make this clear, the mixture of *blue* and *yellow* will produce *green*, and green will be found complementary to red. The mixture of *yellow* and *red* produces *orange*, which is complementary to blue; and the mixture of *red* and *blue* produces *purple*, and which is complementary to yellow.

A very good way of fixing this on one's mind is to make a circle and divide it into six equal parts, and place a number in each up to six. This done, pass a wash of red over 1, 2, 3; when dry, pass a wash of blue over 3, 4, 5; and then yellow over 5, 6, 1. Now see what we have: a complete table, as it were, of our primary colours with their complementary secondary colours. Space 1 is coloured orange by the combination of red and yellow, that opposite to it being the primary blue, to which it is complementary. No. 3 is coloured purple by the combination of red and blue, and is opposite the primary yellow, and to which it is complementary. In like manner space 5 is coloured green by the mixture of blue and yellow, and is opposite and complementary to the remaining primary red.

Modifications of these tints may be carried on to almost any extent with similar results, and doing so even to a moderate extent will be found wonderfully effective in instructing the eye as to the harmonious placing in a picture of the various colours. The combination or mixing of two secondary colours will produce what is termed a tertiary, and which in its turn is complementary to the remaining secondary. As an example, take purple and green—olive is the result, this is complementary to orange; purple and orange produce russet, complementary to green; orange and green produce citrine, which is complementary to the remaining secondary purple; and so on to any extent.

It might be thought that the relations of these various colours and their blendings with one another are the result of taste or fancy; not so, they are based on sound art principles. They seem to exist as a physical necessity for the organs of sight, as may be seen by a very simple experiment. This was turned, some years ago, into an advertising medium by a firm of extensive advertisers. Place a red wafer

on a sheet of white paper, then fix your eyes steadily on it for some moments, then transfer your gaze to another *plain* sheet of paper, and in a couple of seconds you will, as it were, see another wafer—but of the complementary colour to red—green. This *ocular spectrum* will remain visible for a few moments, but gradually the white light reflected from the paper will completely displace it. This experiment holds good all round—a blue wafer an orange spectrum, a yellow wafer a purple one.

In the endless varieties of the various combinations of colours this principle will ever hold good. Thus, if a tint of red inclines to a yellowish hue, as in scarlet, the complementary green must have a slight preponderance of blue, and so be a bluish green. If the red partakes somewhat of the blue as in crimson, then the complementary must incline somewhat to yellow, that is, be a yellowish green. This might be carried on for ever, so numerous are the combinations and so delicate the gradations that can be so formed. To follow them in detail here would be madness, but for private practice it will be found very advantageous.

All colours, whether primary or secondary, will be found to possess certain delicate contrasts and effects quite peculiar to themselves; as, for example, blue is the coldest colour also the most retiring, while orange, its complementary, is the warmest and most assertive or advancing. Thus every combination as it approaches orange or blue will be warm or cold as the case may be. It also suggests the effect of approaching the eye or retiring from it in the picture.

Yellow is the brightest colour—the fullest of light; its complementary, purple, is the darkest. White and black, although they represent the contrast of light and darkness, are not regarded as *colours*. White, which most assimilates with light, is supposed to represent a combination of all the colours; while black, like profound darkness, is an absolute absence of both colour and light.

Red is the most positive, exciting, and aggressive of all the colours, yet its complementary, green, is the most soothing and grateful to the eye. In mixing tints it will be found that two primary colours seem to form a new and perfect hue, but every subsequent combination will tend towards neutrality. The neutral tints so formed will be found to possess the characteristics of the primaries to which they are most allied.

Contrast is produced by the skilful placing in juxtaposition of the complementary colours. They mutually benefit each other and secure *harmony* of contrast. Thus purple and yellow of equal purity and volume will each become brighter by contact—the yellow gaining intensity by the extra yellow rays reflected by the purple, and the purple additional richness from the purple rays emitted by the yellow. Similarly all neutral tints placed near full hues seem tinged with the complementary colour of such hues. A grey in close proximity with a red will seem to become a kind of greenish grey, green being the complementary of red. One can form some idea from this how important it must be to skilfully arrange these various tints so as to produce brilliancy and harmony over the entire picture.

REDMOND BARRETT.

PHOTOGRAPHY AND CRIME.

THE Police Museum, Scotland-yard, contains much of photographic interest. Its "speciality," of course, would be, and is intended to be, an exhibit of remnants (assorted) connected with bygone atrocities and cases of general interest. It well serves its purpose. The room is a very miserable one of whitewashed walls, now a dark brown, changed possibly from its former tint by its ghastly contents. To one well read in records and detailed connexions with notorious cases, this collection must prove entertaining; and to such, by all means arm yourself with an order from the Assistant-Commissioner and make tracks. The writer was pressed for time, and very mixed as to names and the particular crimes dating many years since, therefore all errors hereafter committed must not be classed "clerical errors," but attributed plump and plain to sheer ignorance of that he talks of. He right away confesses of knowing little or nothing of them. How should one who tries to avoid as far as possible papers that serve up at breakfast-time strongly coloured—not ordinary photographic black and white, but highly-coloured—details in this sort of thing? If you wish to breakfast, breakfast and enjoy it. But how was it, says the reader, you allowed your delicate organization to enter the very heart or essence of that you tried to avoid? "Well!—well, you see, such is the weakness of human nature, the most frivolous of all animal natures!"

On entering, the first little lot is that of the Wainwright case. Here you have two small portions of the murdered woman in spirits—one from the thigh, and the second a portion of bone; also the gold earrings

he wore. The chopper with which Wainwright did the crime you may handle, and it is that of the ordinary wood-chopper shape. The spade he used to dig the hole for the body is likewise here. A topper stuck on a pin is the cigar he was smoking when arrested.

Further on you find a bundle of tricks, once the property of a gentleman, or gentlemen, who thought it no harm in starting a small opposition to the Mint, by way of manufacturing two-shilling and half-crown pieces; to allow a good profit and save expense, utilised bismuth in lieu of silver as a fundamental basis. Their home-made articles appear to receive the greatest and tenderest of care, each coin having a separate wrappage of tissue paper. And so things went on with them swimmingly, until effectually stopped by a dignified high-handed official from Her Majesty's department. This set is shown under a glass case, and looks both bright and pretty. The plaster moulds contain two coins ready for disconnecting and exchanging.

Another set is that of a bundle of "Flimsies," or "Bank of Engraving" five-pound notes—stock-in-trade of those who work, and often in this nineteenth century successfully, to bring off the confidence trick.

A very handsome box in morocco leather was taken by a would-be customer to a West-end jeweller, who there rung the changes, taking that full of value and leaving behind his *facsimile* containing but two lumps of good quality Wallsend coal!—black diamonds in exchange for white.

"Charley" Peace has quite an assorted collection, including a very original portable ladder, which folds to about twelve inches, made from strips of wood; the green goggles and artificial arm stump he so delighted to use to conceal his identity; quite an artful, miniature, sharp-biting hand-vice, with which he used to nip from the outside the small protruding portion of the key left in the door-lock, showing the folly of considering oneself safe when, having locked up, you leave the key in.

Tichborne (?) is represented by a neat pocket comb in limp leather case, pencil case, and many small but useful little trinkets generally used by one particular, very, in his general get up.

Many sets of white caps and ropes, used for certain hanging jobs, are about the room, with generally a plaster cast after death of the culprit to each. There are hardly two alike in the matter of dislocation. The ropes, for substance, are much thinner than one would think. The caps fit the head awfully tight, although the cranium on which it was now tried was of small dimensions, still it came "awfully near it," and would render breathing all but impossible. It is not at all strange at an execution, after the prisoner receiving the white cap, that he says nothing further—funny if he did! He must by then be partly suffocated.

An interesting portion of the show is that which places beyond all question the value of photography. It is in connexion with the murder of a policeman at Dalston some little time since. He was shot. Behind was left only an old, soft, felt hat and a chisel. Now, this chisel was found by a photograph to contain a certain word scratched on the blade. An enlarged picture brought it out visible from the invisible. This and this alone brought about the apprehension and consequent hanging of the murderer.

Passing along you come across a big boom in an assortment of jemmies, all shapes and sizes; some roughly made, others finished with the greatest nicety. Jemmies to fold, jemmes to screw, and jemmes with bayonet joints. Some carefully packed in close-fitting green baize bags, devotedly cared for as a pet dog; others large, with ugly-looking capabilities to render a nasty knock if called upon; some small in size, but very determined in substance, while a few looking too delicate to do any mischief whatever.

Decorated on a red cloth are many pistols and revolvers; dimensions ranging from the old blunderbuss to the neat ivory handle nickle pocket piece.

A trio of snobs' tools—two lap hammers and knife, tied together by a piece of string—are those the wretched Cornwainer used to smash the head and cut the throat of a sleeping woman with whom he cohabited.

A frame of clever photographs, illustrating the "twelve types of crime," done from life, at once seize the attention. Who made them it does not say, but evidently done by one of great ability, both for artistic and technical knowledge of the art. Photographs are very prominent throughout the room, and, no doubt, a great factor in bringing about detection. Clock movements of captured infernal machines are shown in their varied positions of working.

The catalogue takes the form of a manuscript-book illustrated by photographs. Many criminals are shown; Madame Rachel, for instance, with a brief sketch of her doings, trial, and resulting term of imprisonment. In this picture she looks far from beautiful.

Quite a nice-looking, gentlemanly cabinet is that of the one who

succeeded in killing his half-brother by way of sending him sweetmeats, which also contained a small capsule of poison. He was found guilty, and paid the law's full penalty. The identical capsule is shown pinned on a card.

In a corner stands a red banner captured by the police from the mob of unemployed of Trafalgar-square fame; the catalogue describes it as the "Battle of Trafalgar." A pad and padlock with which a foolish man locked himself to the railings of St. Martin's Church, declaring the right of meeting and that he should not be moved.—He was.

A peep into the "Album Room" at once proves a great amount of busy, brisk work to be done within the prison walls. The albums are tremendous books, all loaded; many, many thousand criminals are here illustrated, all in one position generally—large bust, with the open hands flat on the breast, broken or peculiar finger-nails being thus recorded.

T. COAR.

JACK AND I IN NORWAY.

VII.—SÖHOLT, GEIRANØER FJORD, MARAK, HELLESYLT, AND GRODAAS.

THE first four miles of the journey from Vestnaes was very charming, quite like English scenery, trees, shrubs, and grass in profusion, and in the evening light everything looked placidly soft and green; but as we drove further on our way gradually we left foliage and vegetation behind, and entered on moorlands barren and bare. The withered patches of heather stood up on either side of the road, and oh! such a rough road as it was. The switchback railway was nothing to it. The willing little pony spanked along, up and down, up and down, on a perpetual series of land waves, so to speak. It was not very easy for us, for the stolecarrie was fitted with pillars round the back support, and when we came upon the rough places these pillars were rather rough upon us, for with every jolt they caught us in the back producing a sensation that was far from pleasant. It became unbearable, and we had our rugs arranged over this ornamental work in the form of a cushion, which brought a little comfort.

This drive to Söholt was the roughest ride in all our tour. The first station on the route was about ten miles on; it stood on a scraggy heath amidst oppressive loneliness. We reached it at midnight.

On our arrival two rough-looking fellows appeared from a dilapidated house and came towards us; in the sombre light they looked extremely ugly, and the surroundings were awfully chilling. The whole appearance of things did not strike us as right. The biggest of the two fellows insisted that we should have two horses, we insisted that we only wanted one, he argued that one was not fit to make the journey, the roads were so rough; with the usual assurance of ignorance we told him that he talked nonsense. He then lifted our portmanteau with seeming great difficulty to show that it was heavy. I then lifted our rugs with greater difficulty to show that they were heavier. This last trick brought a smile to his sombre face; at this he succumbed and produced his horse and stolecarrie. We felt rather uncomfortable as we proceeded on our way, for to use an Irishism, that same man was to be our boy for the remainder of the journey, and there he sat on the luggage at our backs. As we drove away imagine the scene—a stretch of miles covered with snow, with dots of heath and heathery patches, at intervals a leafless tree standing up alone with its barren branches reflected against the sky like a weird skeleton, long thin posts standing up on either side of the way to guide us in the track, frozen lakes every here and there glimmering in the midnight light, and the grating wheels of the conveyance kept grinding through the crisp hard snow—it was desolate; and, to crown all, the warm breath from the man behind played about the backs of our necks, making the situation more eerie still.

Up and up, hills over hills, until the road became too steep and heavy for the horse, and we got out and walked. On the beaten track we plodded on through slush and snow some three feet deep, hill over hill we trudged along, only to find a higher one still further on, and by the time we reached the topmost height we were quite blown; weary and breathless we sat down upon a rock to await the horse and driver—they had been left far behind. As soon as we got the turn of the hill, "a change came o'er the spirit of our dream." The man stood up on the baggage behind. With reins in hand he encouraged his pony in some unknown dialect, when it started away and down those hills like a whirlwind it sped; if we had encountered any obstruction on the way we must have gone to utter smash. Down, down, unharmed we kept our way, and with such speed that we sat motionless, looking forward in breathless suspense for miles; it seemed as if it would never end, when with a heaving sigh we cry, "At last!" as we reach the lower level, and in the early morning come upon avenues of trees, pass houses, see human beings—civilisation once more. We paid our sombre guide well, but he returned no thanks; then into the hotel and to bed, to sleep the bad impressions away.

Söholt is a bright little village abounding in a wealth of vegetation. We made use of the morning in taking some views of the place, as we had to start by boat in the forenoon for Helligslyt on the Sunelv Fjord. On this journey we again came upon ranges of mountains like perpendicular barren walls, thousands of feet high, with only a shelving of rock or a small flat covered with grass to break the monotony of these towering walls, or it

might be some little house looking no larger than a packing box with windows in it set in a most precarious position half way up to the clouds.

On the way the Captain drew our attention to some white painted squares on the rocky part of the mountains, and quite in the water. He explained that they were put there to attract the fish, who when they saw these light parts immediately made for them and thus got netted or trapped. I suppose this idea is much the same as the torchlight used to attract the fish in our spear fishing.

We did not land at Hellesylt, but went right on to Marak, passing through the Geiranger Fjord, the scenery of which is considered as fine as anything in Norway.

On the mountain top, just where we entered this fjord, there was a cap of snow looking as if it would hurl over at any moment. The Captain gave this impending mass a wide berth by sailing over under the hill on the other side, for should it happen to come down the weight of it would be hundreds of tons, and, as he sagely observed, "If we were caught in it we would go down to the bottom never to come up again."

Near this place the Captain drew my attention to one of those little wooden houses set upon a shelf of the mountain. "Do you know," said he, "that a strapping young fellow sold himself for that house up there?"

"How so?" I asked.

"Well, for the sake of that place, he married an old woman that might have been his grandmother, and there the two live together now."

"Oh, well, both the sacrifice and the gain are comparative things," I said.

"I do not understand you," replied the Captain.

"Considering the conditions, a young fellow living at any rate in such a place as this, the sacrifice of binding himself to an old woman might not be so very great, and this shanty of a house that I would not take in a gift might be looked upon by him as of considerable value." He shrugged his shoulders and laughed.

This fjord is very narrow, and as we twine in and out of a seeming land-locked watercourse, the face of the rocks take on many fantastic and grotesque shapes and forms. To the sailors who are continually passing out and fro these markings of time and weather form themselves into pictures of men and things, and a lively interest is kept up in pointing them out to the stranger, to see if he also could trace the likenesses that they have formed on the surface of the rocks. We were shown men's faces in jagged profiles, wonderfully good; and before coming to the Seven Sisters Fall, but on the other side of the fjord, the Captain pointed out to me what he called the minister in the pulpit, and when told what to look for it was really very like. The tracing and carving on the front of the pulpit, with the place for the book and the minister behind, all came out quite clear and distinct. Now this must have grown out of the fancy of some one, who, when gazing upon the worn and furrowed rocks had been tricked into the fantastic resemblance, like a child seeing pictures in the fire.

The Seven Sisters is a celebrated series of falls close together in this fjord, but on our way to Marak the light was dead against us, and we could not get a picture of it then; but as we had to return the next day at a time when the light suited, the Captain promised to stop the boat there and thus give us a chance of taking the falls.

As we sailed into the bay at Marak, the valleys looked very inviting, lying bathed in the light of the evening sun. There were a good few people on the boat, and by the time that we saw to our traps and reached the hotel we found that it was crowded, but we got quarters in a new house further up the hill belonging to the hotel people, and which they kept as a reserve for the press in the summer months. We were very comfortable here.

The whole place is small, built on the face of a hill, the houses zig-zagging down from the highest point to the water much in the form of a Z. We only stayed one night at Marak, and went through the Geiranger Fjord again next day, but for a tourist photographer with unlimited time on his hands, Marak would prove a good centre for camera work, as interesting rivers, falls, mountains, bridges, and glaciers are to be found within easy distance of it. We took impressions of the village from the bay.

On our way back the Captain was as good as his word and stopped the steamer just before we reached the Seven Sisters Fall, and we made two exposures. This fall is so named from the fact that seven falls in close proximity to each other come lashing down from the mountain top. Two of these had dried up when we were there and only five were on the fall, the Captain playfully remarked that the other two sisters had gone away to get married.

After passing through the fjord we landed at Hellesylt. From there we took stolecarrie for Grodaas on the Horningsdals Lake. At starting the road is as steep as the face of a mountain, which it is. The track has been very cleverly engineered in twines and turns to make it easier for the horses. It is so steep that we prefer to walk up the hill and let the stolecarrie follow after. The walk was very enjoyable, for at the turnings of this winding way we came upon a series of beautiful views of Hellesylt and the fjord beyond, continually changing as we ascended. On our upward way we came upon a party of Americans and carriages coming down, they, too, were walking, thinking it too steep to venture down in their conveyances. We thought it too steep to ride up, they thought it too steep to ride down; so you can understand it was pretty bad. As soon as we got over

this hill of difficulty we took our seats in the stolecarrie and stepped along at a brisk pace through plantations of trees and over a good but mountainous road, and as we neared Grodaas we descended into the valley in which it nestles rich in vegetation with green-clad hills and gurgling glens between. This valley was very English in appearance. It is a marvellous thing in this country how a few miles only separate the most barren lands, where scarce a sea-gull could exist, from such a spot as this, rich in verdure and vegetation. As we arrive at the hotel we again meet our American friends, who are just starting for Faleide.

We stayed here overnight. The hotel stands on the edge of the Horningsdals Lake in a very charming situation. It has a veranda running along all the length of the house which commands a view of the full extent of the lake, starting at our feet and receding miles away into the dim distance of mist.

There was a small quay belonging to the house which ran right into the water from the side of the hotel, and there was a very comfortable looking bathing box on it. We half made up our minds before going to bed that we would go down there and have a plunge in the morning. When we got up, I looked out and it was very tempting, for the sun was shining brightly. I asked Jack if he was coming, he said he didn't care about it. All undressed as I had got out of bed, I wrapped myself in a waterproof, put on a pair of slippers, and away I went to have my bath. The air was delightfully warm, and all went well until I put my feet on the steps under the water, which were all coated with a green, weedy stuff; on this I slipped, and away I went down to the bottom, about ten feet deep. And oh, the coldness of that dip!—ice seemed nothing to it. Up I came, and scrambled out as quickly as possible, with not a feeling about me but freezing cold. I never took into account that the temperature of the lake would be that of snow and ice water which was continually descending from the surrounding hills; but a good rubbing up with a rough towel soon set in a reaction, and all in a glow I walked back to my bedroom much the better for my bath in spite of Jack sitting grinning at my mishap, which he had seen from the window.

MARK OUTE.

FIFTEEN YEARS' EXPERIENCE OF A DAGUERREOTYPYER.

[A Communication to the Society of Amateur Photographers of New York.]

IN response to the request of your Corresponding Secretary, Mr. Duffield, I hereby give an outline of my experience in the history of the Daguerreotype, for a period of fifteen years. The details of this antiquated, senior branch of your art can interest you only in such parts as are similar. A comparison of the two, however, will show the progress of the half century we commemorate to-day, as also the centennial of the birth of Daguerre.

The first Daguerreotype I saw was made by Robert Cornelius, in Philadelphia. His laboratory was conspicuous. On the outside could be seen a large mirror, swung on a bracket, for illuminating his sitters with reflected sunlight. The use of bromine was not yet known in 1840, but Boudine introduced it soon after. In the same year Robert Chilton called on my brother to make hyposulphite of soda, offering four and a half dollars per pound, stating that the French article cost over five dollars to import, although still impure. Thus the first hypo was made here at the corner of Twenty-third-street and Fourth-avenue, the present site of the Young Men's Christian Association. Orders for other chemicals followed, and in 1843 Louis Becker was the first to manufacture photographic chemicals exclusively, at Old York-road, Philadelphia.

In the same year I entered the Daguerreotype business of Mr. Fred Langenheim, in the Merchants' Exchange of Philadelphia. Here there was little to be seen of the things you see nowadays in a photographic art gallery. A kind of a hiding-place for a dark room, and a spyglass-like camera, were all the indications of the mystery I was to learn. The camera rested on a candlestick-like tripod, with three set screws for adjustment, and was placed on an ordinary table. To interchange the ground glass and round Daguerreotype plate, it was necessary to unscrew a flanged ring and replace the same by a reverse motion. For the adjustment of the focus there was the rack and pinion, as Voigtlander's instruments still have. This instrument was one of the first made according to the mathematical calculations of Professor Petzval, of Vienna, having two achromatic lenses. It had been sent by young Voigtlander to his college-mate, William Langenheim, as a present, with supplies and instructions, but also the warning not to try Daguerreotyping unless he had courage enough to try five hundred times more after failing with the first hundred pictures. William Langenheim, a lawyer, did not have the courage, but his brother Fred had, and succeeded so well that he was offered six hundred dollars for that odd camera.

The manipulations of preparing a Daguerreotype plate will not interest you much. I should state, however, that the production of a chemically clean surface on silver is a difficulty that increases fourfold with the size of the plate. Another difficulty is the use of the chemicals in a volatile state. The iodine can be controlled by sight with faint daylight, but the bromine only by even temperature and constant practice.

At Langenheim's, necessity soon introduced a square camera with square plates and holders. A high tripod was also used instead of the table. In the

summer of 1843 the first dozen of small Voigtlander objectives, such as are still on the market, were imported. Soon after four larger ones, for 6×8 inch pictures, arrived. In the fall of that year Phillip Hass, formerly of Paris, showed Fizeau's method of fixing the image on the plate by cold gilding. Soon after the picture was made more brilliant by heating the plate while the gold solution was on it. In that winter the first polishing wheel was made. It was constructed like an ordinary grindstone, worked by a treadle, the wheel being cushioned and covered with buckskin. With the aid of this machine, and after weeks of hard labour and many experiments, we succeeded in making the first good large Daguerreotype of 6×8 inches, called whole-size; half and two-thirds-size were advertised and made with success. At that time we also succeeded in making a picture of a sick lady at her own residence, which was then considered impossible.

In the spring of 1844 Mr. Edward White bought one of the large Voigtlander instruments, and for him I made the first large Daguerreotypes in this city at 175, Broadway. There were then but a few Daguerreians here. They were—J. Gurney, Anthony, Edwards & Chilton, Augustus Morand, Van Loan, Burgess, Brush, Weston, Artho, Trisley, Plumb, and others I cannot recall. I remained with Edward White until December, 1844, when it became impossible to make a picture in his operating room on account of the extreme cold, for Mr. White would not allow a fire in the place overnight. Then I commenced business for myself, at the corner of Nassau-street and John-street, and after May, 1845, at 201, Broadway, under the firm of Langenheim & Beckers, agents for Voigtlander & Louis Beckers.

At that time the large Voigtlander objectives had a chemical and a visual focus, so that in order to make a large, near picture, the lenses were moved out one-eighth of an inch, while for usual work the ground glass was set permanently one-sixteenth of an inch nearer than the plate. That summer I took a view of High Bridge before the scaffolding was removed. This picture was taken for the engineers, and was, perhaps, the first one ever taken here in aid of architecture. By taking outdoor views I discovered that the plates increased in sensitiveness with the time between the preparation and exposure.

In 1847 I began to use a speculum metal mirror, in order to have my pictures not inverted. For very unsymmetrical faces this arrangement was quite indispensable in order to get a likeness. The mirror was attached to the instrument at an angle of forty-five degrees. The use of the mirror required double the time of exposure. It was made by Fitz, senior, the optician, and was used for years after.

In 1848 Fred Langenheim bought Fox Talbot's patent for the United States, at six thousand dollars. He introduced it here and failed in the undertaking.

In 1849 my firm was changed to Beckers & Fialil. Having now more time, we succeeded in substituting machinery for cleaning our plates, and thus obtained cleaner and better plates in one-third the time required by hand.

In 1852 M. M. Root, of Philadelphia, made two pictures on one plate; we succeeded in making four on one plate, and in such a way that the exposed quarter was in the centre of the field of the lens. It was then a great relief, as locket pictures were in fashion. In 1856 Mr. Ormsbee patented this same multiplying plate holder, and collected considerable money on it, until my priority made his claim void in the lawsuit brought as a test.

The production of stereoscopic portraits was the next task. Marchner, of Philadelphia, made patent cases to show these pictures in a very neat way. In 1854 F. Langenheim had commenced to manufacture stereoscopic views on glass. He sent me three dozen of his make to find sale for them here. At the first exhibit of these pictures one dozen of them were broken. This loss set me to thinking how to find an arrangement to show and secure the pictures against breakage, and in 1857 I obtained a patent for my revolving stereoscope. The increasing demand for this machine induced me to sell my Daguerreotype business in 1858.

Thus I was relieved from satisfying the vanity of each individual beauty of this world, and ended my career as a Daguerreian. ALEXANDER BECKERS.

PHOTOGRAPHY IN JAPAN.

Mr. W. K. BURTON writes to the *Japan Mail* of June 5 to the following effect:—

"I ask leave to tell your readers that the Photographic Society of Japan has now been duly constituted. There are already nearly sixty members, of whom very nearly one half are Japanese. There are a few professional photographers, but the great majority are amateurs. I am glad to be able to state that His Excellency Viscount Enomoto, Minister of Education for Japan, has consented to be nominated as President. The Vice-Presidents are Professor D. Kikuchi, M. A. Cantab, Director of the College of Science, Imperial University, and Dr. W. S. Bigelow; the Secretaries are Professors H. Ishikawa and W. K. Burton; and the Treasurer is Mr. T. Asanuma, of Honecho, Tokyo. These are all *ex-officio* members of the Committee, and besides them there are Professor C. D. West and Mr. Kajima Masanosuke. . . .

"All communications concerning the Society should be directed either to Mr. Ishikawa, at No. 5, Minami Nabecho, Ichome, Tokyo, or to myself at the address given below, W. K. Burton, College of Engineering, Imperial University, Tokio."

Foreign Notes and News.

THE combined Exhibition of the three Societies—the German and the Silesian Societies of Friends of Photography, and the Club for the Promotion of Photography—designed to celebrate the jubilee of the existence of photography as an art and science, has met with most unexpected support since the rooms of the Royal "Kreigsacademie" have been granted for the purposes of the Exhibition. The problem which the promoters have set themselves is to present as full and complete a view as possible of the many-sided development which photography has undergone during the last fifty years, and to show how wide an application it has found in art, science, and industry, and in all departments of civilised life. As far as can be at present judged, it appears that astronomy and spectro-photography, as well as the various methods of printing, will be most brilliantly represented. The Observatories of Potsdam, Pulkowa, Greenwich, Herény (Hungary), Paris, Boston, and Mount Hamilton, have announced their intention of taking part in the Exhibition, as also the Belgian Photographic Society. The Exhibition will open on August 19—the birthday of photography—the date on which Daguerre, fifty years ago, announced his discovery in a lecture delivered in the "Palais Mazarin" in Paris.

Mons. A. ROSSIGNOL writes to the *Amateur Photographic* as follows:—"Photographs obtained by means of a telescope of objects at a distance are comparable to photo-micrographic enlargements. The image formed at the focus of the object glass of the telescope is very small. But as the last glass of the eyepiece renders the rays of light almost parallel, nothing prevents the image from being repeated at the focus of the photographic objective, just as if non-distant objects had been taken, so that it is sufficient to direct the telescope towards the object which it is desired to photograph, and to focus it in the usual manner. An ordinary photographic apparatus is then placed in a line with the axis of the telescope and the eyepiece, and the focussing of the enlarged image completed by conveniently shifting the ground glass plate. This method, however, is open to the same objection as the production of photo-micrographs by means of an eyepiece, the last lens, acting as the objective in relation to the small image, is deficient in proper curvature and is not achromatic. This, at least, as much as any other cause, may be advanced as an explanation of the want of sharpness shown by the proofs thus obtained. Owing to the distance, moreover, the movements of the intervening air, especially when it becomes heated in the summer, render the formation of satisfactory images an impossibility, even where the most improved optical instruments are employed."

Our Editorial Table.

ELECTRIC LIGHT FOR THE MILLION.

By ARTHUR FREDERICK GUY.

THIS booklet (published by Simpkin, Marshall, & Co., price 6d.), imparts concise practical information on electric lighting and its cost to the uninitiated, and explains many things that have hitherto been mysteries.

THE WILD NORTH COAST.

A. JOHNSTON, Bridge-street, Wick.

THIS is a series of views photographed from drawings by Mr. Johnston, whose artistic *forte* we had until now imagined to have been confined to photography, in which we know him to be a proficient. In these sketches of the wild north Mr. Johnston has used his pencil with much effect, although for the sake of a rock-bound coast which we have seen under conditions of greater placidity, we could have wished that he had not invariably secured nature in such an angry mood, fulfilling Vedder's description of the—

"Land of the whirlpool, torrent, foam,
Where oceans meet in maddening shock;
The beetling cliff, the shelving holm,
The dark, insidious rock."

We have seen these scenes under other atmospheric conditions, when the ocean lay like a mirror, calm and quiescent, its contact with the iron-bound coast scarce creating a murmur.

These drawings depict some of the best-known rock scenes in the extreme north of Scotland and islands beyond, some of them bearing the descriptive title "Old Man," such as the *Old Man of Wick* and the *Old Man of Hoy*, the term in question being an evolution from the Scandinavian *Alt Mann* (high rock), descending by a stage easy to Scotchmen to "Auld Man"—"Old Man."

The views are all most effective, although we might notice Keiss Castle, Brig-o'-Trams, and the Brough as being especially so.

Is a sample of graduated cloth received from Messrs. Marion & Co. we find just the thing for which many photographers have long breathed aspirations. Commencing with a light drab, the colour goes on deepening by imperceptible gradations until it has become quite dark. In the hands of a clever photographer, or one who knows how to use a background, this graduated cloth places quite a power at his disposal. The material is woollen, and is quite pliant and flexible.

MR. JONATHAN FALLOWFIELD sends us a pint bottle of hydroquinone developer mixed ready for use in one solution. No directions for its use are necessary. In trying it we merely poured from the bottle enough to cover the plate, and the image came out evenly and well. The transparency thus developed is now mounted and forms an item in the editorial collection of slides worthy of being looked at.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,724.—"Improvements in View Finders for Photographic Cameras." J. J. D. CLEMINSON and H. W. G. BLOOMFIELD.—*Dated July 23, 1889.*

No. 11,923.—"Improvements in Albums for Photographs, Pictures, and the like." F. W. HOCHHEIMER.—*Dated July 26, 1889.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 5	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 6	North London	Myddelton Hall, Upper-st., Islington
" 6	Holmthorpe	Society's Rooms, Sutton, Surrey.
" 6	Sutton	Masonic Hall.
" 6	Sheffield Photo. Society	The Studio, Chancery-lane, Bolton.
" 6	Bolton Club	The Dispensary, Coventry.
" 7	Coventry and Midland	Anderton's Hotel, Fleet-street, E.C.
" 7	Photographic Club	Free Public Library, Hamilton-st.
" 8	Birkenhead	36, George-street.
" 8	Manchester Photo. Society	Masons Hall Tavern, Basinghall-st.
" 8	London and Provincial	

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 25,—MR. J. TRAIL TAYLOR in the chair.

The CHAIRMAN showed some flash-light portraits, the work of Mr. T. H. McCollin. The arrangement for burning the magnesium consisted of a pan for holding "Blitz powder," a pyrotechnic compound containing a large proportion of magnesium powder, and an air jet which, on pressure of a rubber ball, blew through a flame on to the mixture and ignited it. The photographs were much admired for their satisfactory lighting and absence of any appearance of blinking, and the Chairman said that he would bring the lamp and powder to some future meeting for demonstration.

In answer to a question, the CHAIRMAN said that no reflector had been used; Mr. McCollin preferred to use a large quantity of powder and dispense with reflectors. The flame was very large, and that assisted in the evenness of the lighting.

Mr. A. Cowan then showed some plates, the result of some sensitizer experiments with various developers—pyro, ferrous oxalate, hydroquinone, and a new product called Eikonogen, and the latter showed the highest number. He also showed a transparency on chloride plate developed with the same substance in a less active condition, that is, after it had been used for many plates in succession. The tone was good and warm but the action still very rapid, development being complete in half a minute.

The CHAIRMAN had been trying Eikonogen developer the previous evening for negatives, transparencies, and for paper, and was perfectly charmed with it.

In reply to an inquiry as to the composition of Eikonogen, Mr. F. P. CEMBRANO said that analysis had shown it to be $C_{10}H_5$ in conjunction with SO_2 , Na , O , H , NH_3 .

Mr. A. HADDON then discoursed on the subject announced for the evening—*Sensitising and Resensitising Albumen Paper*. He had started by floating albumen paper on a filty-grain bath, and then, when nearly dry, floating it upon two successive dishes of distilled water, so as to remove almost the whole of the free nitrate of silver. A print on this paper was shown, and was exceedingly weak. The paper was then fumed for ten minutes in ammonia gas, and pads of eight thicknesses of blotting paper, also fumed, were used for backing up while printing. The result was now very much better. He had also tried to remove the whole of the free nitrate by soaking this washed paper in three changes of water and then adding salt, but the paper still printed, although with extreme faintness. Fuming again gave much better results. Another experiment was to float the washed paper, back downwards, on a solution of sodic citrate at ten per cent. Rochelle salt at ten per cent. was also tried. Both these substances appeared to improve the vigour of the print. Carbonate of soda was also tried in a similar way. Next, some of the washed paper was floated on a five per cent. solution of nitrite of potash; the result was far superior to any of the others when there was no fuming. Fuming, however, improved all.

The CHAIRMAN said that Americans invariably employed fuming and sensitising on a strong bath. Toning was much more easily effected on fumed paper. He had met with some ready-sensitized paper that would not tone as it was, but after a prolonged fuming toned readily.

Mr. W. E. DEBENHAM had, some two years since, met with a similar result. In this case, however, the paper was some which toned readily when fresh but if kept loose in a warm place for a day or two gave only a rusty-looking print. After fuming for a long time—twice or three times as long as for ordinary paper—it again became usable. He noted in all Mr. Haddon's prints a certain appearance as if there had been difficulty in toning—a peculiar, almost cork-colour effect on the light half tones.

Mr. HADDON said that that was so. He did not consider the paper equal to that sensitised and printed unwashed in the ordinary way. With paper containing the full quantity of nitrate of silver the free chlorine given off whilst printing converted more of the nitrate into chloride, and so a stronger image was obtained.

The CHAIRMAN, in thanking Mr. Haddon for his communication, referred to the benefit of having the results of such strictly comparative experiments as those Mr. Haddon had described.

With reference to the subject for the next meeting—Mr. Friese Greene's communication regarding photographing on so-called opal cards—the CHAIRMAN mentioned some very fine results obtained on Brinckerhoff's paper, which was understood to be prepared with gelatine and a white pigment, such as sulphate of barium or oxide of zinc.

BATH PHOTOGRAPHIC SOCIETY.

MR. AND MRS. PUMPHREY's garden party, given to the members of the above Society, took place on Tuesday, the 23rd ultimo, and, considering the unsettled state of the weather, was well attended. The President escorted the company over the various places of scientific interest and the tastefully arranged grounds. Occasional showers necessitated shelter being taken in some of the many retreats, in all of which our host and hostess had provided ample refreshment. A string band added to the general enjoyment.

Saturday, July 27, outdoor meeting at Chepstow, thence to Tintern Abbey *via* the Severn Tunnel.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

JULY 25,—MR. A. W. BEER in the chair.

Mr. Harry Holt was elected a member.

Mr. W. TOMKINSON reported upon the excursion to the Bollin Valley on Saturday, June 29. The party numbered sixteen (including two ladies). On arrival at Manchester, the party was met by Mr. Davenport, Vice-President of the Manchester Photographic Society, who proved a courteous and attentive guide. They then proceeded to Oxford-road station (Mid Cheshire Railway) and took train to Altrincham, eight miles; here they engaged three conveyances and had a pleasant drive of three miles (passing the celebrated church of Bowdon) to Rostherne Village, and the lovely Rostherne Mere, one of the largest Cheshire meres. Towards the south the banks gradually rise to a considerable height, and, being well wooded, form a most charming feature in the landscape. Overlooking the lake on the south is the pretty church of Rostherne, embowered in trees, and the *beau ideal* of a sequestered country church. The churchyard is entered by a picturesque old lych gate. The church dates from 1533. The former picturesqueness given to the body of the building by the row of dormer windows has been much interfered with by recent restoration (?)

Here operations with the cameras began in earnest, and were continued until five o'clock, when a comfortable tea was served in one of the cottages, after which the party proceeded by a charming walk across the Birken and Bollin Valleys to Ashley Mill, where the prize picture was obtained. Two groups were taken as a conclusion, and after a pleasant saunter (with two or three stray shots on the way through charming scenery) they arrived at Peel Causeway Station. There tickets were taken for Manchester in time for the home train at half-past nine, having enjoyed a very pleasant half holiday, the weather being all that could be desired. The work of the day resulting in one hundred and six exposures.

Respecting the excursion to Chester on July 13, Mr. TUNSTALL reported that owing to the unfavourable weather only a few members turned up, and operations were confined to the Cathedral. Facilities are granted to photographers at Chester which he hoped could be obtained at other cathedrals. The full muster was seven and twenty exposures made.

The PRESIDENT announced that the Judges—Messrs. Sayce, Atkins, and himself—had unanimously awarded the medal to Mr. William Tomkinson for the best picture taken at the Bollin Valley excursion. He was glad the Manchester Society had shown such a kindly spirit of fraternising, and felt sure good results would be attained by its adoption.

The HON. SECRETARY read circular note from Mr. J. J. Briginshaw calling attention to the Photographic Convention of the United Kingdom to be held from August 19 to 24 inclusive; also to the Exhibition of the Photographic Society of Great Britain to be held in the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, from September 30 to November 13; and to the Exhibition in the Town Hall, Cardiff, by the Amateur Photographic Society, from October 9 to 19.

Attention was drawn to Oldham's patent dry powder developer (quinol), a sample of which had been tried and proved satisfactory.

The PRESIDENT, referring to Dr. Backelandt's patent water developing dry plates, said he could not give a very favourable report. The Hon. Secretary had also tried a sample with similar results.

A vote of thanks was accorded the editors of *Photography* for allowing the competition prints of "Interiors" to remain in the room for inspection. These consist of some very choice specimens of photography upon this the most difficult branch of the art. The gentlemen who adjudicated must have had an onerous duty, as many were of such excellence as to run those awarded the first, second, and third places very closely. It is gratifying to record that the President, Mr. A. W. Beer, has obtained the second prize.

Mr. R. Crowe submitted his adapter for using smaller sized slides, by which the operator could use different sized slides in addition to those belonging to the camera in use.

Wolff's patent adhesive mounts were shown and distributed, also Talbot and Famer's exposure tables; and a selection of single lenses which had been sent by Messrs. Hockin, Wilson, & Co. for inspection.

Mr. J. A. Forrest exhibited pictures of Dolgelly and Barmouth taken by a lens by Ross (forty years old); these were highly creditable.

Pictures of Ceylon scenery by H. Holt, and competition prints taken at the Bollin Valley excursion, were on the screen for inspection in addition to the *Photography* competition prints.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

A SPECIAL general meeting of this Association was held on July 22, Mr. Henry Blandy (President) in the chair. There was a good attendance, the Hon. Secretary having announced an exhibition of detective cameras; also to consider the proposal of the Committee as to the advisability of admitting lady amateurs to membership of this Association.

Correspondence having been read by the Secretary from several firms making detective cameras regretting their inability to send one for exhibition owing to pressure of orders, the HON. SECRETARY proceeded to explain and show the working of Dr. Kruener's book camera; also Messrs. R. & J. Beck's.

Mr. J. FURLEY LEWIS explained and showed the Kodak, passing round prints taken during a trip across to Bay of Biscay.

Mr. GEORGE SMITH exhibited and explained "The Optimus" and two others. The PRESIDENT, in opening the discussion upon the question of admitting ladies to membership, said he would read the last two circulars from the Secretary upon the subject, a copy of which every member would have received. He would then answer several objections that had been sent to the Secretary by some of the Members, which had received his careful attention, and he hoped to meet all in a satisfactory manner.

The discussion following was very animated. An amendment, proposed by Mr. S. Wells, seconded by Dr. Marriott, was put first and lost; upon the proposition being put, a ballot was demanded. The result being twelve for, eight against, many of the members refraining from voting.

IPSWICH PHOTOGRAPHIC SOCIETY.

THE monthly excursion on Saturday last, July 27, was, by permission of Lord Toller-mache, to Helmingham Park. There was a full muster of members, including their veteran President, Mr. J. Dixon Piper.

After a pleasant drive in a two-horse brake, Helmingham was reached shortly after three o'clock, and the party was met by Mr. Orchard, a resident member of the Society, who acted as guide.

Helmingham Hall is a fine old Elizabethan mansion, and is surrounded by a wide moat with a drawbridge, which is raised every night at ten o'clock. There is a fine library containing many rare books, including the first book printed by Caxton. There is also a lute left by Queen Elizabeth as a heirloom to the family. The church contains some very fine monuments to the Toller-mache family.

After a pleasant walk across the park to Mr. Orchard's residence, we found that Mrs. Orchard had generously provided a tea in the schoolroom, which came "as a boon and a blessing to men" who had been rambling in the fresh country air for three hours, so that it is needless to say how thoroughly it was enjoyed. Mr. Orchard is a successful beekeeper, and it was interesting to be shown his apiary. A start for home was made about half-past seven, and a pleasant afternoon's outing brought to a close about nine o'clock.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

JULY 23.—Mr. S. W. Allen in the chair.

Messrs. Daniel Jones, F. Coleridge Boles, Charles Huxtable, and E. I. Champagne-Smith were elected members.

A Sub-Committee was formed to make certain alterations and additions to the studio, and Mr. Jostl kindly intimated his intention of giving at stated intervals instructions in lighting and posing.

The recent excursions to Margam Abbey and Walnut Tree resulted in some first-class specimens of landscape photography, &c., which were passed round for inspection.

Several details connected with the forthcoming Exhibition were dealt with.

The next excursion is arranged for Barry on August 3.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

JULY 11.—President Canfield in the chair.

Mr. JAMES H. STERNBERG read a paper entitled, *Suggestions as to the Use of Certain New Organic Reducing Agents as Developers*.

Mr. F. C. BRACH exhibited a new camera with the following explanations. The camera which I have the pleasure of explaining to you this evening is a view camera, made by Messrs. S. Wing & Co., Boston. This size is adapted for 5x8 plates, and has a reversible back, so that the plate can be used up or horizontally. I notice one improvement is in the method of fastening the folding bell. In some cameras the method used is an ordinary thumb screw to lock the bell. In others there are two pivoted hooks, which, in being pushed down, clamp the bell. This construction is based somewhat on the plan, but in a slightly different way. A flat spring hook is attached to the under size of the centre brace of the bottom of the bell. The brace is pivoted to inside of the rear cross bar of bell, and when you turn the bell down the spring underneath still stays up above the central cross bar until you press down the central portion of the folding bell with your thumb. When you do that the bell is

clamped by the hook and held rigid, permitting the rear of the camera to be drawn out. Then I should call your attention to another point, and that is, that in the front portion of the camera, at the top, are inserted two levels—one for the up-and-down adjustment, and the other for the side adjustment of the camera. The intention is that the camera shall be placed exactly level, no matter if the object which you are going to photograph is on a high hill. Another peculiar feature is the compound rising front. Ordinarily a rising front is made on one board, which is raised and put in place and fastened with a thumb screw. In this case it is divided into three sections, so that one slides upon the other, and this allows the lens to be pushed down almost to the bottom or nearly to the top of the camera. Another feature of this adjustment is that the lens is held in both the first and second sections of the rising front, and it is because the rising front has to be so thick that it is divided into these different sections. Now I will proceed to level the camera, and then show you the adjustment of the lens, which is another novel feature. We will suppose that we are levelling the camera. [At this point some one objected that the camera stood so high, one could not see the levels.] Mr. Beach replied: I have always adopted the method, in taking a view, of having the camera legs spread out well, then you have a better base, which, as you will observe, lowers the camera enough. The point about the adjustment is, that the lens is inserted in a ball-and-socket joint, and now is pointing up as if one were taking a view of a house on a hill. If it is desired to change the adjustment, all you have to do is to rotate the flange ring in front here on the rising front, and in thus loosening the ball-and-socket joint the lens can be tilted horizontally, and then, by screwing up the flange, it is locked and held in position. The object of that is to do away with all the swing-backs in the camera, and you adjust the view by raising the front and tilting the lens either up or down. You see it works very easily. In regard to the back attachment, there is simply a frame, something like the Blair camera, and it has opposite the ground glass the arrangement similar to that which is used in an ordinary plate holder. The ground glass is forced forward by two springs, and on the extreme end, opposite to where the plate holder is inserted, is an ordinary flat spring which has a little pin attached to it which passes through here and operates on the plate holder. The plate holder itself is quite a novelty and quite a radical change; it is a metallic plate holder. It is scarcely any thicker than the ordinary plate, and is composed simply of a sack of tin which is nicely varnished, and the plate itself is carried on another sheet of tin stamped out the thickness of a plate. There is the plate holder and the plate [exhibiting them]. At one end of this septum is a spring. You simply push the plate in against that spring, and then let it slide back until the two little wire fingers on opposite ends of the holder overlap the plate and hold it. This septum, with the plate in, is then slid into the outer sheath. The operation of exposing a plate is quite simple. After you have inserted the plate in the septum, you simply push it home, and the push on the outer end of it makes a light-tight joint. There is also a little hole in the end of the septum here, into which the spring which I showed you on the back of camera catches. After pushing the plate holder into the back of the camera, when you draw the slide to make an exposure, you simply draw off the outer sheath, leave your plate exposed, and when you get through you put the sheath over again, and it is all done. Now I will show you how easy it is to put the plate in. There is a special light valve in the end of the ground-glass frame. This little spring on the outside end locks the septum, after the plate holder is pushed in. Now you cap the lens, and all you have to do is to draw off the sheath, and you can tell by the bright tin of the septum, seen through the ground glass, that you have drawn the slide sure. After you have made the exposure, you simply push it back, lift the flat spring with your finger and pull out your plate holder, and it is all exposed. When I first saw it I thought it was quite an idea and quite a radical change from what we have been accustomed to. The only point against it that I made was that the weight of the metal was too heavy; but I believe the makers claim that the weight of the tin or the metal is not more than the weight of an ordinary wooden plate holder, but I should rather try some experimental tests in weighing before I accepted it as being true.

Mr. A. PEEBLES SMITH then addressed the meeting on *The Making of Lantern Slides*. He said:—During the past winter I had occasion to make a number of slides for Professor Cromwell when he exhibited at the Grand Opera House. While doing that an old theory, to my mind, was exploded. That is, that the nearer the lantern is to the screen the denser the slide should be. His pictures, as you may well know, are enlarged up to about seventy-five feet square. The lantern is placed fully one hundred feet from the screen, and the slides which I first made went to pieces; they were too thin. I could not account for it, but went to work and made denser slides, with no better results. I soon found out that it was not density that was required, but the colour. The slide should be absolutely clear in the shadows and lights. Since then I have experimented with a great many developers, the effects of five having been shown here by the lantern, and I have decided in favour of antipyrine. I use it the same as I would hydroquinone; that is, take antipyrine, dissolve it in sulphate of soda solution, then make an alkali, the best alkali being caustic potash—the most active. Develop your plate. I have a brass plate about five inches in diameter. This is attached to a wheel under which is a lamp: the plate is heated and a centrifugal motion given to the plate, and while the plate is in motion the gelatine upon the plate is slightly softened, so that all the relief of development entirely disappears, leaving the gelatine free from veiling, which is often the case with gelatine slides. After that I used to varnish with collodion, which I have long since discontinued. I take an ordinary varnish, add to it one or two chemicals which are not commercial and in stock houses, but which can be obtained in drug stores the same as antipyrine, make a water varnish, and varnish the plate while wet, and then place away to dry, which gives a beautiful clear slide, as you can see by these which I pass around. They are free from grain and with apparently no density at all. But the lack of density is made up in the clearness of the lights and the clearness of the shadows. The reducing agent, antipyrine, is very slow, requiring at least thirty minutes to produce a slide. This, commercially, would be out of the way, as a man would starve to death making slides as a matter of necessity; but for the amateur who wants beautiful work on dry plates, he can do it. My next attempt after using this antipyrine was to try a etanediol. This is a

very insoluble chemical. I find it reduces much quicker on a slide plate than the antipyrine, but the deposit of silver is much coarser. That you can see from the slide exhibited. The formula that I have used with acetanilid is practically the same as the other. Of late I have been experimenting somewhat with collodion emulsions. Mr. Newcombe, of the Savill Company, has been at work all the winter in that direction. He has now an emulsion which more closely resembles the wet plate than any I have seen yet, in which a bath is used. With the collodion emulsion the great trouble seems to be that the film is too thick, and with it you get too strong a contrast. You take a very thin negative, one slightly under timed, and with collodion emulsion you get a negative beautifully clear in the lights and beautifully clear in the shadows, providing you do not develop the plate too quickly; and the great trouble with the wet plate process is that you are apt to have the developer too powerful, especially when pyro and alkalis are used. Iron is a little slower in its action, and you are not apt to get this strength in the slide. The objection to iron seems to be that it does not penetrate the collodion, and experiments made lately in that direction seem to be entirely in favour of pyro as a developer. I have a slide here which illustrates this emulsion of which I speak. As to hydroquinone being used as a developer for lantern slides, the formula which I use is one containing a great deal of sulphite, the alkalis used being phosphate of soda and caustics. After the slide has been developed I make a solution of carbonate of barium in water, which is poured over the slide, which acts as a cleaner. With hydroquinone as a developer for slides the colour which you get has a tendency more to warm tones, unless the negative be very dense, and for that reason I do not like it. I find that in slides, if you get a brownish black or a colour with a trace of pink in it, it is much prettier and will show to much better advantage on a large screen with the lantern a good distance from it than one containing the slightly reddish tone which hydroquinone gives. For that reason I use old developer with splendid results on dry plates, getting tones ranging from a warm tone to a blue-black. The blue-black can be obtained by making a solution of iron, say sixty degrees by the hydrometer, and adding to it from two to three drachms of sulphuric acid. Make a solution of oxalate of potash and add to that oxalic acid, both being put together in the usual way for oxalate developer, and then adding a little more sulphuric to the developer, you will get a tone ranging on the green-blue which you see in the exhibited slide, which gives it apparently no density, but on the screen it shows a pretty effect. If you have a tray of 5x8 inches, and you develop in it two slides, you can have the proportion of two ounces of oxalate to two drachms of iron solution. The sulphuric acid gives the cold greenish effect upon the Carbutt plate. I have used it on the Eastman plate, but you are not as sure of the tone on that plate, as that is a bromide of silver plate. For that reason the Carbutt plate gives the blue-black tone much easier. The method of developing these slides—quick development—seems to give the best results without graining. The usual method of producing slides has been by daylight, but I discarded that about six months ago, owing partially to my being so placed that I could not use daylight, and partially because I wished to experiment in another direction. I have since been using magnesium light altogether. There is a certain quality to the light used in making slides by magnesium that you do not get by daylight. For instance, you are exposing a plate to daylight; your lens is slightly stopped down and you make the exposure; the negative may not be even; you try to cut off the light here and there, and your light penetrates the shadows of the negative quicker than it does the lights, and the light detail is only obtained at the expense of the shadows. When you develop that plate your shadows come first, your lights lack the detail which we like to see in them, and the result is a sort of halation which runs through the plate and produces a sort of foggy. Your slide is not clear and does not show clear glass like the wet plate. The use of the magnesium ribbon prevents this, and you can set the light from any point. You can favour the sky or the shadows. One of the principal causes of halation is the light coming in around the edge of the plate and working its way into the plate as you develop. This can be prevented by making a mat, which you place in front of the slide before it is finished. This keeps all rays away from the plate with the exception of those which pass through the negative. The result is that the glass around the plate is perfectly clear and the light cannot work in where you do not want it. Now, as to the apparatus I employ in producing slides. It is so simple I think I will describe it. In the first place, I use an ordinary camera, as ordinary as anybody possesses. I have the kits (holders) ranged in a frame in a box 5x8, and in case some good-natured friend loans me a 11x14 negative, I can reduce that. If I am not using daylight I take a printing frame, which is the only handy thing I have in the house, 11x14; over that I place two or three sheets of cepa skin (thin tissue paper); behind that is a little box with the negatives in it; just beyond that is the camera with the lens. Now, in using the magnesium ribbon I use only two or three inches of it. When everything is in readiness to expose I have two or three little sheets of cepa skin; with the negative in its place, I hold that so as to simply allow the magnesium to come on those portions of the slide I desire. When the slide is developed you get that tone so much desired on dry plates, and you do not get that foggy in the lights you would get with daylight, because the exposure is rapid, that is, in comparison to daylight. It is this way: you expose by daylight; if you can do it and take your time you will get a very good slide, free from this foggy, but if you expose longer, for the reasons named, then the result is contrary. For focussing I place a lamp just back of the diffusing screen, and that illuminates the negative sufficient for focussing. Any lamp will do. The mat on the slides prevents that halation which I spoke of, and enables you to work without covering your camera or the box which holds the negative. There is light passing between the camera and the negative, but this mat so cuts off outside rays that you only get the light that passes through the camera.

Mr. BEACH: Do I understand that the screen is placed in front of the negative before your light?

Mr. SMITH: First is the magnesium, then the screen, and then the negative, camera, and plate. The magnesium is in front of the screen and diffusing the light. A number of people who have seen the apparatus which I employ seem astonished. They give me large negatives and wonder how I reduce them. But I do it by taking a printing frame of the size of the negative, placing the

negative in the printing frame and back of that the diffusing screen, the magnesium close to the diffusing screen, about six inches away from it, keeping the magnesium in motion while I am exposing the plate. The screen is only about an inch and a half from the negative. Then comes a little box arrangement which shades the negative from any rays that may come in over the top, and then comes the camera. Now as to dry plates compared with wet plates, there are points in favour of both. The wet plate gives you the clearest slide and the most freedom from grain. Clear lights and clear shadows can be obtained upon the dry plate with a good deal of care and skill and time expended. The wet plate possesses the advantage of being quicker, not in the sense of working, but the slides may be finished more quickly. The wet plate has this advantage, that with it the tones can be varied the same as on dry plates, but you do not preserve a certain tone value that you do in dry-plate slides. Myself, I prefer the wet plate. There are difficulties in the way of working it which everybody cannot overcome, and I think if the dry plate were worked up more it could be made to come up to the wet-plate standard as regards freedom from grain, which is essential. In dissolving acetanilid I use sulphuric acid and also alcohol, but you have to use them right in connexion with it. It precipitates itself; and by using a strong alkali I manage to produce the image, and afterwards, by a toning process, which I hope to explain later on in relation to dry-plate slides, I get the density required to make the thing a success.

Mr. STEBBINS: If I remember rightly, you stated that barium carbonate was a very good thing for clearing negatives from stains, &c. I cannot, for the life of me, understand why that should have any action whatever on the plate. Certainly it is a white powder, and I should think, instead of removing stains, it would have a tendency to produce white specks in the film. If Mr. Smith will explain how he overcomes this I will be obliged to him.

Mr. SMITH: Barium carbonate has been used in the wet process as a cleaner of collodion; that is, from the very fact of its being a precipitate, and precipitating on to the film it prevents anything that you are using in developing from working into the film itself. It has no cleaning action whatever on the plate.

Mr. BEACH: Do you rub the precipitate off?

Mr. SMITH: It is washed off. Instead of using alum, which has an action, I use that to cover the plate and do the chemical work while it is covered.

Mr. BEACH: I beg to differ a little from Mr. Smith's remarks as to shading the negative in reducing by daylight. I had a little experience last fall in making a number of slides. In two or three cases I had some negatives which were very clear in the shadows and very dense in the high lights, and the only manner in which I succeeded in reducing the slide equally was to take a piece of paper and hold it up in front of the shadow, allowing an exposure, say, of ten seconds originally for the whole negative, and then shading the shadows by moving in front of them this little piece of paper, and giving the high lights an exposure of perhaps a minute, so as to be sure to have an effect upon the dry plate; and the consequence was, when I developed the plate, the details all appeared in the high light just as nicely as they did in the shadow, and I got a very soft and beautiful slide; and I contend that can be done just as well by daylight as at night.

Mr. SMITH: One point further. In the use of magnesium on positives I do not shade with paper. I shade with colour screens, different colours acting differently on certain portions of the plate.

Mr. BEACH: I maintain that with daylight you can obtain just as nice and soft a tone on your slides as you can get by magnesium.

THE PHOTOGRAPHIC SOCIETY OF JAPAN.

A MEETING of the above Society was held on Friday, June 7, at the Chamber of Commerce, Tokyo. Professor Kikuchi took the chair at four p.m.

His Excellency Viscount Enomoto, Minister of Education, was elected to the post of President of the Society.

After some formal business the special business of the meeting was begun. This was a demonstration by Mr. K. Ogawa of Willis's platinotype process. The process of coating the paper was shown, and that of development was demonstrated on some prints that had previously been exposed to daylight in printing frames in the usual way.

There was a good attendance of those interested in the "black art," and they all took a keen interest in seeing the magic way in which the picture appears in the developing solution.

Mr. Ogawa spoke chiefly in Japanese, and some additional explanation was given by Professor W. K. Burton. It was explained that the paper was coated with a mixture of certain iron and platinum salts, that the light in the printing frame affected the former, which, in its turn, had the power, when dissolved by the developer, of reducing the platinum salt to the metallic state, so that an image in metallic platinum in a very fine state of division, or "platinum black," as it is commonly called, resulted.

Correspondence.

Correspondents should never write on both sides of the paper.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

To the EDITOR.

SIR,—Kindly allow me through your columns to announce that the Photographic Convention will be opened on the 19th inst. at St. James's Hall, Piccadilly. The exhibits of apparatus and pictures will be of more than ordinary interest, and many promises of papers have come to hand.

From the numerous inquiries and correspondence that I receive, it does not appear that the objects of the Association are generally known outside the present membership. I take, therefore, the present opportunity to say that the Photographic Convention was established in 1886, on principles

similar to those of the British Association for the Advancement of Science. The increasing importance of photography, both as an art and a science, justified the formation of an Association devoted exclusively to its advancement.

The first meeting was held at Derby in 1886, and the increased numbers attending the yearly gatherings held subsequently at Glasgow and Birmingham—opened in each case by the Mayor of the town—make it clear that the objects of the Association need only be made known to be fully appreciated, not only by those specially interested in photography, but by scientific men generally. The great interest displayed at each meeting in the papers and discussions, together with the exhibitions of pictures and apparatus, have incontestably proved the usefulness of this organization. Regarded as a means to the development and cultivation of all matters pertaining to photography, the wide and varied experience which such a large and representative body of members can bring to bear cannot fail to lead to important and practical results in the solution of the various problems connected with the scientific and theoretical, as well as with the practical and artistic sides of photography.—I am, yours, &c.,
128, Southwark-street, London, S.E., J. J. BRIGNSHAW, Hon. Sec.
July 31, 1889.

PYROCATECHIN AND BRENZCATECHIN.

To the Editor.

SIR,—Amongst the "Foreign Notes" in your issue of the 26th instant, I observe the following paragraph:—"Dr. Eder has recently pointed out the fact—which is, perhaps, not universally known—that both pyrocatechine and brenzcatechine are compounds isomeric with hydroquinone of the formula $C_6H_4(OH)_2$."

It may prevent misunderstanding if I point out that "pyrocatechin" and "brenzcatechin" are synonymous, the prefixes "pyro" and "brenz" having exactly the same significance, i.e., that the substance is formed with the aid of heat. The correct formula is $C_6H_4(OH)_2$, and not $C_6H_5(OH)_2$. Probably the latter is a printer's error.

The systematic name used by English chemists for pyrocatechin is catechol.—I am, yours, &c., C. H. BOYHAMLEY.

The Yorkshire College, July 27.

STEREOSCOPIC PHOTOGRAPHY.

To the Editor.

SIR,—I think it is now time that Mr. Heywood or Mr. Chadwick, or both, should hark back to the starting-point of the extraordinary hunt they have been leading your readers about stereoscopic photography. Mr. Chadwick replied in your columns to an article by "F. M. S." in another paper; I replied to Mr. Chadwick in the proper place—viz., where the original article appeared. Mr. Heywood, addressing a society in Manchester, ridicules statements which he is good enough to attribute to me. I deny having made any such statements, or any statements bearing such construction as Mr. Heywood put upon them, and I challenge Mr. H. to produce the passages where he finds the statements he fathers on me. Further, he attempts to make out a case for the stereoscope as an instrument conducing to artistic effect, simply by holding up statements partly mine, partly paraphrases of mine, to ridicule; he does not even make an attempt to argue the matter, and on my pointing out this somewhat strange diplomacy he still declines the challenge, and in yours of 26th instant he says the subject is Mr. Chadwick's, not his. If the subject is not his—and from his attitude I fancy it certainly is not his—why did he put his foot into it by meddling with—I don't say criticising—a subject of which he confesses he knows nothing, and on which he has to lean on Mr. Chadwick for support? Mr. Chadwick is well up in the subject, as his writings prove, and if Mr. Chadwick likes to debate the matter with me in your columns I am quite willing to let him start afresh or fall back on his original article, and I will meet him fairly and openly. But no more mockery, the last resource of a weak cause; and, above all, let us have something that has at least a semblance of logic. In Mr. Heywood's speeches and correspondence we have phrases about "slippant misleading papers," "shallow notions," "shameful libel," and so on, but beyond the phrases and their offensiveness we have nothing. Mr. Heywood, trying to get out of my somewhat reasonable remonstrance against the phrase "shameful libel," applied to what I ventured to write in opposition to Mr. Chadwick's opinions, gives us a neat little piece of sophistry, which might pass if the word "shameful" had been kept at home. In what possible way can Mr. Heywood's age and my jetticoats affect stereoscopic photography? Besides, I wore a kilt, usually with little trousers below it! If Mr. Heywood wants to argue, I'm there; if he wants to ballyrag I give in.

Mr. Chadwick is quite another foeman, and if I said anything offensive, as from his tone I fear I must have done, I apologise on the spot. Why he is at such pains to tell us when and where he saw Mr. Heywood of course I do not know. I never said he put up Mr. H. to the misplaced attack on me, and I never thought it.

About my phrase, "any other than a scientific interest," that is really an accurate quotation. I was wondering why he answered "F. M. S." in your columns and not in the other paper, when a person pointed out that Mr. C. was advertising in your and not in the other paper. Does Mr. Chadwick suppose that I was throwing a stone at him for making

cameras when I myself am open to photograph bacteria from any part of Mr. Chadwick's person, from his manservant, from his ox, or his ass, and to make and photograph sections from his dearest friend for a pecuniary consideration? Not much. Mr. Chadwick this time has been too fast to take offence, and he replies by a very funny retort about "Andrew Pringle, Esq." I suppose he thinks I am in the habit of signing myself "Esquire"—I did not think Mr. Chadwick was small—or perhaps it is another cut at the Convention.

Mr. Chadwick "does not remember" that the Manchester Society "made any great fuss of" me. My words were: "It is a Society, if I mistake not, to which I am personally indebted for kindness which I shall not in a hurry forget." Where's the fuss? How can anybody discuss matters in the face of this sort of thing?

In future I will reply only to matter touching the stereoscope, so far as these gentlemen are concerned.—I am, yours, &c., ANDREW PRINGLE.

THE FRENCH EXHIBITION.

To the Editor.

SIR,—I have received with great pleasure, as usual, THE BRITISH JOURNAL OF PHOTOGRAPHY of July 26th. While to some gallophobes Mr. Stebbing's answer (?) to E. Lisk's letter may prove satisfactory, I am sure that to the majority of the readers it will not prove anything, except, perhaps, that Mr. S. is short of arguments and proofs. This will especially be the case with Mr. F. York and others who have been there themselves, and able to know better.

Mr. S. is willing to admit the correctness of Mr. F. York's letter in regard to the Paris Exhibition—so do I, since Mr. York states the correct price of admission, and says that policemen do not bother you one after another, but ask you *politely* to move on when working out of regular hours, and he does not say that such a case entails loss of instruments or fine, but only the taking away of permit, which, after all, was of no more use. I would also state that Mr. F. York does not insinuate that parties getting into trouble (all of their own fault) are only foreigners, nor does he suggest that while gentlemen may get into trouble ladies should go free when they sin. Mr. F. York and I perfectly agree so far, as both our letters show (p. 483).

In Mr. S.'s answer I will call the attention of your readers to another mistake, viz., the permit does not limit the quantity of negatives that can be taken to a dozen, but you are at liberty to take as many as you can in the specified time *without* any extra pay whatever. One hundred with a Kodak if you choose, or with Eastman roller films, 22 inches wide, fifty if you like it.

Now, Mr. Stebbing is at liberty to print one more mistake, by stating the exact way the direction controls how many negatives a certain party has taken during the four hours of his permit. One, twelve, or twenty-four—or none. As to my ignorance of photography it is quite a personal matter of no public interest, and of which Mr. S. knows as little as he knows my name. If you know of a friend that wants to take views at the Paris Exhibition I will go with him once, and all I will ask from him will be a truthful letter of all that happens to us, and, when written, send it to you for publication.—I am, yours, &c., E. LISK.

Amherst, July 27, 1889.

DARK FLASHES.

To the Editor.

SIR,—I notice in your last JOURNAL a few words concerning "dark flashes," and from what I saw a short time since the explanation given by Professors S. and C. appears to be correct. In the afternoon of June 7th or 8th I was looking out of my window at some almost constant flashes, when there was a short pause followed by one very peculiar flash, apparently about 350 to 400 yards distant, and at a comparatively low angle. I will try to explain what seemed to occur. There was a sudden burst of light rather above any of the tallest trees that formed the background, and the flash continued to the earth leaving rather more than the upper third as a wide black streak, terminating suddenly in a very thin wavy line to the ground. The centre of the dark portion looked darker than the sides, and the duration of the flash was quite long enough to note what I have mentioned. The thunder was almost immediate, as one very loud, sharp burst. I think this is the only time in my life, either in this or the other hemisphere, that I have observed such a flash at sea or on land. The dark portion appeared to originate in its descent, and not absolutely at the exploding point. I regretted I had no person with me to compare notes, for we all know how easily we are deceived in our observations regarding lightning. I trust you are well and may enjoy yourself at the forthcoming Convention.—I am, yours, &c.,

Greenbank Park-road, Portwood, Southampton,
July 29, 1889.

R. L. MADDOX

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, August 7, 1889, will be on *Purifying Water for Photographic Purposes*. Bank Holiday outing at Godalming. Trains from Waterloo at a quarter to ten.

Exchange Column.

*. * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, good quarter-plate landscape lens; exchange magic lantern, nearly new, shows eight-feet disc.—Address, A. KEANON, 18, Roden-street, N.

Ross' 15x12 L. A. doublet to exchange for instantaneous doublet or similar lens by first-class maker. Difference adjusted.—Address, GILSON BROTHERS, Seacombe, Cheshire.

Wanted to exchange, accessory balustrade and steps in good condition for good unmounted specimens. Will send photograph in exchange for specimen print.—Address, JOHNSON, 44, Gilroy-road, Liverpool.

Will exchange Optimus rapid 7x5 Euryscope for larger lens same make, or Ross' rapid symmetrical, same size or larger. Difference adjusted.—Address, E. A. BASCHÉ, 6, Hartest-terrace, Mill-road, Cambridge.

Answers to Correspondents.

*. * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

W. S.—If the negative sent is the best the lens will produce it must be of very inferior quality.

W. ANDREWS.—You may place absolute reliance on the quality of the lenses made by the firm mentioned.

DR. C. B.—Sorry we are unable to give the address of Rose & Dobson, the makers of the toughened glass.

D. CUNNINGHAM.—The cyanide of potassium employed by you has not been of a good quality, else must it have redissolved the precipitated cyanide of silver.

J. COX.—If, as you say, the developer "works all right," what does the slight discolouration matter! After the long keeping it is not a matter for surprise that it is slightly tinted.

A. Y. E.—Hunt's *Researches on Light* is now a very scarce work. Copies are to be met with occasionally on the second-hand bookstalls. There is little chance of it ever being reprinted.

JACK.—The *American Journal of Photography* (McCollin, Philadelphia), *The Photographic Times* (New York), and *Anthony's Photographic Bulletin* (New York). These will suffice for your purpose.

O. B.—Apply to the nearest chemist for litmus, make an aqueous infusion and steep the paper in it. If your litmus books have faded from exposure to an acid atmosphere, rinse in dilute ammonia and dry.

J. JOHNSTON.—Until we know what the invention is or in what it consists we cannot aid you. We cannot even guess at it from the specimens enclosed. Send particulars, and, if possible, we will assist you.

W. J.—If the spots can be seen on the paper before it is printed, there is no way of avoiding them in the finished picture. You will be perfectly justified in returning it to the dealer from whom it was obtained.

A. H. B.—The bromide enlargement has been very much under exposed. The longer the exposure the less will the "soot and whitewash" character prevail. Expose much longer, until the details in the faces are well brought out.

MACBETH.—Silver prints can be made by exposure to the electric light. But the light must be powerful and the exposure somewhat prolonged. This source of illumination would be much too costly for commercial silver printing.

A. J. B. inquired in our issue of July 12 where he could commence business in any town not inundated with club printers. In reply to this, "L. T." suggests his writing to V. P. Davis, Esq., 20, London-road South, Lowestoft, for information.

RUTLAND.—The lighting on the portrait marked "C" is decidedly the best and most effective. All the others are lighted too much from the front, hence their flat appearance. Follow on the lines upon which "C" was obtained; even in this a more decided side light would have been preferable.

B. A.—Your plan of testing, if all the silver is thrown down, is as good as any. From the result it is clear you have not added sufficient sulphide of potassium. The meaning of the term about which you inquire is that additional turbidity is manifest, if silver still be in solution, when more of the precipitant is added. Possibly your liver of sulphur has been exposed to the air, and has thereby become deteriorated.

S. TAYLOR.—If the mounts will not stand the test you have applied they are certainly unfit for their purpose. Of that there is no doubt.

S. B. R. complains that in mounting pictures with starch he cannot avoid lumps which cause unevenness, unless the starch is so thin that the pictures will not adhere. In applying the starch paste the lumps should be thoroughly broken up by the brush—this is not a difficult matter. Some apply the paste with a sponge; with this a uniform coating is easily obtained. Sometimes the starch is beaten up to a uniform mass in a basin with a spoon, or forced through a sieve before it is used.

A. BARTLETT.—Negative fixing baths are certainly worth saving for the silver they contain. If you send your residues to the refiner in small quantities only at a time you must not expect so large a return, proportionately, as if you sent bigger batches. The cost of reducing a small lot is, in proportion much more than a large one. We do not think the charge at all excessive. You must bear in mind the charge is based upon the time and material consumed, and not upon the amount of metal recovered.

C. W.—Evidently your previous communication, and the specimens, did not reach us. The cause of the foggy look of the prints appears to be due to contamination in the manipulations. The use of unclean dishes, for example, would fully account for it. If you wash prints, after fixing, in rusty iron pans there is little wonder that they turn out unsatisfactory. You had better have separate dishes for the different solutions, and keep them for their special purpose. The hot water has nothing to do with the trouble.

QUARTER-PLATES IN SWITZERLAND.—"Bex" kindly replies to the query of "L. M." in our issue of July 12 as follows:—"Quarter-plates (Hford) and all English sizes can be procured at Geneva, also plates by Lumière, Bernaert, Monckhoven, Engel, Tailfer, &c., but I do not know if in English sizes. Eastman's products can be got in almost every town. There are societies in Geneva, Zurich, and Lausanne. The latter has many English members who would willingly give information. If 'L. M.' is passing here I shall be glad to assist him." "Bex's" name and address may be ascertained on application to the Editor.

A. C. CALVERT writes: "I have always had much trouble in taking instantaneous photographs with an ordinary camera, and I shall be much indebted to you if you can help me out of my difficulties by recommending me some apparatus by which I could focus and see what I was taking at the same time as I set off the shutter. I do not want a detective camera. Do you know any of this kind in the market?"—View-meters, or finders, to fix on the camera are sold at every photographic warehouse. One of these will, doubtless, answer our correspondent's purpose. Mr. McKellen, of Manchester, we believe supplies a telescopic arrangement fitted to the camera, by which the image can be adjusted in focus and the view seen at the same time while the plate in the camera is ready for exposure.

LANTERNIST says: "Referring to the notice in your current issue upon *Copying Woodcuts for the Lantern*, which rather implies the practice of copying from 'the different illustrated periodicals,' I ask if such practice is legal without first obtaining, in each case, the permission of the publishers. I shall be only too delighted to learn that one is free to copy whatever may be so desired, my sole object being to make one (only) slide of each subject that is met with of sufficient interest for private lantern exhibition. I was greatly disappointed some months back upon writing to the publishers of *Punch* for permission to copy one particular illustration to be flatly refused, notwithstanding my assurance that the slide was to be used for private use only, or, at most, to be shown to a lot of school children for purely educational purposes."—The article does not imply that copies can be made without permission, for they certainly may not. It only referred to the practical part of copying woodcuts generally.

A. S. writes: "A few months ago I invited the mayor of this town to sit for a photograph, which he did; I submitted proofs, and after a time he came and paid for them, but did not order more. This week a history of the town and neighbourhood has been published, and in it is a portrait of the mayor from one of my photographs. My permission was not asked, which I should not trouble about if the name of the photographer was mentioned. I consider myself treated badly. Have I any recompense? The photographs not being copyrighted I am afraid I have not, but if I had the photographs registered now could I stop further liberties being taken with them by the same party—as, for instance, stopping his issuing any more books containing the said portrait? I shall feel obliged if you will tell me. I may mention that the mayor gave the publisher the photograph of himself."—Our correspondent has no remedy for his grievance, inasmuch as he has no copyright in the picture, he having been paid for taking the portrait. In this case the copyright is vested in the sitter, therefore if the picture were now registered it could not be made a valid copyright, except to the sitter. Had the portrait been taken without payment, and the sitter presented with a few copies for sitting, the case would have been different.—*Sulphate of iron*, not the sulphite. The precipitation should subside in a couple of days.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1527. Vol. XXXVI.—AUGUST 9, 1889.

EXPOSURE BY RULE.

Is it possible to exercise too great exactitude in aught that belongs to the practice of photography?

Conversing the other day with a friend, whose experience in the art is as ripe as his reputation is great, he provoked a smile by his graphic description of the behaviour of a party of—well, not very experienced—amateurs, who one day took a run out to a rather picturesque village situated a few miles south of the great metropolis.

Waiting their time till a pretty play of light and shade fell upon some object on which all were bent upon securing, fortune at the right moment favoured them still further by bringing, simultaneous with the fitful lighting, the living material for the most effective of foregrounds. Out came the note books with exposure tables, and busy, busy were the pencils engaged in working arithmetical problems to determine what should be the correct exposure to give for such and such a diaphragm.

But foregrounds of this class, like time and tide, wait for no man—not even for a body of gentlemen amateurs from London—and by the time the *f*-20's and *f*-30's of the diaphragms had been wedded to, or converted into their equivalents in seconds of time, the opportunity was lost.

We have seen the same thing. We have nothing to say against exposing plates by rule, aided by all the paraphernalia of note books, exposure tables, and actinometers—at proper time and place; but rules and laws, whether made for slaves or not, are out both of time and place, under circumstances such as those here indicated.

We once spent an evening seeing a professional architectural photographer develop plates of larger dimensions than those affected by the average amateur, and these represented much money, as they had cost him between three and four thousand miles of railway travelling. Each exposure had been made according to his judgment exercised at the moment; an entry was made in a note book, as a guide to the recognition of each subject after the proofs should have been printed, and this was all. In developing, the plates were treated in rotation, and such had been the soundness of judgment in exposing (although this ranged from a portion of a second up to half an hour) that not only was every negative good, but scarcely a single deviation had to be made from the ordinary routine of development. This friend would have laughed to scorn any one that even so much as named to him the employment of exposure tables or actinometers in connexion with his practice, yet his work is before the world as among the best in his special walk. We mention this by way of recommending the exercise of judgment to young amateurs, so as to be able to dispense with the interminable employment of tables and protracted arith-

metical calculations at a time when they should be otherwise engaged.

Notwithstanding what we have said, it must not be imagined that we counsel inexactness in aught vital to successful photographic practice. There are phases in the art in which it is impossible to be too exact—a fact well realised by the makers of emulsion dry plates or of lenses, in both of which success depends upon attention to the minutest things. But in gauging the intensity of light for exposures, or in developing a latent image, there is a certain degree of elasticity which permits of a departure from the ideal standard of perfection.

ECONOMY IN THE PRINTING ROOM.

RESIDUES—PRINT WASHINGS.

FROM a very early period in the practice of silver printing the saving of the precious metal contained in the washings of prints has been recommended, and in a more or less judicious manner carried out, hence there will be many to whom the following remarks may contain no considerable element of novelty, but at the same time, judging from the way in which the "saving" has been carried out in places we have visited, there is a still larger number whose practice is capable of considerable improvement. Let us follow the processes *seriatim*. The prints are washed, and the washing waters preserved. Many printers follow the practice of washing the prints in successive changes of water until the last water is scarcely milky. Now, as a matter of practice, unless the time allowed for the precipitated chloride to subside be very protracted, the whole amount in suspension does not entirely fall, and when the liquid is run off from the deposit, a certain percentage of waste occurs in consequence. This waste is naturally increased the greater the quantity of liquid in proportion to the silver present. It follows, then, that to collect the after washing waters, which, in comparison with the first, are only faintly milky, is quite false economy; the smaller the amount of water the better—consistent with the due carrying out of the main object of the process—the proper toning and fixing of the prints. The object to be borne in mind in these washing operations is the collecting the nitrate of silver solution—for such indeed it is—in as concentrated a form as possible. The value of this precaution is seen when the precipitation of the silver as chloride is brought about, for the stronger the solution the more readily the chloride clots, and the clearer will the supernatant fluid be. It is here where waste will always occur unless extensive precautions are taken, for it will be found that whenever the precipitant is in excess, as, of course, will usually

be the case, so as to ensure the avoidance of loss, there will always be a milkiness, which will persist for many days before entire deposition occurs. That the minimum of loss should be so produced, there should always be two vats in use—one for sediment to settle in, while the other was being gradually filled up, and so on. Also the spigot or other mode of exit for the waste solutions should be placed a considerable distance above the bottom of the precipitating vat, about one-third way up; some recommend it to be half way up the side. By this means the deposit is not stirred up and drawn out in the current, and the finer particles of sediment that have not quite settled to the bottom are also left behind.

We now come to the actual precipitation, this was almost invariably brought about (as chloride) by the addition of either common salt or hydrochloric acid, popularly termed "spirit of salt." The latter is decidedly to be recommended; it aids the clotting and falling of the precipitate, while salt tends to assist the persistence of the milkiness, and, in addition, possesses the grave disqualification of being able to dissolve a very appreciable portion of the chloride itself, and as we are directing our attention to economy, this is an important matter. The deposition also will be greatly facilitated by violent agitation for a short time. The liquid should be well shaken each time fresh print-washing water is added, and it will be as well to place in the collecting vessel, as soon as emptied, the amount of acid judged requisite for the vesselful. We need scarcely say that before running the liquid off after precipitation it should be tested by the addition of a drop of acid, to ascertain that no silver is left. It is the endeavour to save time and avoid this testing by always adding a large excess of salt that the solvent action of chloride of sodium, when it is made use of, is so wasteful of silver.

We may here record some experience we have been brought into contact with that will show where care must be exercised. In one case the utmost amount of silver extracted from the washings of some reams of paper was too insignificant to be worth taking trouble about. An investigation into the attendant circumstances revealed the fact that home-made "ready-sensitised paper had been employed, and its preparation was such as to leave little or no free silver in the paper. The albumenised paper was floated in the ordinary way, then well blotted off and finished by floating on a bath of citric acid. Here was no silver to dissolve into the washing water, and the precious metal lay in the blotting sheets, which in all probability had been thrown away."

In the next instance, in the endeavour to economise, not only had the preliminary washing been saved, but those washings also after taking the prints from the fixing. All, however, it turned out were collected in one vessel, and chloride of sodium naturally failed to produce any change. Some little time was spent in discovering these facts; but once known the explanation is so simple as to be scarcely necessary. There was sufficient hypo present for the silver to be converted into thio-sulphate, and from this of course chloride of sodium would throw down nothing. If hydrochloric acid had been used, a deposit would have taken place, but this would in the main have been sulphur, and the whole of the hypo present would have had to be decomposed before all the silver was extracted from the solution. This again would be false economy in every way.

In conclusion, we may say that where, from want of space and convenience, it is desired to include the process of collecting the silver, both from the print washings and the used "hypo" solutions in one operation, it may readily be done; but in that

case the suitable precipitant is sulphide of soda, employed as described in our first article of this series. Chloride of sodium is useless, hydrochloric acid would be required in large quantity, the precipitate would be largely contaminated with sulphur, and a penetrating smell of sulphurous acid would pervade the place. In this case liver of sulphur would be the most suitable, the simplest, and the most economical precipitant to employ.

COLOUR blindness is again occupying the attention of the Government, this time in connexion with the Mercantile Marine. One day last week the President of the Board of Trade, in reply to a question, said that the subject of colour blindness amongst seamen of the Mercantile Marine had been referred to a Departmental Committee to inquire into and report upon. Also that the Committee would have scientific assistance in the investigations. This is not the first time that this subject has been investigated officially, and the published reports show that this particular defect of vision prevails to a much larger extent than many appear to imagine. It must be very manifest that any one who cannot clearly distinguish between different colours—such as red and green, for example—is quite unfit for office, either on sea or land, where, perhaps, life and property are dependent upon colour signals.

It does not follow that because a person may possess a defective vision with respect to one colour that he will with all, for such is not the case. We have in our mind just now a photographer who is an artist in every sense of the word. His photographs are always highly commended for their artistic qualities wherever they are exhibited. But when he colours a portrait himself, as he sometimes does, although the work is always skilfully executed, it is eminently unsatisfactory. Blues predominate everywhere. The shadows, which should be cool grey, for instance, are represented by blue. Tints which ought to be, say, pale blue, or greyish blue, are either strongly pronounced or violent blues. In fact, in the pictures blue pervades everything. But if this were simply subdued the work would be really excellent, and the colouring perfectly harmonious.

SEVERAL photographers, we know, are to an extent colour blind without their being actually aware of the circumstance. Some printers, for example, cannot possibly tone a batch of prints all to the same shade, however careful they may be. And what is more, when the discrepancy is pointed out they fail to see any difference. Such, however, is the fact.

ACCORDING to a provincial paper an amateur photographer has recently had a narrow escape from poisoning by bichloride of mercury. He took about one hundred grains of the salt in mistake for hyposulphite of soda, so says the report. Bichloride of mercury is a deadly poison, three or four grains being considered a fatal dose. However, a simple and effective antidote for this poison is usually at hand, and it should be more generally known. If after it is taken one or two raw eggs be swallowed no serious result will follow. The salt combines with the egg and forms an insoluble compound which is inert. It goes without saying in all cases of poisoning that the antidote to be effective must be administered at once, before the poison is absorbed by the system. An egg or two is usually to be found in every house, or, if not, they can be quickly procured. Now that bichloride of mercury—"corrosive sublimate"—is so much used in photography, it cannot be too widely known that, in case of accident so simple a remedy, if applied without delay, may be the means of saving life.

In the report of the case alluded to above it is stated that the mercurial salt was taken in mistake for hyposulphite of soda. It would have been interesting to know why hyposulphite of soda should have been taken at all. A solution of the latter is not an agreeable beverage therefore we surmise it was to have been taken medicinally. Hypo

sulphite of soda may be good as medicine, but we have not heard of it being used in this direction, and it does not figure in the *Pharmacopœia*. Neither for that matter do many other substances which are employed as remedial agents. Perhaps, however, the case is not correctly reported.

SOME photographers are exceedingly careless with their chemicals and leave them about the house, notwithstanding that they may be of a dangerous character. An amusing instance of this occurred at the house of an amateur a short time back. He had left a parcel of hyposulphite of soda open in the scullery, and the servant, mistaking it for washing soda, added it freely to the water in which she boiled some vegetables to make them look green. The result was not altogether satisfactory.

EACH succeeding Bank Holiday appears to bring forth more photographic apparatus than any of its predecessors. This must have been eminently noticeable to every one who had business at the different railway termini on Monday last, or on the two or three days preceding it, notwithstanding the unpromising state of the weather. Camera stands and unmistakable photographic packages were to be seen almost everywhere.

AN universal kind of freemasonry at one time existed amongst amateur photographers. So there does now we are aware, but not to the same extent as of old. It is to be regretted that "snobbishness" is occasionally met with, and this was never the case a few years back. Then it was always with amateurs "hail fellow well met," though they might be perfect strangers to one another.

AN amusing incident is related which occurred on Monday last. An old portrait photographer, who when he takes a holiday always takes a light landscape camera with him, was photographing a few miles from town, when he was interviewed, very patronisingly, by a gentleman of the "masher" type, something after this fashion. "Ah! that is rather a good-looking camera you've got there, but you ought to put it more that way," &c. "Whose plates do you use?" On being told, he said, "Oh, they are no good, you should use So-and-so's, they are the best, I always use them myself, and my pictures are very beautiful; my friends say I should send them to the exhibitions." Next he said, looking at the photographer's stained fingers, "I presume you develop your own negatives; I always let — do mine. The man does not charge much, and he does my prints." Our friend replied that he preferred to develop his own. "Oh, I could do it, you know. I have seen it done, but it is so messy I could not tolerate it. How could one appear in company with dirty hands, you know?" After dogmatising on the arrangement of the picture, the interviewer remarked, "I've been photographing nearly three years, so you see I know something about it; how long have you practised it?" Our friend, who is fond of a joke, replied, quietly, "about twenty years professionally, and for many years prior as an amateur." This brought forth a cool "good day," and our friend has not yet decided whether the quick departure was due to the interviewer thinking it *infra dig* to talk with a professional, or to the humiliation he must have felt at having assumed the dictatorial tone he had to a veteran in the art.

THE question has frequently been raised in our columns as to what constitutes an amateur, and what a professional photographer. An equally interesting question would be, What constitutes a *photographer*? In the case cited above the plates are purchased and exposed. They are then sent to a professional photographer to develop and print from; he also mounts the prints. Yet the one who simply exposes them dubs himself a "photographer," and considers that he is justified in exhibiting the finished pictures in his own name. With the exception of the exposure of the plate, the whole of the work is that of a professional photographer. Does the mere exposure of the plate constitute a photographer?

ACCORDING to *Science*, experiments have recently been made that will be of interest to photographers, on account of their bearing

upon dark-room work and its effect on the eyesight. It should need no warning from us to point out the danger of carelessness with regard to the use of the eyes, yet there are many who fail to take the most elementary precautions. Thus, when at work the actual rays of coloured light from a window or lamp should never be allowed to fall on the eyes, and when passing out of the dark room into the brilliant light of the studio they should be exposed for the first moment or two to as little glare as possible. The experiments in question give the order in which a fatigued eye recovers the power of perceiving different colours. If the eye has been fatigued by long exposure to red, the sensitiveness to green is first restored, then blue, yellow, and, finally, red. After a blue fatigue, the order is yellow, red, green, blue; after a green fatigue, red, blue, yellow, green after yellow, it is red, blue, green, yellow.

THESE results, of course, refer to a fatigue of a stronger character than would usually be seen in prolonged dark-room work. There is, we take it, upon the theory of colour perception, so well expounded by Tyndall, an exaltation of sensitiveness to the rays not employed; the nerve endings not excited become more receptive, so that upon entry to the light studio the reception of the light is so strong as to become an actual shock, and to that extent must be injurious.

ON THE DETERIORATION OF DRY PLATES.

II.

IN my last article I referred to a few tests which I had made with plates kept for a lengthened period with the view of forming an opinion as to the keeping qualities of a gelatine dry plate. Within the last few days I have made further investigation into this interesting subject. In my recent tests I used plates dating back from 1882-1883, and these I have tested in as careful a manner as possible, exposing same both by contact and also through the camera, and using different developing formulae. These plates, until the hour of my using them, were never taken out of their wooden boxes, their wrappers were undisturbed; in fact, the boxes were just as they left the works—"Nelson's." As to their storing in the interval, they have been kept in a dry place and have not been subjected to any sudden change of temperature. I must say I looked forward with a certain amount of interest as to their behaviour. The first of these plates I exposed through the camera, and at the same time I ran alongside with it a fresh plate by one of the best makers of the day, and with which I was familiar. Both of these plates were subjected to exactly the same treatment, the same exposure, and were developed in the same tray with the same solution. The fresh plate turned out in every way a satisfactory negative; not so, I am sorry to say, did the old one, which turned out a miserable, flat, good-for-nothing result. A further series of exhaustive trials gave no better results. I then tried an ammonia plate I knew to be dated from 1886; it was a specially fast and good series at one time, but, horror of horrors, what a result now! It was at once apparent that dry plates in some cases much resemble eggs—age don't improve them.

Now, I am often asked by my pupils to account for this or that failure in their plates after exposure. A by no means uncommon experience on the part of an amateur when developing, no matter how carefully he may have studied his exposures and lighting, is to find on development, no matter how he strives to avoid it, that he cannot get anything but dull, flat results. At first it is very likely he thinks from the manner in which the plate behaves during development that he has overexposed it, and so the next is treated in a somewhat different manner. But all to no purpose. Then the lamp is judged as dangerous, or something has gone wrong with his chemicals, and very likely the last thing he thinks of is the plates, and this because he has used some of the same batch on a previous occasion with excellent results.

Just recently I had a very glaring case of this kind brought under my notice. One of the most careful and painstaking workers in the West of Scotland sent me several dozen plates to develop for him. Accompanying the plates were full details of *light, stop used, nature of subject*: in fact, everything needful for any one to form a fairly correct judgment how to proceed in development. The first box turned out all right, and I was quite charmed with the result of the entire set: but on coming to the second and third boxes, oh, what a change! No matter how I cogitated over each plate, altered the quantity of pyro, added bromide, &c. &c., it was all the same old game; nothing but flat, miserable results. No brightness or sparkle, and this notwith-

standing that my notes stated, exposed in bright sunshine. I naturally at first blamed myself, and looked around me for something that was wrong. So I gave it up, and on mentioning the circumstances to my friend, he simply smiled, and said, "Oh, I know; there were a lot of old plates as well as fresh ones." This at once solved the difficulty to my mind. I looked for no other explanation.

Now, to the bulk of the great body of ladies and gentlemen who practice photography off and on, now and again at irregular intervals, this subject must be a matter of no light importance, and it opens up a wide field for thought, if, indeed, not an entire revolution, in the manner in which plates are now supplied to the public. I am quite aware that a professional is not nearly so liable to fall into such pitfalls as one who merely now and again takes out his camera, for the professional in his constant turn over seldom or never has a supply of plates of any great age. Not so, however, with many amateurs, whose plate boxes are frequently found to contain samples of nearly every brand in the market, and of all degrees of sensitiveness. Where such is the source from whence slides are filled, in my opinion it is almost hopeless to look for any good results.

I have long since come to the conclusion that about the worst possible way of storing plates is the placing of them in grooved boxes. My experience is that deterioration soon sets in when such is the case. Another by no means infrequent cause of deterioration in plates is that which is perhaps most common of all: I refer to the practice followed by most amateurs in allowing their plates to remain in the cells of their dark slides for any length of time. It may not be known to many, but I have clearly traced a very rapid deterioration (in some instances merely a question of hours) to plates from the blacking of the slides. This, of course, is most liable in the case of new slides, or those which are freshly done up. Whenever such staining material gives off a pungent smell, beware of the evil. I have seen a plate which was not twenty-four hours in a cell that had been at the mending, and which had received new cloth hinges and blacking, show a straight line across just where it had faced this stain. For some years I have dispensed with the staining of my cells. I prefer to have them lined carefully with clean sensitised paper, which I expose to the light. I am quite sure of this, that one of the most frequent causes of deterioration of plates in the hands of an amateur, and one that is but little or seldom thought of, is this blacking of the slides. I know some samples that will spoil a plate in a few hours.

We all know how common a practice it is with many amateurs who, after being out for a time, return home with some of their cells containing plates not exposed; these remain there, it may be for weeks or months, until occasion arises for a fresh outing, then out goes the plate again, and it is expected to turn out all right. Such a practice can never yield good results. I invariably tell my pupils to empty their cells on their return home, and I know of no better way of keeping plates than by placing them face to face and storing them away in metal boxes, jamming them up with little bits of cork to keep them from slipping about. I often think were some enterprising maker to take a bold step and supply his plates to the public packed face to face in metal boxes, it would be a step in the right direction. I have travelled for over a fortnight right on end with my camera, and been jumbled up and down over some of the worst roads in the kingdom, but I never yet found any injurious results from packing my plates face to face without anything between them. Any one who knows what the packing of plates (or parcelling) entails in a dark room will at once, I am sure, appreciate any method that would overcome or avoid the trouble both of wrapping and unwrapping the plate. I see no reason, were manufacturers to make certain of the drying of their plates, to prevent them sending some out face to face in metal boxes.

I am aware a metal box is more costly than a pasteboard, but after a time these metal boxes could be returned and refilled; and, taking into consideration such items as paper wrappings, &c., I am not so certain if the cost would be so much greater after all.

As to scratching, I have clearly proved such only exists in the brain of those who speak of such an objection. For years I have adopted this plan, and when a parcel of plates is opened a gentle wipe with a soft silk handkerchief is far and away a better mode of removing any stray particles of dust, &c., than a camel's-hair brush. Plates so wiped will not scratch if placed face to face and jammed up with cork wedges.

A plate coated with a well-washed boiled emulsion will keep in such boxes with safety for a couple of years, but let the same be placed in grooved boxes and subjected to atmospheric influences, and deterioration at once begins to set in; with some brands such is very rapid.

During the course of my investigation of this subject I have from time to time come into contact with other very careful workers, and

I have been struck with their various opinions regarding this subject. In the case of one gentleman, who lives at the seaboard, and whose experience is worthy of all consideration, he declares he can get no plate to keep for over six months without showing decided signs of deterioration, but he has never tried the metal-box face-to-face plan of storing.

Another friend, who lives inland, and who has no gas in his counting house, declares he can keep Wratten's plate, if well taken care of and placed inside a tin biscuit box, for at least two years without any danger. Such quite coincides with my ideas, but I know of other brands that would not keep six weeks.

I see no reason why a good boiled emulsion that is thoroughly washed should not keep for a long time if due care be exercised in storing same.

T. N. ARMSTRONG.

REFLECTIONS ON PHOTOGRAPHERS AND PHOTOGRAPHY.

WE will begin with the assumption that people do not like to be found fault with, deserved or otherwise, and generally find some excuse to shift the blame on to something or somebody else than themselves. The old adage that "the bad workman always finds fault with his tools" is, and will continue to be, true till the end of time. This applies in a very marked manner to most of those who take up a new hobby for which their capabilities are not particularly adapted. Photography is one of those things so easy in some respects that a great majority of those who take it up consider themselves past masters in about a week, and past learning in a fortnight. The element of uncertainty—I will call it this for want of a better definition—exists in such a marked degree that it is almost impossible to say off hand if a certain fault is owing to the workman or his tools, for sometimes even after a very careful examination we may fail to draw a right conclusion.

Defects, though many and varied in character, may be roughly classed as faults in the material and faults in the user; with some that can scarcely be said to belong strictly to either category, but depend on peculiar and special conditions that cannot be anticipated. The sensitive film seems sometimes to be in that state of balance between faultiness and perfection that a slight difference in treatment will determine to one side or the other. Very highly sensitive films are often of this character, and it is with these we find a greater proportion of failures than with those less sensitive. There is no disputing that many faults are invoked by inexperience; and with regard to the manipulation of gelatine plates, from a chemical point of view, I am inclined to think that amateurs have the advantage over those termed professionals, and that instead of "amateur" being used in a depreciatory sense, and as an excuse for bad workmanship, it ought to be a term expressing a thorough and scientific acquaintance with the subject. We naturally infer that as the professional is supposed to make his income by the practice of photography he ought to know more about it than anybody else. This is, however, true only in a limited degree. The professional is eminently a "Groovist," to coin a word for the occasion, and there is neither inclination or necessity to get out of a rut that enables him to produce satisfactory work and give satisfaction to his customers—in fact, the less change the more profit. To be thoroughly master of one system is better, from a business point of view, than knowing a variety moderately well. The old professional under the new order of things is positively at a disadvantage, having to unlearn, so to say, rules and practices that have become a sort of second nature to him, whereas the amateur starts with a clean sheet, and all he has to do is to make himself acquainted with the working of dry plates that give him no trouble to prepare, and by following a few simple rules and formulæ he is enabled to produce negatives equal to those by more experienced hands—in fact, everything is so simple and so divested of trouble that he must be a very dolt who cannot produce a good photographic image, from a chemical point of view, after a little practice.

As the amateur is supposed to take up photography from mere love of the process, it stands to reason that he is free from all those obligations to an exacting public that so hamper the work of the professional. Formerly there is no doubt the art of photography required infinitely more skill—knowledge of chemicals, combined with dexterous manipulation—that could only be obtained by constant practice, so that the professional was in a much better position for producing photographic pictures than an amateur was likely to be, and his work, take it altogether (the amateur's), was in consequence inferior; there were, of course, some excellent workers amateurs, but the majority had certainly to take a back seat. The superiority of professional work in those days was undoubted and incontestable; now, however, things have changed, and the amateur, having most of the difficulties

cleared away, is certainly on an equal footing with his professional friend, if not with an advantage. Amateurs are, or ought to be, pioneers and experimenters, in contradistinction to the professionals, who carry out in the best possible manner the different plans and processes that have been discovered and utilised, rather than striking out new lines for themselves; they have their livings to gain by it, amateurs have not. This brings us on to a very delicate ground, where the two classes are unfortunately often at variance.

Amateurs, undoubtedly, fill up a place in the photographic world from which they, for many things, could be ill spared, and so long as they are contented to remain amateurs, professionals are only too glad to welcome them. It is when the professional gets rubbed the wrong way of the grain by amateurs trying, under false pretences, to make a market for their work that the grievance develops, for no doubt at the present time many businesses have been seriously injured and interfered with by the so-called amateur, who, doing very little good for himself pecuniarily, has succeeded by mere force of numbers in doing considerable harm to legitimate trade. It is the continual dripping of water that wears away the stone. It is as well to look the fact in the face, and if any can devise a remedy so much the better for everybody concerned.

There is one class of business, practically, little interfered with, and that is portraiture; and another, perhaps in a more modified degree, is copying. Both these phases of photography require a certain amount of permanent work room and a knowledge of managing the light, that, except in a few instances, is not very likely to be at the command of the amateur. But for all work where no special conditions are required, there is no reason whatever why the amateur should not produce work equal, at any rate, to that of the professional; and it would be to the credit of the amateur if he refrained from giving a systematically commercial aspect to his amusements, for although each amateur may individually make no difference, hundreds or thousands undoubtedly do.

Ordinary observation shows how extensively photography is being taken up as a hobby, and those who do so may possibly be a means of affecting some substantial good to the community at large by discovering application for the art at present unthought of. "Many thoughts, many minds," and it is to the amateur we especially look for enlightenment, and to the professional for carrying out in the best possible manner the different plans and processes that have been discovered and their usefulness indicated. So much for the workmen. We will now jot down a few stray thoughts on the materials they have to deal with.

The faults of the sensitised plates are varied, and often independent of any skill the user may bring to bear upon them, and those in best repute are not altogether at times free from reproach, although it must be conceded the great majority of plates sent out are very satisfactory, and bad plates are the exception rather than the rule. Having the opportunity of seeing the work, and hearing the remarks of many amateurs, there is no doubt that some faults which, by the exercise of a little more care, could be avoided are not so. For instance, when glass is cut too large or too small for the size it is supposed to represent, irregular in thickness, curved or rough at the edges, a great deal of avoidable annoyance and difficulty is created, and of which the purchasers have reasonable cause of complaint. Then, again, unequal coating, a fault much less frequent now than formerly, when it was a rather rare thing to get a plate with the same amount of emulsion on one end as the other, producing disastrous effects on the negative, not only in the appearance of the image, but in its permanency, the thicker portions in some makes of plates taking an unconscionable time to thoroughly fix (if they ever do get properly fixed is problematical), with the result that after, perhaps, several years of use, without showing any fault, a dark yellow-brown stain will develop, thoroughly spoiling the negative, and rendering it useless for printing purposes. There is great uncertainty in knowing when a plate is thoroughly fixed. Appearances, unfortunately, will not convey the information, the dangerous combination of hyposulphite and silver being colourless and transparent, until acted on by light or more slowly by time, may remain on the film after the negative is apparently fixed, to its ultimate destruction. Thick films that have had a liberal dose of chrome alum in their preparation are most difficult to deal with. Two hyposulphite baths, the second twice the strength of the first have been pointed out by eminent chemists as absolutely necessary to ensure the perfect removal of the hyposulphite of silver from the film, and I think we may look upon it as an established fact that the conclusion on the whole is correct. Acting on this advice the negative should be apparently fixed in the weaker bath, and then transferred for a short time to the stronger one.

Another preventable fault is caused by the method of packing thin paper of various kinds as used to place between the films. Providing

the paper was absolutely pure and of even texture, and the films perfectly dry, I do not suppose any harm would accrue, but as in many cases plates are undoubtedly damaged by this style of packing, we may reasonably infer the conditions of preservation were imperfect. Anything in partial contact with the film for a length of time is open to objection. Even if no chemical action is set up, unequal pressure may cause, by a physical alteration of the particles of bromide, marks in development. The thin card frames used by some firms seem free from objection as any, the injury, if any, being confined to the edges of the plate, and the films more protected from the action of the atmosphere than when strips are placed at two ends only. Providing the glass is quite flat, and care taken that no particles of anything hard is on the film, plates placed face to face in close contact, and kept from moving by four gummed bits of paper applied over the edges on each side, is an excellent plan, especially for the larger sized plates. But if plates are only to remain packed for a short time a piece of good white blotting paper or *papier Joseph* will, I think, not be likely to cause any faults. Speaking from my own experience, I have never found any deterioration from this method.

With regard to spotty plates which, if not home made, are beyond the control of the user, the fault is probably induced by the use of an unsuitable sample of gelatine, or imperfect filtration of the emulsion, or some error in mixing. Dark lines or insensitive patches may generally be traced to some oversight in the preparation of the plates, or, in the case of dark lines and marking of this character, to abrasion of the surface of an otherwise perfect film. A gelatine-plate manufacturer once told me, when I complained of finger marks on his plates, that it was almost impossible to get the work girls to be sufficiently careful when not being watched. This was perhaps true in that particular instance, before the improved methods of coating and storing plates in vogue at the present time were adopted, but now plates of the present day are, as a rule, very free from faults of careless manipulation. Fogged and defective plates have undoubtedly been sent out from the makers for which there is no excuse, such action being calculated to produce considerable loss and vexation to the users, there being no means whatever of providing for such contingencies or remedying the defects.

I believe all makers of reputation at the present time test every batch of emulsion made, as it is evidently to their advantage to put plates perfect as possible in the market, and, take them all round, they succeed very well in their endeavours, sensitiveness being the quality in which they most vary; but the mode adopted of expressing the rapidity of plates is somewhat bewildering, "so many times" being the stock phrase. So many times more rapid than wet plates is of course inferred, but as the sensitiveness of wet plates is not a constant quantity, it is but little guide in that respect. Moreover, the majority of users of gelatine plates in the present day probably know little or nothing of wet-plate practice. It is time some other mode of expression was adopted that would really indicate the different rapidities in a rational manner, which is far from the case at the present time. A matter so important as exposure—the principal element of success in a good negative—ought not, for the credit of photographers, to be dealt with in so absurd and childish a fashion. The Warnerke sensitometer has been the best available guide at present, but a far from perfect one; still, by quoting such a number "Warnerke," a better idea is conveyed of the rapidity of a plate than by the "so many times," which conveys no idea at all, except an erroneous one. Photographers, look to it!

Wrong exposure is one of the principal causes of faulty negatives. The forced development of an under-exposed negative will bring out faults that would, with a proper exposure, have remained unnoticed even if latent, and, at the best, such negatives are always deficient in quality, or the power of producing rich, solid prints, no matter how carefully and skilfully they may be printed. It will be seen that the lights are harsh, and there is a want of detail in the shadows, and the connecting half tone is poor, and sometimes altogether absent. Over exposures are more easily dealt with, and, in many cases, the development can be restrained so that a good negative is the result, but much depends on the character of the film. An exposure that has produced a reversal of the image cannot be treated satisfactorily. Some emulsions are more prone to this than others, and the image will become reversed with an exposure that would not affect another make of plate in the least; in fact, some are so sensitive in this respect that a view that has received generally a light exposure will have the highest lights reversed, or very thin and flat. This tendency to reversal is a very grave fault, as undoubtedly the whole of the image is prejudicially affected, although it may only be detected in certain parts as interfering seriously with the printing qualities of the negative. A proper exposure will, on a good plate, produce a perfect image with a minimum of trouble; the intensity will be right, the shadows

clear, with plenty of printing detail, no chalkiness in the high lights, and the prints from it will be rich and harmonious in all respects.

Streaks and mottling are sometimes produced by imperfectly mixing the developer or by holding the negative up to the light to judge of the intensity, especially in the earlier stages of the development, or by letting the plate remain still instead of rocking it during the process. If horizontal baths are used, the solution should always be kept in motion whilst plates are under treatment, whether it be the developer alum or hypo, or the probability is there will be markings on the negatives. The old vertical dipping bath is much the best for both alum and fixing solutions.

To those who have had but little experience in development it is most difficult, if not impossible, to correctly assign the effects to proper causes, especially as similar defects are produced by very dissimilar causes; and it is only by keen observation and practice that the right reasons are discovered. A very slight difference in modes of manipulation will result in success or failure. Another fault is "green fog." This is a questionable fault, as it may be avoided by the use of fixed alkalis in the developer in lieu of ammonia and ammonia compounds, which seem to induce a precipitation of silver throughout the film, and thus produce the fog. A first-class negative may be made by using soda or potash, that with ammonia as a developer would be utterly useless. Insensitiveness, beginning at the edges of the plate and gradually working inwards, is generally caused by the action of impure air or gas on the films. Plates stored away and imperfectly protected are liable to this fault, especially if they are very sensitive films. Sometimes the insensitiveness shows itself in patches all over the plates; at other times plates develop with excess of density at the edges. This is probably caused either by some small amount of light having acted upon them as they are packed together, or by something deleterious in the strips of material used to keep the plates apart. The spreading of these defects depends very much on the character of the film itself. Probably in bad cases the emulsion was insufficiently washed.

To preserve a dry plate for a length of time, it is advisable to keep it perfectly dry and protected from the action of the air. A good plate then will keep indefinitely. It is a dangerous practice to keep plates in the dark slides, as several possible sources of damage are risked—exhalations from the varnish, wood, or leather; dust, and free access of air. It is possible to keep plates so uninjured, but the risk is considerable. As to faults on the plates from the light getting to them from defective camera fittings, the cause suggests the remedy, although some leakage of light may exist a long time without being suspected, the focussing cloth, or something else, accidentally remedying the defect during exposure. We may pay especial attention to the corners of the bellows, the fitting of the flange to the front, or some nail or screw hole insecure. In the dark slides the fitting of the shutter into the frame, or, with the cheaply made ones, the giving way of the corners, are likely to cause trouble; for, bear in mind, a very little chink will let in a very great deal of light, if not directly on to the plate, by reflection. How important the total exclusion of light, other than that which passes through the lens to form the image, is, may be emphasised by our knowledge of the fact that a pinhole scarcely visible to the unassisted sight, in fact quite invisible unless searched for specially, will form a developable image on the plate in a comparatively short time, or by acting at the same time as the lens produces fog over the whole or part of the plate.

These rambling remarks are not strung together with any idea of novelty, but merely to hint at the probable cause of certain defects and failures that must be more or less familiar to all those who "go in" for this pleasant hobby—Photography.

EDWARD DUNMORE.

PHOTOGRAPHIC USES OF URANIUM.

IV.

THERE is occasional allusion to the fact that the uranium salts may be used to tone albumen-silver prints, but practical experiences of the method are seldom forthcoming. The nitrate, with potassium ferridcyanide, is, as we know, suitable for augmenting the deposit of the negative, and for changing the appearance of positives obtained by development, and there is some reasonableness in the suggestion—for such a method has never clearly held a specific place in the photographic formula—that this, or another uranium salt, would prove of service in determining the final colour and constitution of the printed albumen-silver positive. Besides gold and uranium, platinum is sometimes briefly mentioned as being serviceable as a toning agent. The process is not, and never was, largely adopted, the principal reason adverse to it being probably that the deposition proceeds with extreme

slowness and perfunctoriness. This difficulty of tardy reduction is not experienced with uranium.

It will be plain that, if in any attempt to modify the printed silver picture it is considered essential to reproduce the familiar *rationale* of the gold-toning process by another agency, a salt having chlorine in its combination must be selected. Of the uranium compounds, the oxy-chloride ($U_2O_2Cl_2$) is a body having claims to notice on that ground. The necessity for adding an alkaline compound to the uranium-toning solution exists as in the case of the gold chloride, although it is a moot point whether an acid solution might not be taken. In the old platinum-toning process acidified and alkaline solutions are said to have yielded respectively black and brown tones, but, as a fact, the latter kind were rarely employed, and consequently the resultant tone of the platinum-treated silver prints was invariably black. The distinguishing feature of uranium as a toning agent is that in deposition upon the silver image it imparts a cold black hue to the picture, which, as metallic uranium lends itself to considerable alteration of colour, may be appreciably varied by other alkaline substances.

According to some of my own experiences, uranium nitrate also appears suitable for employment in the toning of albumen-silver prints, although this is in disregard of the theoretical considerations dictating the use of the chloride. A mixture of two grains of uranic nitrate and ten grains of potassium carbonate in ten ounces of water is a solution of convenient strength. The most marked results seem to be obtained if the print is only moderately well washed. The toning action proceeds as rapidly as with gold, and may be carried to a considerable depth; the pictures acquire a cold black colour. With other alkaline agents, variations of tone may be obtained as mentioned above. Silver images on plain or matt paper are, however, more agreeably influenced by uranium toning than those formed on an albumenised surface; indeed, from the kind of picture so produced, it would point to the absence of the albumen as affording the best conditions for the employment of a toning agent conducive to the cold non-glossy effects largely favoured at the present time. Obviously, any expression of opinion upon the stability of silver images so treated would be pure guess work. It is, however, not difficult to understand that the displacement of gold by uranium for toning purposes cannot, on grounds of theory, be recommended, while the whole matter of the comparative permanence and longevity of photographs is ill-defined. A great deal of what has been said on the subject is mere speculation, too often biased and partial.

The line of analogies that may be instituted between the properties and reactions of many of the substances used in photography is of interest from several standpoints. This is particularly to be noticed in the case of the ferric and uranic compounds and their derivatives. The similarity of the higher uranium and iron bodies as temporary image-forming agents is the subject of common remark, and has already been glanced at here. There remains a comparison of interest that may be made between the ferrous and uranous compounds, although it belongs less to the realm of certainty than to that of conjecture. I will try to give expression to it.

Ferric oxalate, $Fe_2(C_2O_4)_3$, by its sensitiveness to light produces ferrous oxalate, FeC_2O_4 , which, among other characteristics, has the power of reducing certain silver salts to the metal, notably the sub-salt of the latent image formed by exposing the bromide to light. Let us turn to what may be called the corresponding uranium compound. The per-salt, the nitrate $U_2O_5(NO_3)_2$, is acted upon by light, being changed to uranous oxide, UO_2 , which has the property of depositing the metals silver and gold from their salts. The point I desire to underline is the likelihood of uranous oxide, in addition to depositing silver nitrate, carrying on the resemblance to ferrous oxalate to the limits of completion and reducing silver sub-bromide. I consider the inference to lean to an affirmative answer, although I am at present unable to sustain the argument by any other evidence than simple deduction. I would, however, premise that these and the preceding notes of the subject covered by the title of the present series of articles were made in the latter part of the past winter. Since then I came across a fragmentary reference to a statement, bearing the authority of the late Dr. Van Monckhoven, that "the latent image can be developed by salts of uranium." Granting that this can be subjected to conclusive proof, I should support the supposition that an oxide is the active reducing agent referred to. The term "salts of uranium" is, in this sense, a vagary; none of those in the ordinary channels of commerce "develop" (reduce) the haloid silver salts. I find no record of a uranium oxide ever having been employed as a reducing agent; but, passing over my own conclusions, the weight and esteem of Monckhoven's statement is too great to be seriously doubted, and while awaiting an opportunity of confirming or negating the theory, I will shelter myself behind his

authority, and assume the completeness of the analogy between the ferrous and uranic compounds.

Among early adaptations of the uranium salts was Colonel Wortley's modification of the collodio-bromide process, in which uranic nitrate was added to the emulsion, and was said to assist in imparting an increase of sensitiveness. The same principle was, I believe, utilised in the gelatine process. From this and what has gone before, it can be seen that, commencing with the constitution of the sensitive film and finishing with the positive impression, the uranium salts have at different times played not unimportant parts in the operations of photography. The chemistry of those bodies has never been fully expounded, and it may be that to this cause we are to attribute the curiously incomplete manner in which they have been handled by the experimentalists. Very likely they would well repay for the diversion of a little of the attention that is now bestowed upon subjects that are getting tediously over discussed. An enumeration of the many uses to which, despite our imperfect knowledge of their properties and capabilities, the uranium salts may be put, should alone fortify the opinion that we have much to learn in those regards.

THOMAS BEDDING.

LIGHTING THE SITTER.

IV.

THE best method of applying curtains to the side light or casement is to have two curtains, preferably of a dark blue material, hung with rings on a brass tube or wire stretched at the upper end of the window. When these curtains are fully drawn they will meet in the centre, completely covering the glass, and their length will, of course, be a little longer than the height of the window.

If mirrors are applied outside the casement, it will be desirable to have a second blind of thin white calico hung on a separate wire stretched parallel and near to the wire supporting the dark blue curtains. It often happens that a weak diffused light is wanted from the direction of the casement, and this may be obtained by drawing the white blind across the glass instead of the dark blinds. If preferred, the white blind may be fixed to a spring roller at the upper end of the casement. This would be a neater arrangement than having it hanging loose.

Having now discussed the details of the walls, the ceiling, and the windows, we come to the floor. This is a very important point, as it is the proper place to put the reflector of the skylight. If the floor is covered with white paper it will be impossible to get strong shadows on the face, however we may alter the lighting: while, if the white paper is replaced by dark oil cloth the shadows cast by the top light will be too dark. With the side light on the one hand, and the reflecting blinds on the other, we can soften these shadows, but still it is not the best way to proceed. We should always try to have the reflector opposite the main light, and when the lighting is from above, it is obvious that the reflector should be on the floor.

It is not much use relying upon an oil cloth printed in light colours on the surface, as the paint soon wears off or becomes discoloured. As a rule, the design is of a red or yellow cast, and is useless for reflecting purposes.

As we cannot conveniently make a fixed reflector of the oil cloth, we must use instead adjustable white coverings to lay on the floor when required. White wall paper is both cheap and handy; when it gets soiled by being walked upon it is not a ruinous consideration to have it replaced. White calico sheets, stretched on light lath frames about two feet by four, are convenient, and can be washed or brushed occasionally.

A reflector of white paper or calico a yard wide, stretching across the floor of the studio just in front of the sitter, has a wonderful effect in softening the shadows cast by a strong top light.

Studios surrounded by buildings, and which are said to be "down in a well," will find these floor reflectors very valuable. They have a marked effect upon the expression, which is apt to appear too heavy and careworn with a strong top light; to soften the expression we must first soften the shadows.

In laying these floor reflectors we must take care not to bring them too far in front of the sitter, or they will produce false lights in the eyes. A safe rule is not to bring them further forward from the sitter than the height of the sitter's face above the floor. Thus, with an adult standing figure, the edge of the reflector nearest the camera should be within five feet of the heels; with a sitting figure the limit will be about a foot nearer the background.

When "instantaneous" portraits are taken in the studio of babies, kittens, dogs, and other subjects in which the problem of perpetual motion seems to be solved, we can shorten the exposure a good deal

by using plenty of reflected light. The maxim of exposing for the shadows and leaving the high lights to take care of themselves is a good one; so, to shorten the exposure we must increase the lighting of the shadows. With the full power of the skylight and mirror-fitted casement, and with the assistance of the reflectors on the floor and the side wall, we should be able to shorten the exposure almost enough to render the drop shutter necessary.

In large studios, where the skylight has a considerable area of glass, it is found convenient to have a small screen or two placed half way between the glass and the sitter; this small screen will produce the same effect on single figures as that obtained by the use of blinds four times the size placed close to the glass. The latter would, of course, be required with large subjects, such as groups.

The small screen has an advantage over the large one; by its use it is easy to increase or reduce the light falling on the sitter without interfering with the lighting of the backgrounds; by this means we can to a certain extent make the background light or dark at pleasure.

A convenient and simple way to fix these small blinds—one which can be applied to any studio—is to fix six or eight screw eyes or screw rings into the wall just over the background, and then fixing a similar set of rings to the opposite end of the studio, behind the camera, at a like distance from the floor. A quantity of ordinary copper bell wire being procured, we can proceed to stretch it from one end of the studio to the other by means of the screw eyes. We shall then have six or eight parallel wires running overhead the full length of the studio. If the studio is long, it will be better to have a horizontal cross bar of wood in the middle, running from the casement to the opposite wall. The screw eyes can be fixed to this bar, and the length of the wires necessary will be thus greatly reduced, as they need only extend the length of the skylight.

We may next make two or three very light wood frames about four feet long and two wide; upon each of these we can stretch or pin a piece of white calico or paper. These frames will then rest by their own weight upon the wires, and can be placed in any position by a touch with a walking stick; or, if short lengths of string or wooden laths are fixed to the frames, with the ends hanging loosely down within reach of the hand, the stick will be unnecessary.

The system is so simple and inexpensive that it ought to become popular. By its use we have perfect control over the top light. The white paper screens will cut off sufficient light for most purposes, while, if greater opacity is wanted, it is easy to use brown paper instead of the white.

The light-framed reflectors made for the floor will answer also for the overhead shades; but as they may be wanted in both places at once, it is advisable to have three or four of them.

When outdoor portraiture is being undertaken, and there is no means of cutting off superfluous top light, we can prevent dark shadows being thrown over the eyes and under the chin by the use of reflectors on the ground. We may get these by placing the sitters upon or behind a light stone pavement; or, in default thereof, we can spread on the ground some light material, such as two or three yards of white calico.

These reflectors need not appear at all in the photograph, even with a full-length portrait, but care should be taken not to bring them too far in advance of the sitter.

This series of articles may be concluded with a final hint, which will be useful when persons with dark-brown or black eyes are being photographed. In such cases the iris is apt to appear as dark as the pupil. By arranging a large white screen of the same shape as the light patch which indicates the iris, we can put it in the proper angle of reflection, so that its miniature image will appear on the iris when viewed from the camera, and will photograph exactly as if the iris itself was the source of the little bit of light, or, rather, half tone.

The shape of this iris reflector may be a crescent, the outer edge forming a two-thirds segment of a circle, the diameter of which is equal to the distance—five feet, for instance—separating the crescent from the sitter. The horns and edges of the crescent should be shaded off with grey pigment, so that the shape of the reflection in the eye will appear somewhat ill-defined.

When in use, the convex side of the crescent should always be opposite the chief light, or, in other words, the two horns of the crescent should point at the light. If the skylight is the chief source of illumination, the horns will point upwards. If the top light is screened off, and the side light used instead, the horns will both point horizontally at a point half way between the camera and casement. If the sitter is looking at the camera, the crescent will be placed between the two. If he is looking at a point three feet to the right of the camera, the crescent will have to be put on the same side with its centre at double this distance from the camera, viz., six feet.

The crescent should not be used with light eyes, as its use would

be detrimental to the photograph; but with dark eyes it is an advantage, as it apparently brings out the detail of the iris. It should be illuminated strongly, and is, of course, only effective when the studio wall behind it is dark.

ALBERT W. SCOTT.

AN EASY METHOD OF DETERMINING THE RELATIVE SENSITIVENESS OF PHOTOGRAPHIC PLATES.

WHEN a photographer has purchased three brands of plates marked 60, 35, and 26 by their respective makers, he not unnaturally may wish to know which is really the most sensitive. He can readily settle the question to his own satisfaction, however, without any special apparatus, the first clear evening. Let him focus his camera for parallel rays by daylight; the larger and longer focus his lens the better. When night comes on point the camera on the pole star by sighting along its edge, as one might sight a rifle. This is necessary, as the stars are in general too faint to be seen upon the ground glass. Care should be taken that in this position the plate remains perpendicular to the axis of the lens, as some cameras are liable to bend when inclined. This difficulty may be overcome by resting the camera upon a board. One should use the full aperture and give an exposure of about ten minutes. On developing, numerous stars will be found which are invisible to the naked eye. The stars will all leave trails, forming arcs of concentric circles whose centre lies near the centre of the plate. The plate should be given full development, as nothing will be seen upon it until it is fixed. Since the stars are in constant motion, the intensity of the image is independent of the exposure, which effects only the length of the trails. To obtain a good stellar photograph, much more accurate focussing is required than for ordinary views, and it may be necessary to take two or three plates, varying the focus slightly in each case, before the best result is obtained.

In general, a photographer wishes only to know which of several plates is the most rapid. To this end they should be exposed immediately one after the other, and then each developed according to the printed directions accompanying the box. The experiment should be repeated two or three times in order to ensure the greatest certainty in the result. The most accurate way of comparing the plates is to cut a circular hole one inch in diameter in a piece of paper and hold it against the back of the plate, so that the pole star shall be in the centre. The pole star may be recognised as a black, somewhat elongated dot near the centre of the concentric arcs. Now, with a pocket magnifier, count all the stars visible through the hole. The plate showing the most stars is the most sensitive. It is well to count them over two or three times, as if there are many it is at first difficult to make them come out twice alike. A difference of five per cent. in the total number of stars shown by two plates would make very little difference in their relative sensitiveness.

If it is desired to find out how many times more sensitive one plate is than another, one must vary the aperture of the camera lens by paper stops placed in front of it, until the same number of stars are shown in both cases. The relative aperture of the stops then give the rate of sensitiveness of the plates.

PROF. W. H. PICKERING.

Harvard Observatory, Cambridge, Mass.

—Anthony's Bulletin.

SILVER PRINTING ON ROUGH DRAWING PAPER AND OTHER SURFACES.

AMONG the many processes which have either been forgotten through want of persistent keeping before the public, or by reason of not being taken up as a trade matter, or from other causes, but which remains in a state of suspended animation, is that of the proper way of printing on rough drawing paper. The subject was written of a few months ago in a contemporary journal by Mr. H. H. Biggs as a new thing, and had it remained there unnoticed, it is probable that it might have been left in its comparative obscurity; but when our eminent friend, Dr. Ellerslie Wallace, of the *American Journal of Photography*, takes up a similar rôle, as quoted in page 474 of this JOURNAL, it is time, and there is reason, in calling attention to the subject, more especially as neither of these gentlemen have, to use the vulgar expression, "got the right sow by the lug." The first-mentioned writer simply advises sizing the paper with a four-grain solution of gelatine, salted with five grains sodium chloride to the ounce, and sensitising it with a sixty-grain solution of ammonia nitrate of silver made in the usual way, and coated by brushing with a Buckle's brush, then to be printed deeply, and toned and finished as usual.

Dr. Wallace, writing of this, takes a broader view of the subject, and

looks more at the qualities sought for by using the rougher and matt surface papers together with the artistic advantages to be derived by using this and similar processes which give effects that cannot be got by the use of albumenised and other glossy surfaces. There is one point, however, of which no notice has been taken by either of the gentlemen mentioned—i.e., the permanency of prints on plain as compared with albumenised paper, a truth which is now accepted almost without question. The most cursory examination of silver prints taken from the same negatives by the same persons five-and-twenty or more years ago, whether kept in frame or folio, or mounted in book form, will show the better keeping qualities of the plain paper print. In the latter way of keeping prints I notice that the fading, where there is any, is always at the edges, where the effect of the mountant is often visible in a distinctly faded external edge, the print being attached to the book mount by the outer edges only in the cases quoted, and almost always unfaded in the centre of the print.

But there has been found by workers with plain paper a peculiar difficulty in preventing the print having a sunk-in appearance, and combined with want of vigour as compared with those on the albumenised surface, which no doubt accounts for the comparative disuse of the really more artistic prints on the plain paper. About the period alluded to a pretty exhaustive series of experiments were entered upon and carried through with the view of finding a method of keeping the image more on the surface of the paper, and giving it, while keeping the matt surface intact, more of the brilliancy and power of its rival. In the earlier days the selection and choice of papers was a most important matter, but choose which one might, as they were all prepared pretty much in the same way as that indicated above, with the difference only of using plain nitrate of silver solution instead of the ammonia nitrate, the latter not coming into general use for some time later, the outcome was sometimes most tantalising, the differing samples of paper behaving in very diverse ways, and generally diverse to the way that was wanted. This series of experiments led to the proposal of a system for preparing the surface of any kind of paper so that it would accept the sensitising medium and keep the image on the surface, thus showing the same vigour without having the meretricious gloss of the albuminous print, and without its inherent elements of decay. The method was known and named, as everything was then named, a process—the "Ormolu" process, from a technical trade term, the emulsion used for preparing the paper bearing that name, and one form of it being used for a very different purpose.

In simply sizing with gelatine the surface of drawing or such-like papers, the image, as previously stated, will seem to enter into the body of the paper, so much so, that with some of the thin papers the photographic picture seems as if it were brighter when looking at it as a transparency with a good light behind it than when looked at on the surface. By this Ormolu process all kinds of paper may be used for photographic printing purposes, whether made with that intention or not, from the thinnest to the thickest, the most highly glazed to the roughest hand-made writing papers, and any kind or sort of drawing paper, from Whatman's best to the cheapest cartridge, and in addition crayon papers of all shades, as well as all the softer papers, are as amenable to photographic uses as are the best Rives or Saxe; indeed, there were exhibited, the last time it was publicly spoken about, pictures upon the lithographed backgrounds of Sarony, on the backs of theatre and circus posters, and on all kinds of common wrapping and brown papers, which were perfect in all photographic respects. This method, however, will not prevent the appearance of such accidental imperfections as are caused by the minute atoms of brass, copper, or iron which get embedded into the substance of all papers in greater or less numbers, according to the care in the preparation, the perfection of the machinery, and other factors of that nature; but it seems proof against all others, so far as has been experimented upon.

For the corners of handkerchiefs, silk or linen, it is perfection when the material is used very thin, and on the tops of note paper many a dainty little negative can be printed with the greatest of ease and almost without soiling the fingers. One great advantage this system possesses over simple gelatine is that by being emulsified it becomes much more insoluble, and so assists the paper to stand the washing better, in addition to the more valuable property of keeping the image on the surface.

In preparing the emulsion we will consider the gelatine first. Of course there are many varieties of this substance, some being more suitable than others, and that which takes the first place in this process is known as gilders' clear size, which is made by boiling, or rather simmering, cuttings of parchment or vellum, or of untanned buffalo hide, &c., all of which substances are sold for this purpose. In great cities, such as London, the size can be purchased ready made. Next to this may be placed the ordinary calf-foot jelly for table use, but without colouring or spicing of any kind. This last may be taken

as the proper strength of gelatinity to use for this process. In making use of either of these varieties, there seems to remain in the substance of the gelatine a portion of animal oil, which, if not essential, is at all events advantageous, so much so that in using the commercial gelatines, which are so treated in the preparation by exhaustive bleaching with lime, &c., that all the oily matter of the hides from which it is extracted is destroyed, it is desirable to add a minute portion of oil to the emulsion, as will be pointed out further on.

In using commercial gelatine it may be well to note that all samples are not of the same strength as it is called; for instance, tradesmen in using glue know that the best Scotch or Russian is almost infinitely stronger than the cheaper English and French examples, although the latter may look even better. Ask a bow maker or a pianoforte case maker to use the latter-cited kinds, and he would laugh at the idea. So it is with the commercial samples of gelatine, and that is why the preference is given to the strength of the solution rather than to the weight in grains or ounces, as five grains of one kind may be worth ten of another, which, while quite as good for the purpose for which it was made, has not the same amount of gelatinousness in it.

With these preliminary observations it may be said that the best way to proceed, if gelatine be used, is to place in an earthen or glass jar—such as a Liebig's essence one, or of that shape—as much as will half fill it of the shreds, or if the material is in cakes then break it finely down in a cloth or strong paper; cover it, when placed in the dish, fully with water and allow to remain for three or four hours, or till it has absorbed as much water as it will. Then pour the water off and add as much fresh as will just cover the swelled mass; afterwards dissolve or melt by heating, but do not raise the heat above about 180° Fahr.—it is injured very much in its properties by being overheated; a warm water bath similar to a glue pot is the proper thing to use; then allow it to cool and set, when the strength of the jelly will be seen. If too strong add a little water, if too weak a little more of the dry gelatine (this really is a matter of judgment). For convenience this may be called solution A.

In the interim this may have been got ready. Make a solution of any of the under-mentioned gums in methylated spirits of wine of not less than 60 per cent. o. p. It would be of little use putting the specific gravity, as this is the method of describing it, on sale or purchase, and these remarks are meant as a practical help for common use. Shellac freshly bleached stands first. If this substance is kept long, by exposure to the air it becomes oxidized and insoluble, which is easily seen by breaking the stick (it is sold in sticks) across, when, if it is old, the external crust will be found to have become yellowish, and the further this extends inwards the more useless is the sample, and therefore to be avoided. Next in order and usefulness is gum sandrac, which is like the bleached shellac—a nearly colourless gum. Gum benzoin has much more colour and is altogether not quite so useful for this purpose, but it does. Gum mastic does exceedingly well, but it is difficult to dissolve wholly in spirits of wine, and this combined with a high price will prevent its common use. The palest orange lac will also do, the only objection to it is the slight colour it necessarily has, otherwise it is the best.

To make use of the lac or benzoin they must be pounded into a coarse powder, the sandrac and mastic are in the form of tears, and need nothing of that nature; but with either of them it is well to add about the same bulk of coarsely pounded glass, which keeps the gum from agglomerating and forming a sticky mass difficult of solution, and this, when the gum is dissolved, falls to the bottom with the dirt and insoluble particles and does not affect the result. In this connexion the longer the solution is kept, and in full light, the brighter and more colourless it becomes without affecting its other properties. If this has to be used with the commercial gelatines it is well to add a drop of castor oil, which mixes easily in the spirituous solution, to each two ounces of it; this will make the gelatine act more like the clear size in the making of the emulsion and so render it better.

The proportions are about one ounce of either of the gums to eight ounces of methylated spirits, which, after being made as described, may be called solution B; it is better after it has deposited all the dirt and insoluble matter to filter or decant for use. The proportions given are not hard and fast, a little, more or less, on either side does no appreciable harm.

To make the emulsion melt the gelatine, as directed, pour as much of B gently into A, with stirring, as will give it the colour and appearance of cream. There will be a deposit of gum in most instances, caused partly by the difference in strength of the gelatine, and partly by the proportion of gum being perhaps too great; in fact, it is a very rare occurrence that the emulsion is completed without this deposition.

Add now from four to seven grains of sodium chloride or ammonium chloride, as the operator may wish to use. The potassic chloride has been found unsuitable. The salt should be dissolved in a few drops of warm water and added to the emulsion, then filter through fine muslin and it is ready for use. In coating the paper a camel's-hair flat brush may be used, but perhaps as handy a way is to use a fine small sponge, spreading it in all directions until the paper has absorbed the necessary amount, which will be ascertained when it shows equally wet or rather damp all over and without any portion being unduly flooded.

This treatment relates to the firm-bodied, well-sized drawing papers with rough or smooth surfaces, as prepared and made specially for water-colour painting; but in dealing with the softer papers, such as those used for copper or steel-plate printing, or the toned papers used for crayon drawing and such-like purposes, a slightly different treatment is necessary, they being so slightly sized as to be in some instances little, if anything, harder than blotting paper. Crayons may be first considered, as photographs are frequently wanted to be as like them as may be—indeed, a life-size head printed on crayon paper and well finished by an artist's hand is better than nine-tenths of the portraits which pose as fine crayon portraits by gentlemen with half an alphabet after their names. In printing a life-size head, whether taken direct or with an enlarged negative, it is found that after being prepared, printed, and finished in the ordinary way, that the surface of the paper has been so destroyed that it will no longer take the crayons hard or soft, that the paper has lost its tooth, as the phrase goes, and even with the preparation by this method the result is similar; but there is a way out of the difficulty which has proved satisfactory, and it is this: Instead of using the full strength of the emulsion, as in the previous case, add about one-third of water to it; then, in addition, add the proper proportion of salt for the added water, and give the paper when it is melted and mixed a first coat in the manner described, but without allowing it to soak so thoroughly into the body of the paper as has been directed. It may then be hung up to dry anywhere or how, but preferably over a rod or stretched cord. When quite dry give it a second coat of the same, and dry it flat, as directed afterwards, if there are several sheets; but if there are one or two only, a good way is to fix them on a drawing board with a few tacks or pins, just as a sheet of drawing paper is put down for sketching upon. If the photograph is of the head and shoulders vignettted, the position being arranged, there need be no more sensitised than the required portion, the ammonia nitrate being used in this case, but let the tyro beware and not do the same thing with the emulsion sizing, as if that is partially done the sheet of paper will be utterly spoiled.

After the printing and washing is finished, which is all done in the ordinary way, the toning need only be carried as far as it is desired that the finished chalk should be in colour, and after the completion of the fixing and washing, the question of the restoration of the surface of the crayon paper, so that it may take the chalk as if it had never been interfered with, arises. Fix on a board with blotting paper below it, and with a sponge go over it with a weak solution of ammonia, but avoiding the printed part, which should be kept damp, or but slightly touched with the ammonia. Allow this to sink in, then press the damp sponge over the surface, removing as much of the sizing as the alkali has softened; then, after the full effect has resulted, take hot water and sponge over and over, dabbing with the fine sponge to extract the softened sizing without breaking the surface of the paper. This, if deftly and skilfully done, will leave the sheet pretty much as it was before printing the photograph upon it. If, after being dried flat, as indicated further on, it should be found that it is a difficult matter to get the chalks to bite, a usual expedient is to go over the whole surface very lightly with a piece of the finest glass paper, known as flour paper; this, when carefully done, dusted off, and finished with a rub with a piece of uncoated paper of the same kind, will at once create the necessary tooth for the crayons or pastels, and so enable the picture to be artistically finished. The operations may seem tedious and lengthy, but in reality they are very rapidly got through; it is the description that, to be accurate, had to be protracted.

The whole operations of sizing with the emulsion, and everything but the drying and keeping of the prepared papers, should be done in a place as free from dust as possible, and in daylight. When the sheets are about three-quarters dry, they should be placed one above another, face to face, and back to back, and the prepared side should be marked with a pencil to prevent mistakes; when all are piled up, place them on a flat board with blotting paper below, and above them another similar board with a light weight on top, in which state they should be allowed to remain till quite dry.

Dr. Wallace lays some stress on the fact that albumenised papers

expand and contract irregularly, this is caused by the strong contractile power of the albuminous coating which is on one side only; but it is a fact that all papers which are machine made have a fashion of expanding more one way than the other when they are damped. Hand-made papers have not this peculiarity, as they stretch equally in all directions; as he makes no observation on this point, he may not have noticed it.

In some of the more recent experiments there has been added, to increase the insolubility of the emulsion, about a grain of chrome alum to the ounce of emulsion, but without appreciable effect, and printing on crayon paper it should not be used. In sensitising the paper, which will be found perfectly flat after the treatment prescribed, this may be done in the ordinary way by floating on a sixty-grain silver bath, or if the paper be of a strong kind, like Whatman's heavy drawing, it may be made into a bath by pinching the corners with clips, or by using for the same purpose strong mourning pins, the black japan varnish protecting the solution from all injury. Of course, the sheets may be fumed or not at pleasure. If the ammonia nitrate sensitiser be preferred in coating it, I like a fine small sponge (kept for the purpose), as in the case of the emulsion, as it seems in the crossing and recrossing to prevent any of those white lines which sometimes will appear when using a camel's-hair or a Buckle's brush. The rest of the treatment is precisely as for ordinary photographic printing as to the toning, fixing, and washing, but in the final drying, while treating them as recommended during the coating with emulsion, it is well to interpose blotting paper between each printed sheet, and the result will be found to be a perfect success in every quality which a print should have if the directions have been carefully attended to and the negatives what they ought to be, and they will be as flat as a steel engraving, and flatter than many water-colour drawings.

A very beautiful and effective way to treat large views or copies is to so mask the negative and drawing paper as to get the picture in the centre of the sheet with a margin of three or four inches all round; the effect will be found to be very agreeable and artistic, while costing very little trouble.

W. H. DAVIES.

THE BEACON ON MEN AND THINGS.

WE extract from Dr. John Nicol's *Beacon* the following somewhat strongly expressed jottings on things European, to show in what estimate our Chicago friends hold them:—

W. J. STILLMAN's ideas of "art in photography" are, as most students of the literature of photography know, rather hazy, and, when clearly expressed, lean strongly to the nonsensical side. According to his confession of faith, the artistic qualities of photography are to be sought for only in the perfection of its technical qualities; and, therefore, all the art to which photography is capable of giving expression may be found even in the ridiculous positions so often assumed by popular actresses, as if they were merely lay figures twisted into grotesque attitudes, on which to display fancy costumes, so long as something approaching technical perfection has been reached. No doubt this view of the question is flattering to those of the fraternity whose soul cannot soar above the merely mechanical, but their faith ought to be shaken in Mr. Stillman as a teacher when they read what he gravely tells us, in a recent issue of a contemporary, is true art and what is not.

The article is too long and too weak for quotation, but the gist of the matter seems to be as follows: According to this teacher, legitimate art is "design," and design does not consist of thought and plan and arrangement, of the conception of a work of art in fact, but in the transferring of it by brush or pencil to canvas or paper. In case this should not be clear enough, he illustrates and enforces his views by mentioning two prints, each equally good and beautiful—the one a photograph from life, the other a copy of a picture. He says that the print from life might, in all its essential qualities, have been from a picture, while the print from the picture might equally have been from nature, and that then their position in respect to art would have been reversed. In short, according to Mr. Stillman, it is not perfection in composition, and light and shade, and the possession of good pictorial qualities generally, that entitles a picture to be considered a work of art, that coveted title being only legitimately bestowed on work turned out in a particular way.

AMATEUR photographers have need to pray to be delivered from their friends, and especially from the well-meant but very questionable advice of Laura M. Marquand in a recent number of *Science*. If her mission was to make manikins in art she couldn't adopt a better method of teaching. It is, get a hold of all the "masters" you can, both ancient and modern, and copy, copy, copy, imitate, imitate, imitate. Don't let slip a light or shadow, and be sure you get every article of dress right. Oh, Laura M. Marquand! you don't know how much harm such advice would do if the rising race of amateurs were to adopt it; but your concluding paragraph is comforting. "This is a branch of photography which has been but little attempted." Let us be thankful for

that, and pray that long may it so be. The "masters," both ancient and modern, are invaluable as studies or educational agents, but the mind that can be content to merely copy and imitate is very small to begin with, and will soon dwindle into something smaller still.

STRANGE things are sometimes seen from the watch tower, but nothing stranger for many a day than the Emerson squabble that has been going on in some of the English photographic journals. Dr. Emerson is a young man of considerable ability, but possessed of much less than the average amount of wisdom, and his book, *Naturalistic Photography*, is made up of good and bad in something like the same proportion. Because some of his critics have honestly said so, the doctor has treated them to a column and a half of senseless abuse that must be the envy of every Billingsgate fish-wife. "Liars," "lying cowards," "stupid fools," "ignoramus," are a few samples of the choice vocabulary of the gentlemanly doctor.

THROUGH JAPAN WITH A CAMERA.

CHAPTER VIII.—SHIRAKAWA—THE TOTAL ECLIPSE—A JAPANESE CASTLE—THE JAPANESE FEUDAL SYSTEM—EARTHQUAKES, FIRES—SENDAI BLACK WOOD.

THE 16th of August saw us at Sendai, where we had business, and where we should have stopped. I was determined, however, to be at Shirakawa on the 18th of August, so as to see all the preparations made by the Americans for the observation of the total eclipse. So I decided that we should travel to this place and come back again to Sendai for our work. I have already sent to England a note on the arrangements made for the eclipse. Had we stayed at Sendai we should have seen it fairly well. We would not, however, have seen the arrangements made for observing it, and, moreover, would not have seen the beautiful country surrounding Shirakawa, so that I by no means regret the extra distance travelled, or the time taken.

The country around Shirakawa is, as I have said, beautiful. It is of hill and dale, valley and rice field. Various of the party, myself included, made several photographs of bits of it, but I don't think that any of them convey a good idea of the nature of the scenery. To me the most interesting place was the castle, which had been selected as the observatory by the Americans, and from which the views just mentioned were taken.

It is a thing difficult to appreciate of this now eminently constitutional and peaceful land, that only twenty years ago it was regulated by a feudal system as complete as that which existed in England in the middle ages; that only twenty years ago there were feudal lords, or daimio, who had their crowds of retainers, fighting men, called Samuri, a set of awash-bucklers, who went about armed with two swords each, who were scarcely amenable to any law, were continually quarrelling and brawling and chopping off each other's heads in a gay and festive sort of manner, not to mention their habit of performing hara-kiri, or of committing suicide by the very nasty method of disembowelling themselves with a knife, very often for no very palpable reason other than, perhaps, "to encourage the others." Of the castle of Shirakawa, it is also almost as difficult to believe that it was only twenty years ago a stronghold of one of these same daimio, and was in actual service. So quickly does the exuberant vegetation of Japan spread and cover every spot left open to it, that the walls of this castle are now clothed in such a profusion of trees, bushes, plants, underwood, creepers, and moss, that they look as if centuries must have passed over them since they were in active service, and must have been kept clear of all vegetation except, perhaps, the large trees.

A Japanese feudal castle is a very different affair from an English castle of the middle ages. The tall, square castle and keep, with which we are familiar in a ruinous condition at home, would have been impossible in Japan, on account of the earthquakes, if nothing else. The so-called Japanese castle would be better understood if it were described as a fort or fortified hill. So far as I have seen, a piece of elevated ground is always chosen for the castle, and this is fortified by heavy embankments faced with stone, and moats constructed in a complicated manner around it.

It is rather less than twenty years since the revolution took place which resulted in the complete and sudden overthrow of the feudal system. Before that time there had been a double rule in Japan, the power being divided in a way too complicated for most foreigners to understand, much less to describe, between the Mikado and the Shogun. The former espoused the popular (or anti-feudal) cause; the latter adhered to the old system. The daimio took different sides, according to the opinions or sentiments they held. Shirakawa was the scene of much fighting. The castle was, at first, in the hands of a daimio who favoured the Mikado, but it was attacked and taken by the Shogun's soldiers. It was, however, retaken within a week by the Mikado, who was finally victorious everywhere.

The evening of the day after the lamentable 19th we made our way from Shirakawa as far as we could by rail on our way back to Sendai; but this still left us nearly ninety miles to do in jinrikisha. By getting up before daylight, however, and by having frequent changes of two men, we managed to do the distance within the day. Dr. Goto had left us at Shirakawa, so that I had only Nagasakisan with me now.

Of the town of Sendai two things particularly remain in my mind. One is a street corner where there are several houses exhibiting the more florid style of ancient Japanese architecture. These houses are, I was assured, over 300 years old. This, it must be understood, is a very rare thing in Japan, the prevalence of earthquakes and of fires, combined with the fact that the flimsy wooden houses that the Japanese build are naturally not very permanent structures, reduce the average life of a house in this country to something comparatively very short.

A word on the earthquakes. There are, in Japan, something approaching 1000 earthquakes in each year. The vast majority of these, however, are quite local, and are so feeble as to be observable only by delicate instruments. Perhaps about once a month there is in any one place in Japan an earthquake distinctly perceptible to those who happen to be awake. I have perceived only one as yet, and that was at Sendai. Shortly after I had gone to bed it came. There was a shock—not violent, but much sharper, more like a blow than I had imagined an earthquake to be—which made the joists of the house creak loudly. Then for about thirty or forty seconds there was a perceptible trembling.

Of course such earthquakes as this do no harm to wooden houses; they slowly disintegrate brick and stone houses, unless certain precautions are taken in building. But since there has been any record of such things in Japan, there have been an average of three or four terrible earthquakes in each century. These have levelled even wooden Japanese houses. The ground is said at the last of these to have opened and swallowed up thousands of people. The loss of life in Tokio alone is said to have been, on the occasion of the last of these, some 20,000 souls.

Naturally, with wooden houses having charcoal fires in them, such an earthquake is generally followed by a conflagration; but leaving the occasions of great earthquakes out of the question, there are continual fires in all towns in Japan. In fact, if one considers the tinder-like nature of the houses, and the way in which they are heated and lighted (with mineral oil lamps), and that the means of fire extinction are of the very crudest, the astonishing thing is that there are not more fires than there are.

It will now be understood how rare a thing it is to see a really old house in a Japanese town.

The second thing that I remember Sendai for is a very beautiful black woodware. The wood is, I understand, fished up from underneath the river which passes through the town. It is quite black, and very beautiful trays, &c., are fashioned out of it. The most extraordinary thing about it is its weight. Dr. G. Cargill Knott has taken the specific gravity of one of the carved trays that I bought, and finds that it is very nearly 1.3.

W. K. BURTON.

THE YORK EXHIBITION.

THE photographic department in this International and Industrial Exhibition can scarcely be said to be a success, the exhibits being comparatively few. Various causes have been assigned for this, one being the duration of the Exhibition, the exhibitors being kept out of their pictures from May 5 to its close in October. Another, which probably acted more powerfully, was the charges for space, which, according to Rule 9, are as follows:—

"The charges in Division A will be 1s. 6d. per square foot, with a minimum charge of 3s., any fraction of a foot to be charged as a foot. In Division B the entrance fee will be 10s. for each picture. In Division C the charge for space will be 1s. 6d. per foot, with a minimum charge of 5s. In Division D the charge for floor space will be 3s. per square foot, the minimum charge being 5l."

In explanation, Division A represents—

The Amateur Competition, open to all; the negative must have been exposed, developed, and printed by a *bona fide* amateur.

Division B, the Professional "Champion" Competition, open to all, but limited to one photograph from each competitor, which has not taken a champion prize elsewhere.

Division C, open to all professionals, the number of photographs not being limited.

Division D, Photographic Apparatus, Medals, and Diplomas to be awarded for the best specimen and collection of apparatus, or for any appliance of special merit.

Medals in gold, silver, and bronze, together with certificates, were placed at the disposal of the judges—Messrs. Henry Moore, A.R.A., H. P. Robinson, J. Traill Taylor, Charles W. Hastings, and W. Monkhouse, who had power to give or withhold them wherever they saw fit.

This power they exercised with the following results:—

DIVISION A.—AMATEURS ONLY.

Class 1 (*Champion Gold Medal for the Best Photograph, &c.*).—Prize withheld.

Class 2 (*Architecture*).—Silver medal, F. P. Cembrano, jun.; bronze medal, M. B. Copland.

Class 3 (*Landscape or Seascape*).—Silver medal, B. G. Wilkinson, jun.; bronze medal, Rev. F. Stow.

Class 4 (*Portraiture*).—Silver medal, withheld; bronze medal, Miss Clarisse Miles.

Class 5 (*Instantaneous*).—No awards.

Class 6 (*Genre or Figure Studies*).—No awards.

In this division all the medals are given by the proprietors of the *Amateur Photographer*.

DIVISION B.—PROFESSIONALS ONLY.

Class 7 (*Champion Gold Medal for the Best Photograph, &c.*).—Prize withheld.

DIVISION C.—PROFESSIONALS ONLY.

Class 8 (*Architecture*).—Silver medal, Lyd Sawyer; bronze medal, withheld.

Class 9 (*Landscapes or Seascapes*).—No awards.

Class 10 (*Portraiture*).—Silver medal, W. W. Winter; bronze medal, W. P. Glaisby.

Class 11 (*Instantaneous*).—Silver medal, Henry Symonds; bronze medal, withheld.

Class 12 (*Genre, &c.*).—Silver medal, R. W. Robinson; bronze medal, withheld.

DIVISION D.—PHOTOGRAPHIC APPARATUS.

No awards.

There being so few photographs in the Exhibition which have not been seen in many others, description or critical comment is not here considered necessary.

But as if to make amends for the paucity of the photographs, there is a large and truly admirable collection of paintings in oils and water colours by masters both ancient and modern. There is also a fine collection of statuary. In the galleries devoted to these works of art one may spend many hours pleasantly, and with profit. But apart from these, the general Exhibition also is of a high class. Although it would be quite out of place to contrast it with the recent exhibitions in Manchester, Glasgow, or Newcastle, cities famous for their manufacturing industries, yet is this one in York not to be lightly esteemed. We failed, however, to observe any stalls possessing features of special interest to the photographer, except that of a local optician, Mr. J. M. B. Smith, who shows a nice selection of lenses, cameras, and numerous other photographic appliances by makers of high reputation.

Mr. Joseph Davis, the General Manager, is a capital caterer, and provides ample stores of instruction and amusement for the visitors, especially for the large numbers who frequent the Exhibition and grounds during the evenings.

JACK AND I IN NORWAY.

VIII.—FALEIDE, UTVIKEN, RED, AND HAFSTAD.

In the valley of Grodaas we got some very interesting and characteristic studies. There were little wooden saw mills perched on the rocks at the entrance to the glens, built at points where the falling water from the glen could be easily led into them; some of these with their surroundings made very picturesque and typical pictures of the country. These little mills, used for sawing wood, are scattered all over; we found them in every nook and corner, in the most secluded spots where water was to be procured we came upon them plying away. As all the houses are made of wood, the demand for it must be great, and hence this industry must be one of the largest in the country, wood here taking the same place as stone and brick with us. Wherever there is a plantation to be found and a stream near by, there is sure to be heard the grinding of the mill and the whirring of the saw.

After we finished here we drove on to Faleide on the Nord Fjord. The drive from Grodaas to Faleide is very pleasant, and especially from Kjos, the station between the two places. Onward from this point it is very thickly wooded, and romantic-looking lakes could be seen glinting through the trees as we journeyed on.

Faleide is a favourite resort, and many English people stay here for a month or two at a stretch in the summer-time. It is a very picturesque place of itself, besides being a good centre, so many places of interest lying within a few miles of it on all sides. The hotel at Faleide stands like the one at Grodaas, overlooking the fjord, in the most enviable of positions for prospecting. This hotel looked a very peculiar habitation when we got our first look at it; the wooden front seemed as if it were stuck upon a rock about two storeys high; the entrance to the house was by a doorway cut in this rock, and the stairs and apartments in the lower part were roughly hewn out of the solid rock, the walls left with protruding pieces and chisel marks. These are the working rooms, which must be deliciously cool in summer. One stair up brought us to the wooden edifice which was the hotel proper and the visitors' rooms. After exhausting Faleide we had to continue our journey in a small rowing boat across the fjord to Utviken, a distance of seven miles. We had two most antiquated specimens of boatmen to row us over. If any one had told me that they had come out of the ark, I would have been inclined to believe it. We started; the wind was dead against us, and the water came lashing all over the side of the boat with every thud of the waves, soaking both ourselves and

our traps, whilst the ancients shook their wise old heads and smiled, and talked away in their native tongue (they had no English) through their gums (they had no teeth), and they toiled and sweated and drank any quantity of water out of the lake, which they drew up with a bailing *cog*—a wooden vessel shaped like a shoe. Jack made up his mind to have a picture of these two old men of the sea, and we tried all we knew to get them to understand. They seemed to know what we wanted, but they would not have it. When we reached the other side we gave them tips to try to induce them. They kept the money, but they would not stand. After disappearing for a little they returned, each with a large flour scone under his arm. I am sure they would be twelve inches in diameter. This was their food, and water was their drink. As we stood waiting on our stolecarrie we saw these two old men away out on the troubled waters toiling homewards, fighting with all their might against the wind that came sweeping down through the mountain gorges. And what, think you, was the remuneration that those poor souls received for all this toil? Only 1s. 1½d. per man, or a sum total of 2s. 3d. for the two! This for toiling through rough water for fourteen miles, when you count the journey home again; all that you give above and beyond this 2s. 3d. you give of your own free will, for that sum is all the law allows. No wonder, then, they thought it a waste of time to be photographed.

The first part of the road from Utviken to Red was very rough indeed. The farmers that were supposed to keep the roads in order must have been away from home in these parts, for, to begin with, it was no better than an unfinished pass up the mountain side, with many stumbling blocks, in the form of stone, roots, bits of rock, and other *débris*, strewn all over the way, but the road improves much as we proceed. On this journey we had an irritatingly cautious driver—the first time we had met that virtue in all our journeyings; he got down and looked at the horse's feet, he next got down and inspected the harness, he could not allow the pony to run up hill for fear of breaking his wind, he would not let him run down hill in case he would fall and hurt his legs. And this game continued for about seven miles, when Jack got so exasperated that he let the old fool have a round of the guns in English, which our noble conductor received in quite good part and with an imbecile smile. "Oh, this will never do," exclaimed Jack, when *Caution* got down for about the twentieth time to inspect something; and springing from the stolecarrie on to the road, he said he was going to walk, as he considered it better than staying with that old ass fooling around—life was too short for that sort of thing—and away he went. I sat still, as I was not in any hurry, and although we were going along slowly, I felt comfortable enough, for we were getting down to the lower level, where travelling was always easier.

Jack stepped out and was hidden from our view in no time, and the old man, instead of sitting on the luggage behind, came on front into Jack's seat to enjoy the comfort when he had the chance. We bowed along very pleasantly, for when we got down to the flat, which we did shortly, the nervous terror about his beast left the old man, and he allowed the pony to exercise its own sweet will, which was to go. We came up with Jack after he had walked about six miles; he stood in the middle of the road awaiting our approach, and eying the old man most wrathfully. "Where the mischief is the portmanteau?" he exclaimed, pointing to the back of the conveyance—where it was not. You see, the old man had undone it to make it more easy to sit on when he was driving there, and he had forgot to fasten it when he came into Jack's seat, and so our portmanteau—for we had only one between us—with every bit of clothing, day and night, belonging to us had dropped off on the road without our observing it. The thing might be six miles back, and it was close on twelve o'clock at night—here was a fix! and I can tell you that it did not improve Jack's temper.

"You go right back and find that portmanteau, and bring it on to Red, though it should be four o'clock in the morning, or I'll know the reason why. I will make it pretty hot for you! On you go!" he said, as the old man looked defiance, and said he would wait till the next day. "Nothing of the kind," said Jack; "you go on now, and we will walk to the hotel at Red and wait for you." The old man made another little effort at resistance, but Jack was too many for him, and slowly and sadly he turned the vehicle round and moved along the road we had just come, looking for our missing wardrobe. We had a two-mile walk to Red, and when we reached the hotel explained how matters stood, and they had a hearty laugh at us, but assuring us at the same time that the portmanteau would turn up all right; so we sat down to supper slightly consoled, and before we had finished, our charioteer appeared with all our goods and chattels; he had picked up the portmanteau on the road some three miles back.

I was glad he came so soon, as we had arranged to try an exposure at midnight, and the style of this place favoured the attempt, the only thing that seemed against the success of the experiment was the number of people that were moving about. There had been a shooting match in the village of Red that day, and the young fellows had come in from all quarters to it; and it was wonderful to see how jolly they get on the light beer they drink, for they can't get spirits to buy; they were going about as lively as if it were the forenoon instead of midnight. When we had the camera fixed, and making the exposure, I was timing it with my watch in my hand, for we were giving it six minutes; in the midst of this wait a cheery-looking native came alongside of me and also pulled out his watch—it was scarcely so large as a cart wheel; he stood there smiling

when I remarked to him in English that my watch was far better than his, for I could double it up, in fact, that it was as pliable as indiarubber, and then by the well-known trick I bent it backward and forward and seemed to double it up. He stood aghast. The exposure was concluded, and my friend still stood and gazed, when I passed several coins into his pockets—which afterwards he did not find there. To watch that man from the hotel window for the next half hour was as good as a pantomime; small groups of people were gathered round him, and he was explaining the watch trick and trying to pass the money, with many gesticulations and considerable energy; he was still at it when we went to bed. Red, as a village, was much better situated for photographic work than many of the other places we had visited. The lake on the edge of which it stood was all surrounded by hills, that came so close that the village seemed shut in. We had the advantage of getting down quite close to the water's edge, that helped out the composition of pictures considerably; so many of the other villages were so situated that views of them had to be taken flat-on if we wished to get representations of them at all, so that our exposures here were highly satisfactory.

We left Red in a rowing boat and sailed down the lake some ten miles, and it was as smooth as glass, this water being so sheltered by the hills. One object of interest here is the Rittelen Mountain, which has a large hole right through it. We had not proceeded on our journey more than a mile when we observed the young girl from the hotel rushing along the bank and evidently waving to us, we put back to see what was wrong, wondering what could be up now. Jack had left his pocket handkerchief. That girl must have run a mile at least, and to see her delight on receiving a silver piece, value some 7½d., for her trouble was amusing. If a kingdom had been bestowed upon her she could not have manifested more joy.

We reached Forde, which lies at the other end of the lake, and we took a picture of our boat and boatmen, but the subjects were commonplace compared with the old men who would have none of it. This place Forde is also named Hafstad, their being another Forde a few miles further on, and two places of one name so near is apt to cause confusion.

We got a stolecarrie and proceeded on our way along a good road amongst the hills, having a considerable quantity of the switchback element about it—up and down. The cliffs here are very rugged and overhanging, and the comparatively flat parts are all strewn with immense rocks and stones that giants in mythological times might have been delighted to play with. By-and-by we come upon more cultivated ground as we leave the heights and descend into the valley, where we have a beautiful view of a charming lake in the distance, which, in course of time, we come close to the edge of. For fourteen miles we drove along the side of this water—Jölster Lake—with charming views at every turn, we, meanwhile, stopping and taking whatever struck our fancy, and in the evening drove into Nedre Vasenden, which means the lower end of the water.

MARK OUTE.

A DAY'S OUTING WITH A CAMERA IN KENT.

It was a bright morning in the present leafy month of July, and the country was bathed in all the glories of its splendour, when, having accepted the invitation of a gentleman—an enthusiast in his art—we joined him in a day's photographic expedition throughout that portion of the country-side which could be compassed and exhausted in the day before us. We may premise that within the past few years the art-science of photography has made rapid strides. In the early days of the art, photographers had not the command of the delicately constructed and much-perfected apparatus which now form the appliances of successful photography. Then cameras and lenses were of comparatively rude construction, whereas now science and constructive skill have combined to place photography in the foremost rank of remarkable human inventions. We may say for the "nonce" that our *compagnon de voyage* was Mr. C. Vernon, of Tonbridge-road, Maidstone, a gentleman who has signalised himself as a master of the art of which he is so devoted a teacher and disciple. The comfortable trap which took us on our road was packed with tripods, together with rosewood cases containing the mysterious "Open, sesame!" all ready for sudden and immediate utilisation by our friend the operator.

A delightful drive through a country which was literally fresh in living green, and the air of which was suffused with the sweet odour of the honeysuckle and the hawthorn, brought us to the grim old, but picturesque, ruins of Allington Castle, once a noble structure, and of which history records stirring events. Choosing the most advantageous positions, several capital plates of the exterior and interior of the massive ruins were secured. The position of the castle, standing high above the back of the meandering Medway, the beauties of its ground and the rich foliage of the finely wooded country around, all combined to form a scene the very loveliness of which made us loth to "move on." Pushing on through a country which may be truly described as paradisaic in its beauties, we arrived at the noble mansion of Preston Hall, Aylesford, the seat of H. A. Brassey, Esq. The park in which the mansion stands displays its sylvan beauties with bounteous lavishness. The deer, posing with natural grace, were cropping the fresh herbage; away to the right was the picturesque village, its sacred fane standing high above it; and far away in the blue distance were the famed Kentish hills, "shimmering in the sheen" of the July sun. Plates of the front and the back of the

mansion were well realised, the Dallmeyer lenses giving powerful definition, and the light was admirably suited for the purpose.

After a few moments of enjoyable lingering in the park we visited the old Friars at Aylesford, the seat of the Dowager Lady Aylesford, but now occupied by Captain Carter. This grand old pile, the first foundation of Carmelite Friars in England, stands amidst an embowment of foliage overlooking the historic Medway, and furnishes the materials for a sketch which should delight the heart of the painter. Here Mr. Vernon, our courteous guide, exposed several plates, obtaining, as he gleefully informed us, a series of strikingly beautiful views of the venerated structure. Our trap was again requisitioned, and skirting the rural village of Ditton, and passing through little bustling Larkfield, with its prosperous-looking shops and residences, we came to the rhythmically sounding waterfall which forms the principal feature in the Old Swan-street of West, or as the denizens love to term it, Town Malling. The waterfall is the depository result of a stream which rises above the Abbey grounds and disposes itself in this more than picturesque fashion.

The Abbey was in the good old times a Benedictine nunnery, and right merrily, looking at the ruins of the refectory and its collateral surroundings, most the nuns have fared. The Norman tower and portions of the Conventual Church are in a good state of preservation. Passing through the arched gateway we looked in at the chapel on the left, a pretty apartment in itself, but which the Vandalistic hand of so-called restoration has succeeded, as far as the surroundings of the Abbey are concerned, in making to look incongruous. In this pleasant retreat we spent fully two hours, during which a number of realistic negatives of the prominent features of the Abbey and its beautiful surroundings were taken by Mr. Vernon, who, inspired by the love of his art, warmed enthusiastically to his work, and seemed in smiling guise, as he secured each well-defined view, to exclaim in the old classic language, "Eureka! Eureka!"

Journeying from these interesting ruins, we drove to the massive and well-preserved Norman tower known as that of St. Leonard's. The hop gardens surrounding the structure prevented our ardent photographer from snatching a view on the ground, but, with a power of resource which reflected credit upon him, he chose a quiet corner in a neighbouring garden, from whence he secured a splendid negative of the hoary remains of the old and renowned Norman conquest of England. A drive along a capitally made road brought us to Mereworth Castle, a large and handsome mansion standing in a park, the ornamental water of which was conspicuous for its beauty. The noble owner, Viscount Falmouth, it occurred to us, had been photographed by Mr. Vernon for a portrait in the *Graphic*, and on reminding our travelling *compère* of the fact, he modestly replied that it was a soft impeachment to which he must plead guilty. Several views of the Castle, adding to those which at different times had been taken by our versatile photographer, were secured, and seeking shelter and refreshment from the heat of the day, we repaired to the comfortable hostelry of a neighbouring friend, who treated us with cheerful and hearty hospitality.

On the road home we tarried for a time at Wateringbury, and this was utilised for taking negatives of the interior and exterior of the ancient parish church, and for obtaining plates of the several members of the famous pedigree stock of Mr. Herbert Leney. The day's labours were, to our mind, sufficient in themselves; but notwithstanding the continued exposure of his lenses, Mr. Vernon, with a love of his art which did him credit, could not refrain from taking, as meal-times were passed, several groups of artistically posed kine, to whom the lazy enjoyment of chewing the cud lent enchantment to a pastoral picture. Wondering at the rapidity with which these negatives were taken, Mr. Vernon informed us that he used the most rapid plates, instantaneous shutter, and the whole of his apparatus was of the most modern description; without these his efforts would have been powerless.

We arrived home after a day of unalloyed delight, bearing with us the sweetest memories of an art which can bless, immortalise, and bring one in direct contact with the relics of the past, and the beauties of ever-gladdening and inspiring nature.

It. W. H.

A NOTE FROM NORTHUMBERLAND.

A STROLL round Newcastle and district, with special reference to the photographic studios and displays, is interesting as showing the immense disparity in quality, execution, and artistic excellence between the work of some four or five artists and the remainder of the brethren. Particularly good is the display of platinotypes by Mr. Bacon, of Northumberland-street, Newcastle. Mr. Bacon's window, when seen by the writer, contained no specimen whatever of silver printing, and the general effect was very fine and pleasing. Mr. Lyddell Sawyer, opposite, is well in front with his silver work, but I cannot help thinking that Mr. Sawyer's best work is kept "out of the show cases." Mr. Brewis, a comparatively new starter, is rather handicapped by his situation, but makes a good show, well worth notice. Mr. Anty, at Tynemouth, "holds the field," his show room, decorated principally with enlargements—carbon, platinotype, and bromide—of some of his well-known sea and landscapes, portraits, &c., makes a very impressive display; while Mr. Parry, on the other side of the water, with his splendid photographs of shipping, engines, models, workshops, &c., instantaneous and otherwise, including

portraits, shows a general excellence sufficient to turn the ordinary photographer "green with envy."

Mr. J. P. Gibson's (of Hexham) reputation is now established. One could spend hours in looking through this gentleman's albums of lovely "bits," "studies," and other representations of the beautiful scenery to be found near and around this historic town. Mr. Gibson's large work does not impress one so favourably as his smaller landscapes.

Mr. Hodges, of Hexham, well known for his splendid illustrated work on *Hexham Abbey* and other publications, is achieving a name also for his architectural photographs, principally in platinotype, of antiquarian interest.

The recent visit of the "Shah" gave the local body of amateurs and professionals an opportunity of trying their "shutters," which, judging by the number of cameras to be seen on the line of route, seemed very generally taken advantage of. The net result, as shown by one solitary specimen, is disappointing, and forms a fit subject for reflection and conjecture as to what proportion the number of successful attempts at "detective" photography bears to the number of plates exposed and the cost of apparatus used.

Foreign Notes and News.

THE amateurs of Havre and the lower Seine district have definitely arranged to establish a photographic club, to be entitled "Le Photo-Club, Havrius." More than sixty local photographers have been enrolled as members, and everything seems to promise well for the future of the new Society, the more especially as the composition of the Administrative Committee, numbering as it does among its members MM. Rougé (President), Perrichot (Vice-President), Albert Goupil and Professor Soret, gives a more than sufficient guarantee that the management of the Club will be conducted with energy and success. The Society, it appears, intends to make a speciality of marine landscapes, and in conjunction with the Photo-Club of Paris and several other societies, is making preparations for a sea excursion on a very large scale. We wish every success to the undertaking.

DR. PROFESSOR ENER, of Vienna, has recently been elected an honorary member of the *Dansk Fotografisk Forening* (Danish Photographic Society) in Copenhagen.

PROFESSOR DR. STOLZE writes, that which is already known to some of our readers, viz., that there is no necessity to add bromide of potash to oxalate developer, as the bromide produces a grey tone; he prefers altering the period of exposure. For avoiding yellow colouration in the whites, he points out that if one adds water to a normal oxalate developer, it rapidly becomes turbid through precipitation of ferrous oxalate; precipitation is also produced when the print is placed in water for washing, even when the water is acidulated. The remedy is to be found in the employment of a weak developer—for example, one part of iron to five of oxalate—the print may also be placed in a fresh solution of oxalate. If by any chance the image has acquired a greyish tint, the print may be improved by leaving it in the fixing bath for half an hour, which acts, however, more energetically if it contains alum. Another method of toning gelatine-chloride paper, according to Dr. Stolze, is to treat with a bath composed as follows: Dissolve 35 parts of hypos, 9 parts of common salt, 4 parts of alum, and 2 parts of sulpho-cyanide of potash in 150-250 parts of water, and before using add a few cubic centimetres of a two per cent. solution of chloride of gold.

THE *Pharmaceutische Post* gives the following receipt for a good solution of gum:—

Crystallised sulphate of alumina	2 grammes.
Water.....	20 c.c.

To this add 250 grammes of a strong solution of gum, made in the proportion of two grammes of gum to five grammes of cold water.

HERR JOSEPH ARMBRUSTER, of Freiburg, promises to exhibit, at the forthcoming meeting of various photographic societies at Weimar, an apparatus, or perhaps rather the rudiments of an apparatus, which he has constructed to obviate the shaking of the camera so frequently caused by the liberation of instantaneous shutter arrangements. His apparatus, in its present condition, appears to be composed mainly of cardboard, and to be held in position in front of the objective by hand. Herr Armbruster admits that if his apparatus were to be constructed by some one accustomed to the manufacture of instantaneous arrangements, more satisfactory results would probably be obtained. In this opinion we venture without prejudice to agree with him, and to suggest that Herr Armbruster is to be even more congratulated for having drawn attention to an existing evil than for his success in devising a means of obviating it.

HERR OTTOMAR ANSCHÜTZ, of instantaneous reputation, has furnished the Sport and Fishery Exhibition, now being held at Cassel, with an interesting exhibit. A dark chamber has been fitted up in one of the walls, in which is a square opening. This opening is successively filled, at such small intervals of time as to render the impressions produced practically continuous by a changing series of instantaneous photographs. The photographs thus exhibited comprise subjects from the riding school, soldiers at the march past, gymnasts on the horizontal bar, &c. Every detail of movement is represented by a separate image, which occupies the opening before the eye has had time to perceive the removal of its predecessor. The result is that the observer sees successively pass before his eyes the rising and falling of the horseman in the saddle, the elastic play of the horse's limbs, the movement of the hoofs, the scattering of the sand, the constant alteration of light and shade produced by the various muscular movements—in short, a changing picture, as though one were gazing through a window upon a horseman in full gallop below. The value of instantaneous pictures, when exhibited in this manner as a means of throwing light upon the real movements of both men and animals, can hardly be exaggerated, and can scarcely fail to prove of high interest both to the artist and the physiologist. Herr Anschütz is a worthy follower in the pathway first opened by Mr. Muybridge.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,010.—“An Improved Portable Photographic Camera.” W. J. PAYNE.—Dated July 29, 1889.

No. 12,117.—“An Improved System and Apparatus for Uncovering and Obscuring a Photographic Lens.” G. J. F. M. MATTHIOL.—Dated July 30, 1889.

No. 12,230.—“Improvements in Apparatus for Realistically Representing Horse and other Races in Progress upon a Stage.” Complete specification. E. A. WILLIAMS.—Dated August 1, 1889.

No. 12,309.—“Improvements in the Treatment of Paper or other Fabrics to render them suitable for Photographic Purposes.” J. WILLIAMS.—Dated August 2, 1889.

No. 12,343.—“Improvements in the Method of Mounting Photographic and other Lenses.” Complete specification. D. W. NOAKES.—Dated August 3, 1889.

PATENT COMPLETED.

AN IMPROVED BOX FOR PHOTOGRAPHIC PLATES.

No. 13,082. FREDERIC BARRETT, 165, Queen Victoria-street, London.—July 13, 1889.

THIS invention relates to the manufacture of an improved box for containing photographic dry plates; the main object of the improvements being to provide a box which, while being light, shall be strong and light-proof.

In manufacturing my improved box I form the ends thereof of wood, provided with a number of vertical grooves placed at a suitable distance apart, and adapted to receive the edges of the plates, the outer grooves serving to receive the sides of the box, also made of wood and adapted to be slid in or out. The permanent sides of the box, as well as the bottom thereof, are made of cardboard or the like. The space between the removable wooden sides and the permanent cardboard sides of the box serves as a cushion against the effect of blows or pressure during transit or otherwise.

In practice I find it advantageous to provide the upper edges of the box with a flap of non-actinic paper, to be folded over the edges of the plates before the lid is placed over the box, as a further protection against the entrance of light, particularly after the box has been once opened.

The lid of the box is made of cardboard, and is adapted to fit over the top of the box as usual. The bottom of the box, as well as the inside of the lid, is advantageously strengthened by means of a thin piece of wood or of corrugated paper packing.

By this improved construction of box I obtain absolute security against the entry of light, combined with rigidity, at the same time that the plates can be placed in and removed from the box with facility, and efficient protection against injury is afforded to the plates during transit and otherwise.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 12.....	North Middlesex Club	Jubilee Hall, Hornsey-road.
„ 13.....	Derby	Society's Rooms, 3, Derwent-street.
„ 13.....	Manchester Amateur	Manchester Athenæum.
„ 13.....	Bolton Club	The Studio, Chancery-lane, Bolton.
„ 14.....	Photographic Club	Auderton's Hotel, Fleet-street, E.C.
„ 15.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 1.—Mr. W. M. Ashman in the chair.

Mr. F. A. BRIDGE called attention to some much blistered prints on argentic bromide paper. Another print made on paper of a previous batch and developed and fixed with these was without blisters, showing that the fault lay in the particular sample of paper. Alum had been used before fixing, but

without avail. The only remedy that he had found to be effective was to immerse the print for some time—three-quarters of an hour—in methylated spirit.

The CHAIRMAN said that in very bad cases of frilling plates he had known a whole night's soaking in methylated alcohol to get them down. Chrome alum added to emulsion tended to prevent frilling, but if more than about one-eighth of a grain to the ounce of emulsion was added it was apt to coagulate the gelatine. He would like to know whether acetic acid had been tried for relieving emulsion that had been thus coagulated.

With respect to the Eikonogen developer, Mr. A. COWAN said that he had used a solution for developing several plates in succession and then left it uncovered in a dish for twenty-four hours, and found that it would still develop. For some plates he considered that the addition of a little bromide was advantageous.

Mr. F. P. CEMBRANO remarked upon different characteristics of prints by platinum and silver from certain classes of negatives.

The CHAIRMAN said that a well-known London photographer made it a practice to ascertain, if possible, before taking the negative whether silver or platinum prints were likely to be required; if the latter, he made the negative much denser and took care to keep the shadows perfectly clear.

Mr. CEMBRANO then opened the subject of the evening—*Camera Stands*—and said that in the *Photographic Review* the desiderata for camera stands for field use had been pointed out. One stand which he showed met most of the specified requirements, and in one particular—lightness—rather went beyond them. The particular stand he exhibited was less than three pounds in weight, would extend to five feet, and pack at twenty-two inches in length, and would go into a portmanteau. It was very solid though so light, and the legs were both folding and sliding. He considered the sliding leg to be very important, as it was not only so much easier to work on uneven ground, but by extending one leg and shortening the other two it became possible to plant the camera close alongside a wall or other object. Camera stands of other constructions were also shown; one of these, the Brattice stand, was remarkably rigid and firm. The head of the stand, he thought, was best made as a turntable, forming part of the camera.

Mr. COWAN said that it was very useful at times to be able to vary the length of one or more legs of the stand, an arrangement which the sliding form made quite easy. In one case that he remembered, when photographing from the side of a steep bank, he had one leg made expressly several feet longer than the others, and so was enabled to work the camera at the only place suitable for the particular subject.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of this Association was held on July 20 at 53, Pall Mall, the Right Hon. the Lord de Ros in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—Monsieur le Viscomte de Condeixa, the Hon. Maude Lawrence, Rev. George Perram, Messrs. H. C. Lawton, H. O. Hutchinson, and Fred. Wrigley.

The Secretary then laid before the Council the pictures for the current year, which had been arranged and classified by Mr. Glaisher (Vice-President). There were in the first class 144 pictures, being, with one exception, the largest number ever contributed in the first class.

The Council, after examining every picture, and confirming in almost every case Mr. Glaisher's marks, awarded the following prizes:—To F. S. Schwabe, the first prize, for Nos. 4, 82, 107, and 108, a large silver goblet. Mrs. Hobson, the second prize, for Nos. 74, 84, and 91, a silver goblet. R. Leventhorpe, for Nos. 184, 185, 187, and 188, a silver goblet. W. Muller, for Nos. 254, 256, and 257A, a picture in frame. R. O. Milne, for a series of large views, a medal. W. S. Hobson, for Nos. 354 and 356, a medal. W. Gaddum, for Nos. 15, 18, 37, and 70, a picture in frame. F. Griffith, for Nos. 7, 11, 15, and 17, a handsomely bound album. L. Ashburner, for a very different Indian interior, a medal. W. Dumerque, for Nos. 14 and 28, a small silver goblet. The Right Hon. the Lord de Ros, for Nos. 39 and B, a medal. Surveyor-General Foster, for No. 1, a handsomely bound album. M. de Déchy, for No. 22, a medal. R. Murray, for Nos. 241 and 242, a medal. P. Gunyon, for Nos. 634 and 653, a medal. Mrs. Benson, for artistic portraiture, a medal. F. G. Smart, for Nos. 6 and 10, a portrait album.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

JULY 22.—Mr. J. L. Treadway in the chair.

Six gentlemen nominated for membership at the last meeting were unanimously elected.

Samples of Oldham's dry powder developer sent to the Secretary were distributed.

Mr. STEWART read a paper on *Autotype Printing*, giving a history of the process from the time when the effects of the bichromates upon gelatinous substances were first noticed until the present time. He then proceeded to illustrate the practical details of the subject.

The Autotype Company kindly lent samples of finished prints, &c.

Mr. WALKER raised an objection to the process from the effects of the bichromates in causing a skin disease, which he said he had been informed most of the Autotype Company's employes suffered from, and stated that he himself had been prevented from using it from that cause, although he much admired the results obtained by it.

Mr. STEWART said that, although he had worked the process extensively, he had never noticed any unpleasant effects to follow. He would also recommend those members who might intend working the process to buy the tissue ready sensitised, as in sensitising it at home there was a difficulty in drying it sufficiently to get good results, as if it took too long in drying it became insoluble without being exposed to light.

It was decided that there should be an outing on Bank Holiday to Welwyn, train leaving Finsbury-park at a quarter to eleven. The Great Northern Railway has consented to issue reduced fares; therefore all members and friends intending to be present are requested to communicate the same to

Mr. S. Quincey, Blenheim-house, Harringay-road, West-green, and meet at Finsbury-park Station at twenty-five minutes to eleven to facilitate procuring the necessary tickets. Visitors invited to attend.

SHEFFIELD CAMERA CLUB.

AUGUST 2.—The President (Dr. T. H. Morton) in the chair.

Mr. H. J. HARDY (Hon. Secretary) exhibited some excellent instantaneous studies taken by Mr. J. O. Arnold. The prints had been toned with chloride of gold and soda carbonate, which he thought was superior to soda bicarbonate, as used generally.

Mr. HARVEY RAWSON introduced the topic of the evening—*Clouds*—and said that early in his photographic experience he saw the necessity of having clouds in landscape pictures; there could be no comparison between views with clouds and those without. When they were absent he printed them in from a special glass cloud negative, and preferred a thin image, but with contrast. Having shaded the foreground, clouds were soon printed in the plain sky. Masking required skill to avoid showing evidence of double printing. Clouds were not easy developing, and he thought that the use of yellow-tinted glass placed behind the lens would obviate or reduce, during exposure, their intense brilliancy. A pinhole camera might prove effective. A number of cloud negatives were shown as illustrations, also capital prints of scenes in Derbyshire and stereoscopic views.

The President read a short paper as follows:—

The subject—*Clouds*—is one of considerable interest to photographers, and hardly has received the attention which it deserves; at least, I have not met with much written concerning them. It is the wish and delight of the landscape photographer to obtain a fine cloud effect in his picture by one and the same exposure, but how often does this occur? The reason, if not fully understood, should be ascertained. When you have a deep blue cloudless sky with brilliant sunshine, or a light blue with faint haziness or thin cirrhus cloud, I need scarcely say the resulting negative is dense and valueless as regards the sky. The clouds have to be printed in or a certain tone given the paper, according to the composition; but even if fine, bright cumulus clouds are present when exposure is made they most frequently become obliterated during development before the foliage, rocks, or other dark objects have reached a proper printing density. If we could safely stop development of the sky at an early stage the clouds would be evident in many cases. This fact being recognised points to unequal lighting as a cause of clouds being absent from the negative. The foreground, &c., is under and the sky over exposed comparatively, and if one could differentiate the developer, i.e., give more to foreground and less to sky, much would be accomplished, but in this lays the great obstacle. I possess a number of negatives in which clouds are present and print fairly through without any dodging. Some were taken by drop shutter and others with an exposure of as much as six seconds. Now, in reference to my note book and a recollection of the views how they were lighted, I have come to the conclusion that even illumination was in most instances the cause of success. For example, dark round masses of cloud with just a silver margin here and there, and a bright open foreground and few shadows, also some views without direct sunshine but well lighted, are good. I may say that in nearly all the sun was behind or either to right or left of the camera. In seascapes clouds are often caught, as the sea is generally well lighted and is a reflecting surface. The sky being rather more dense in negative than the sea, the latter has to be masked when printing. Cautious development is essential to the securing of cloud and landscape: a solution of pyro, medium strength, with not too much ammonia as a start, and careful watching that the sky does not get too opaque. I find that keeping the developer well on the foreground by tilting the dish upwards, relieving the sky of its action, has a marked good effect. Of course a thin sky can be made by over exposure or a weak developer. In taking cloud negatives specially, a drop-shutter exposure, if light is strong, lens at $f/16$, rapid plate, will answer; a developer rich in pyro—say three grains to the ounce—and one drop of ammon. fort. and one grain of bromide in each two ounces of solution; develop until the cloud contrasts are just overdone, wash and fix. Some photographers have recommended a slow plate and rather long exposure, but this would bring matters almost to the same condition as in the former method. The ever-varying light intensity of clouds, the position of sun, and time of day, will always need discrimination in exposure, but any rules or suggestions that could be made to facilitate securing clouds in our views without combination printing would be hailed with satisfaction.

Mr. G. T. W. NEWSHOLME, M.P.S., observed that he had taken several views recently with short exposure and lens stopped down, and obtained good clouds, but the foreground refused to develop.

Mr. HARDY thought that Dr. Vogel had recommended a tinted glass screen.

Mr. Borbidge and other members joined in the discussion.

Correspondence.

Correspondents should never write on both sides of the paper.

THE STANNOTYPE PROCESS.

To the Editor.

SIR,—In your issue of July 5, p. 437, under the heading *Neglected Processes—Stannotype*, you say that stannotype is "analogous in principle to the Woodbury process, and capable of giving as good results."

It seems strange that you have not observed that stannotype is radically defective (which Woodburytype is not) because it narrows every depression and broadens every elevation by twice the thickness of the tinfoil (or other layer). That is to say, if the tinfoil was one-eighth of an inch in thickness, then every hollow would be narrowed and every elevation broadened by one-quarter of an inch. Should you doubt this,

cut out a card the shape of a W, measure the width of the hollows, then put a layer over the outline and measure again, and note the result.—I am, yours, &c.,

WM. BIRRELL.

[Our correspondent overlooks the fact that the image is raised as well as broadened. In actual practice the stannotype process produces charmingly sharp and fine impressions.—ED.]

PHOTOGRAPHING DISTANT OBJECTS BY A TELESCOPE.

To the Editor.

SIR,—Under the head of "Foreign Notes" (p. 511) you quote from an article by Mons. A. Rossignol on this subject. The writer, however, entirely misapprehends the action of the telescopic eyepiece when he says, "But as the last glass of the eyepiece renders the rays of light almost parallel, nothing prevents the image from being repeated at the focus of the photographic objective," and so on. Now it is a well-known fact that the rays of light which issue from a telescopic eyepiece are not parallel, nor even almost parallel; they are converging parallel rays, a very different matter. How, then, can M. Rossignol focus them by means of an ordinary photographic lens and camera, as he states he does? In wonder he gets what he is pleased to call "a want of sharpness shown by the proofs thus obtained." The fact is he has gone about it in the wrong way. There is no necessity for using the photographic objective at all. He lays most of the blame upon the eyepiece because, he says, "it is deficient in proper curvature and is not achromatic." Both of these reasons are wrong. An ordinary Huyghenian eyepiece when used photographically has the very best curvature for the purpose, as it gives exceedingly flat pictures, and it is well known that it is achromatic when used in combination with a telescopic or microscopic objective.

I have been led to draw attention to this matter from the fact that in a book just issued by Sir Robert S. Ball—*The Story of the Heavens*—there is a diagram of the action of the telescope upon the rays of light passing through it in which the rays after leaving the eyepiece are drawn as parallel, and not converging parallel, as they ought to have been. I should have thought this oversight, for it can be nothing else surely in so eminent a man, would have been corrected in this new edition, but there it stands in my copy. Of course if the rays are simply parallel when they leave the eye-lens, how can the eye ever pick them up? But when they are converging parallel they are brought to a focus, and they all enter the eye at the focal point.

I am not speaking without the book. I have made a number of experiments in photographing distant objects by means of a telescope, and very interesting it is. I should, however, as soon think of placing a telescope in front of a photographic lens and camera and taking a photo micrograph in the same way, which every one knows would be absurd.—I am, yours, &c.

PROCELLA.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange double-barrelled breach-loading gun, with cartridge case, &c., complete for half-plate camera and lenses.—Address, CRAIG, 130, Otley-road, Bradford.

Half-plate condensers or enlarging lantern wanted in exchange for whole-plate portrait lens. Difference adjusted.—Address, S. K., 4, Cemetery-road, Weaste, Manchester.

Exchange Lancaster's half-plate Meritair, three double backs (wood), old pattern for good quarter-plate set or detective.—Address, MERITAIR, Rock-cottage, Instow North Devon.

Wanted, a good quarter-plate outfit in exchange for a national mechanical organett with seven popular tunes. In good order.—Address, T. HACKING, 10, Strawberry bank, Blackburn.

Will give in exchange for tricycle half-plate camera, head rest, printing frames, bat and dipper, tripod stand, rolling press, and embossing press.—Address, LEWIS, 12, Blackstock-road, Finsbury-park.

MR. W. F. STANLEY has brought out a changing box for celluloid or other films, the bulk of which, he says, is that of two ordinary double backs. It encloses "A Descriptive Circular," but upon reading it we find it to consist only of printed directions for using the changing box, of which, not having seen it, we are unable to speak as to its merits.

THE DEMON PHOTOGRAPHER ON BOARD SHIP.—The professional photographer nowadays is a ubiquitous animal, but nowhere does he come more to the front than on the "briny wave." Although he photographs every event of the slightest public importance, he has an especial fancy for ships and sailors. He is scarcely in dock before he appears with his camera, and when she goes out of harbour he is seen rushing from point to point, taking her in every possible position. When he comes on board, and has obtained permission to photograph the officers, he sets up his camera, "takes charge," as the nautic saying is, of the whole place, and finishes by insisting on every sitter purchasing two or three copies. This the sitters usually do, being in high good humor at having at last finished the ordeal of being "grouped," and cramped in various uncomfortable positions for the best part of half an hour. As the photographic also disposes of a large number on shore, he certainly "goes to windward" in the transaction.—*Graphic*.

Answers to Correspondents.

•• Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

W. Draper, York.—Photograph of oil painting representing and entitled "St. Robert of Knaresbro'."

Charles de Joux, London.—Twenty-eight photographs of views in East Africa.

R. Symons, Tenby.—Photograph of St. Catherine's Rock and Fort, entitled "Find the Shah."

W. E. H'OO.—No address given.

CLARKE & CLARKE.—Imperfect fixing.

J. DAVIDSON.—The sulphur will do no harm, it will be simply burnt away in the reducing.

J. BATE.—Formulae for the powder process have appeared in each ALMANAC during the last ten years. To these we refer you.

X. Y. Z.—Wilkinson's treatise, second edition. It is published by England Brothers, 6, St. James's-square, Notting-hill, London.

H. R. H.—*Harmonious Colouring*, published by Newman, Soho-square. See also articles by Redmond Barrett, published in a recent volume.

C. J.—If you are in any doubt as to the genuineness of the lens send it to the maker whose name it bears, and he will verify it if of his manufacture.

W. M. B.—Very finely powdered gum arabic when mixed with the suitable dry colour will answer. It will be better if it all be mixed wet, and when dry ground into a powder.

C. H.—The prints in question are lithographs varnished. They are, we believe, done on the Continent. Probably you will get them at some of the foreign fancy warehouses in the City.

B. W.—If your competitor is using the Royal Arms and styling himself "Photographer by appointment to Her Majesty" without holding the Royal Warrant—which we know he does not—he is liable to a heavy penalty.

M. E. SANDS.—The print named was done by Messrs. Goupil & Co., by their phototypic process, more familiarly known in this country as Woodburytype. Any of the firms who do this class of work will willingly undertake your order.

D. FRASER.—1. We can give you no idea of the comparative rapidity of the three lenses, as you do not say their focal length; without this the diameter of the largest stop is no guide whatever.—2. Better get an optician to make the alteration.

CHAS. WHITE.—The best method of preserving liquor ammonia is to dilute it with, say, an equal bulk of water, and then keep it in well-stoppered bottles in a cool place. In the diluted form it is much easier to keep uniform than when it is concentrated.

W. C. J. M.—A lens of thirteen inches focus will be too long for you to take full-length cabinet pictures in a studio only fourteen feet long. With a lens of that focal length you would get excellent results, but you could not employ it for full lengths.

COPY.—The plates sent are very unevenly coated. As the specks are exactly the same in each, we surmise that they were coated by a machine that did not do its work properly. Such plates should not be used for copying pictures, or, indeed, for any other purpose.

A. S.—The sulphide of silver ought to have subsided ere this. Possibly if you give it a vigorous stirring up for a few minutes it will then settle down. If the old toning bath contains any gold it will be precipitated on the addition of sulphate of iron. Perhaps the whole of the gold was taken up by the prints.

A. E. I.—Try the effect of fuming the paper with ammonia just previous to printing. If this does not prevent the loss of tone then must recourse be had to a different toning bath, or, perhaps, to another sample of sensitised paper; but we think that a vigorous ammonia fuming would answer every purpose.

W. G. S. inquires: "Can you please tell me of any means for removing nitrate of silver stains from linen?"—Yes, we can. Make a very strong solution of cyanide of potassium and dissolve in this nearly as much iodine as it will take up without becoming discoloured; apply this to the stains and they will disappear.

M. A. C.—You cannot prevent your neighbour building on his own ground, even if the workshop were to stop out the whole of the light from your studio. If your studio had been erected for twenty years you could then have claimed "ancient lights," and have prevented him from obstructing them. As it is you have no remedy.

J. W.—If you pack the prints merely in paper there is little wonder that they get marked with the obliterating stamp at the Post Office. The Post Office will not compensate for injury when the parcel is insecurely packed. The pictures ought to be placed between stout cardboard or millboard, then they would receive no injury from the stamping.

W. DIXON, 57, Elizabethan-street, Collyhurst, Manchester, writes: "Will some one assist me? I want to make enlargements 52×36 free from distortion in the margin; description and particulars of apparatus. I have pictures 13×9; I want negatives or transparencies to be taken from these pictures of a suitable size to secure the enlargements as above; description how to make or obtain apparatus suitable."

A. FOX inquires if any of the leading opticians mount their photographic lenses in aluminium. If not, why, seeing the great advantage of this metal in opera glasses and telescopes, on account of its lightness?—The chief reason, we imagine, why aluminium is not used for photographic lens mounts is that it would make them more costly, and purchasers would not care to give the enhanced price. Any optician would, no doubt, mount a lens in this metal to order if required.

W. CORNWILL.—It is a matter for the County Court; but we do not at all think you can recover. According to your own showing, you sent the print from the second negative on approval, and the portrait was not liked; therefore it was not to be expected that further copies would be ordered. Your customer did not commission you to take the second negative at all; that was a speculation on your part, and the portrait was not approved of. How can you substantiate any claim?

PHOTO-LITHO says he has recently been supplied with a mirror for taking reversed negatives, but with it he cannot get a sharp picture. The lens is a first-class one and produces excellent pictures when used direct, yet with the mirror nothing is sharp. He asks the reason.—It is clear that the mirror is not a plane surface, and should be returned. Before doing this, however, the setting should be examined to see that the glass is not fitted in too tightly. If this be the case the glass may be bent sufficient to alter its figure. The mirror ought to be quite loose in its setting.

CONSTANT READER writes: "I am sensitising my own paper, and made a bath for the same with oak frame and glass bottom. I cemented the glass in with shellac and a small portion of resin dissolved in methylated spirit. I have used it twice and find the silver bath becoming discoloured; it is now in a quart bottle, and to look through it it is the colour of dark sherry. I have tried carbonate of soda, also strong sunlight, without effect. Will this affect the albumenised paper by turning whites of prints yellow after fixing? Also, can you tell me how to clear my bath and what to do to prevent recurrence of discolouration? I may say the bath is quite transparent and clear but discoloured."—The discolouration arises from organic matter extracted from the albumen. Add to the solution a dessert spoonful of kaolin, shake well up, and in a short time the liquid will be colourless; decant and filter, and return the solution when again discoloured to the same bottle in which the kaolin is contained.

PHOTOGRAPHIC CLUB.—At the next meeting of this Club, August 14, 1880, the subject for discussion will be on *Blisters*. Saturday outing at Broxbourne.

RECEIVED when going to press:—*Mr. Pringle and Stereoscopic Photography*, by Mr. Abel Heywood, jun.; and Professor Stebbings on *The International Photographic Congress in Paris*. These in our next.

MACHINE-COATED FILMS.—From a sample packet of films received from Messrs. Samuel Fry & Co., Limited, we are glad to perceive that this firm is now employing machinery for coating celluloid films with gelatine emulsion, and very successfully so.

ANOTHER new wide-angle lens is being added to those already existing. Mr. Gotz has shown us one of a series which M. Suter is about to introduce, its characteristics being the including of a wide angle of view, with a stop larger than usual. We shall have more to say concerning it soon.

DEVELOPMENTS.—Under this designation Mr. T. H. Powell has brought out pyrogallie acid in a compressed form. Messrs. Marion & Co., Soho-square, are the sole agents for it. It is a highly convenient form in which to keep pyro, and we can strongly recommend it, as these little tablets were used by us, in another part of the world, between five and six years ago, and with invariable satisfaction. They are originally due to Dr. George S. Sinclair, of Halifax, Nova Scotia, who, annoyed at the numerous expedients to which he must have recourse to keep pyro in solution in a concentrated state, eventually got rid of his trouble by adopting compression; so machinery was made, and he had it compressed into small round tablets, each containing two grains. The Scovill Company introduced them commercially under the name of "Pelle-tone," being supplied in bottles containing one hundred of them. We are glad to see them introduced in this country under circumstances which will tend to their speedily becoming naturalised.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1528. Vol. XXXVI.—AUGUST 16, 1889.

NEGLECTED PROCESSES.—THE CHROMOTYPE PROCESS.

PERHAPS no process of photography was ever introduced with a greater flourish of trumpets than was the chromotype process; and, certainly, no better prints could be produced than were made by that method, and, what is more, they were permanent. The chromotype is an excellent process, yet it is truly a neglected one, and by this time, possibly, a forgotten one by many of those who paid heavy fees for licenses to work it; and that no longer than twelve or fourteen years ago.

The chromotype process, it may be explained, was introduced and patented by M. Claude Leon Lambert, a Frenchman, in 1874. It is a modification of the carbon process, and it was for a time, without doubt, the strongest rival that silver printing, for ordinary work, ever had. Its result could not be distinguished from silver prints, and any colour could be obtained. Certainly, M. Lambert did produce, from given negatives, better prints than they would yield in silver. Furthermore, he threw out the challenge—so did others—that he would produce, from any negative, not only as good but better prints than could be obtained in silver. No one took up the challenge.

The late Mr. Jabez Hughes—always an enthusiast in permanent photography—although he had more than once essayed the carbon process, for every-day work, by different methods, such as developing on zinc plates, varnished glass, Johnson's "lac paper" (flexible support), &c., was compelled to abandon it in the end. When, however, he took up Lambert's modification he never relinquished it, and up to the time of his death, we believe, all the prints issued from his establishment were made by the chromotype process, silver printing being, for many years, entirely abolished. Chromotypes were usually printed with a masked and tinted border, but Mr. Hughes did not adopt this style, at least to any extent; he simply produced plain prints like those on albumenised paper. The chromotype process is still worked, and extensively too, by a few houses. We have in our mind just now a town in the West of England where, perhaps, more chromotypes are turned out than in any half-dozen other towns in the kingdom put together.

The chromotype process, it may be explained for the benefit of the younger recruits in the ranks of photography, differs materially from the carbon process as ordinarily worked. In this method the exposed tissue, instead of being developed on a repellent substance, as in the case of the waxed surface of a rigid or flexible support, is developed upon a soft and spongy film of collodion, which assimilates with it and forms part of the finished picture.

The process is worked as follows:—A glass plate is coated with collodion, and when it has set the glass is placed in water to wash out the ether and alcohol. Then the exposed tissue is squeegeed on to the collodion film, and afterwards developed in the ordinary way. After it is finished the transfer paper is applied, as in the usual method of working, and when dry the picture is stripped off the glass, of course collodion and all. The print, when removed, possesses all the high gloss of a silver print which has been "enamelled." If it be desired to retain this high gloss the mount must be attached before the print is taken from the glass, in the same way as enamelled prints are mounted. It will here be seen that when enamelled pictures are required the chromotype process is about the simplest method of producing them. If the prints are simply mounted and rolled after they are stripped from the glass, they will possess about the same degree of gloss as that of double albumenised paper. If less glaze than this be desired, it may be obtained by merely damping the pictures prior to attaching them to the mounts.

From the above brief description of the process it will be seen that the collodion forms an integral part of the finished picture, the same as it does in making carbon transparencies. The collodion, in fact, here serves a double purpose. First, it tends to hold together the more delicate and tender portions of the image during the development. Second, by reason of the glaze conferred by the film, the shadows are rendered as transparent as they are in a silver print. The chief objection to carbon pictures for small work, as ordinarily produced, is the lack of transparency in the shadows. But this is completely avoided in the chromotype process.

Why, it may be asked, with these advantages, coupled with that of permanency, is it that the chromotype has become such a "neglected process?" This is a somewhat difficult question to answer at the present time. At one period the process was hampered by a number of patents, and heavy fees were charged for licenses; also the special tissues used by M. Lambert were only supplied to licensees, although other tissues would have answered quite as well. It was the colour alone that constituted the speciality. Again, exclusive licenses were granted, and it was asserted that some were purchased for certain districts without any idea whatever of working the process, but simply with the view of preventing others from doing so, and thus avoiding competition. Furthermore, an outcry was raised that some of the pigments employed for the special tissue were fugitive—cochineal colours being used. However, there were other tissues in the market at the time of a very similar, if not identical, colour, in which alizarine, a more permanent pigment, was used.

The above have, from time to time, been put forward as reasons why the chromotype process was, and is, so little worked. Now, however, all the chromotype patents have long since expired; so have all those in connexion with carbon printing generally; hence chromotype can be worked without let or hindrance. Still, the process is only worked to a very limited extent commercially. The real reason for this, we strongly suspect, is this: It is somewhat more costly, and at the same time more troublesome, to work than silver printing.

THE FRENCH CONGRESS.

THE voluminous character of the programme of the Congress now proceeding in Paris, together with the accompanying "reports," prevented our appending a few remarks of our own, as we had intended, before the opening sitting. As, however, the proceedings, as so far reported, are of a comparatively unimportant character, we may still carry out our original intention.

The programme has already been discussed by the members of the Photographic Society of Great Britain, and, as was only to be expected, elicited some rather uncomplimentary expressions of opinion. France, as supposed to be *par excellence* the nation of courtesy, might have been expected to have been a little more liberal in its hospitality to the foreign members of the Congress, instead of charging them a heavy subscription in the first place, and leaving them to look after themselves as best they can.

But it is in the capacity of self-constituted promoters of the Congress, which was to be "international," that the exhibition authorities have laid themselves open most seriously to criticism. By what authority, we should like to ask, can they call their decisions "international" when the meetings are held entirely without the co-operation of any *official* foreigners, and when, as reported by our Paris correspondent, the total number of "strangers" present at the first meeting did not reach half a dozen?

Then, again, by what authority, to say nothing of the want of ordinary courtesy displayed, do the self-appointed managers propose to discuss, and possibly frame, laws upon certain questions that have already been carefully studied by our own Photographic Society, whose decisions have been generally accepted throughout the world? Surely the least that could have been expected would have been some direct official communication with the Photographic Society of Great Britain, as well as the most representative societies of other countries, with the view of securing the official attendance of delegates.

In the case of our own Society, the omission was a most flagrant one, and we do not hesitate to say that in the event of the present Congress arriving at decisions differing from those previously come to in England, the Society will have a perfect right to repudiate them, even if photographers outside France show any inclination to follow a false lead.

The fact appears to be that our neighbours are so unduly elated with the success of their exhibition, that they have slightly forgotten themselves. Not only is Paris France, but France, they seem to think, is the world. One cannot help thinking of the fable of the frog and the bull—a particularly appropriate one by the way—and hoping that our lively friends may not meet the same fate as their ancient prototype.

With regard to the various questions to be discussed, it struck us on reading the programme issued, and the very

lengthy reports accompanying it (of which we gave brief abstracts a week or two since), that the "authorities" had made up their minds, once for all, before the start, and intended to carry their own ideas. Such appears undoubtedly to be the case as far as things have gone up to the present, as reported by our Paris correspondent. On question seven, we are told, "the propositions of the commission were accepted and voted without great difficulty," while as regards question eight, though our reporter says "many difficulties came in the way," they seem to have been surmounted with singular ease—with little more than a quotation or two from the official programme.

In reply to an attempt to retain the name of Woodbury in connexion with the process he invented, the President is stated to have said, "That names of inventors could *no longer* be tolerated; photography takes *no longer the name of Daguerre*." The italics are ours, and we read the reply to mean that if Niepce, Daguerre, and Poitevin could be pressed into service for the naming of modern processes, the decision would be different. But the sentiment with regard to suppressing inventors' names was, if we remember rightly, expressed in the programme, or rather in one of the reports. Similarly, "studio jargon" (*jargon d'atelier*) was condemned, and in opposition to Mr. Warnerke's proposal to legitimise the term "hypo," the President decided that "this shop language cannot be tolerated." Probably the actual words employed were the same as those we have already quoted; if so, they are adhering closely to the programme.

The information to hand up to the present is too scanty to form a basis on which to found any serious opinion of the justice or otherwise of the conclusions. Question seven relates to "Uniformity in the expression of photographic formulæ," and, as we learn, the proposals of the Commission have been accepted *en bloc*. These consisted in the suggestions that a uniform system of weights and measures should be adopted, and that solids should be expressed by weight, and liquids by volume. The matter being already settled, who will doubt that the decision is in favour of the French or metric system, and, such being the case, who, be he ever so sanguine, will expect the recommendation to be adopted by English photographers? If this may be taken as a fair prospect of the probable decisions on other questions, we venture to think the labours of the Congress will remain a dead letter so far as this country is concerned.

The eighth question deals with "Uniformity in the denominations of photographic processes," and here the recommendations of the Commission consisted of, first, the abolition of "studio jargon" already referred to, with which we are in perfect sympathy. We cannot at all agree with our friend Mr. Warnerke's proposal to make "hypo," "pyro," *et id genus omne*, recognised scientific terms; they are bad enough in conversation or in ordinary current photographic literature, but would be entirely out of place in more serious works, and therefore we think the proper course has been adopted. With regard to the nomenclature of processes, a systematic application and combination of terms was proposed which will give to the titles of photographic processes a descriptive and self-explanatory character similar to that prevailing in chemical nomenclature. This, at the present time, is of vast importance, and seeing that no organised attempt has been made in that direction previously, we can find no fault with the adoption by the Congress of the suggestions laid before them.

Of the remaining questions, it will be as well to say little.

until we hear more; but we would point out, especially with regard to the question of standard flanges, stops, screws, &c., that these, as established by the Photographic Society of Great Britain, have been adopted already over the whole world, and it will be on no light grounds that the present Congress will be able to alter them. The Whitworth standard screw threads are, we believe, adopted in France, so there can be no difficulty on that score to urge against the acceptance of British standards. If it were otherwise, the French opticians who imitate so readily the *curves* of English and German lenses would be equally able to imitate their screw threads, if necessary.

As regards the standard light, we have nothing in connexion with photography more reliable than the standard candle, or the Warnerke sensitometer, both of which are admittedly defective. However, as Mr. Warnerke is present at the Congress, he will no doubt take part in the discussion, not only on his own behalf, but also as a member of each of the sub-committees of the Photographic Society of Great Britain which have had the trouble of studying these questions previously.

At present we can only hope that the decision will be generally such as may be, if not accepted absolutely, at least used as the basis upon which a really authoritative Congress may work.

EVERYTHING is now ripe for the opening of the Photographic Convention of the United Kingdom on Monday evening next, the 19th inst. The various committees have completed their labours, with the result that there will be a fine collection of pictures and apparatus. Several papers on the topics of the day will be read, and highly attractive excursions have been arranged. These, together with choice lantern entertainments, and an evening lecture by Mr. E. Muybridge, during which he will show his renowned "Animals in Motion" series, afford some idea of what has been prepared for the members of the Convention and their friends. The proceedings will be opened by a *conversazione* on Monday, at 6.30 p.m. Mr. Muybridge's demonstration is fixed for Wednesday, and the annual dinner for Friday.

ANENT the American Convention, which was held in Boston, U.S.A., on the 10th inst. and following days, just when ready for going to press, we have received the *Report on the Progress of Photography in America* during the past year, by Mr. W. Lincoln Adams; and we have also received a medal which was struck by the enterprising Scovill-Adams Company, in commemoration of the Semi-Centennial of Photography, and presented to the members of the Convention. It has a fine head of Daguerre on one side, and a suitable inscription on the other.

WE have repeatedly been asked whether it is not possible to obtain celluloid suitable for sensitive films in this country, it being a well-recognised fact that its chief seat of manufacture is Newark, N.J., a city about eight or ten miles distant from New York. We are pleased to be able to inform such applicants that S. Guiterman & Co., 5, Hart-street, Wood-street, E.C., are English agents for it. From this firm we have received sample sheets, which, when cut up into smaller sizes, we have coated with both gelatine and collodion emulsion. As the sheets measure 50 x 20 inches, and are capable of being cut with remarkable facility, photographers will discover several uses to which this substance may be applied other than their primary great use, that of serving as a support for the negative film. Among the samples are also some of a fine opal character.

THE Newcastle meeting of the British Association is expected to be of exceptional interest, and already active preparations are being made for the due conduct of the various meetings and excursions.

The presidents for the various sections are:—Captain W. de W. Abney, R.E., C.B., F.R.S.; Sir J. Lowthian Bell, F.R.S.; Prof. James Geikie, F.R.A.; Colonel Sir F. de Winton, K.C.M.G.; Prof. F. J. Edgeworth, M.A.; Mr. William Anderson, M.I.C.E.; Prof. Sir W. Turner, F.R.S.

THE evening discourses do not promise anything of photographic interest, but we have little doubt that the excursions will be well accompanied by camera and lens.

APPROPOS of this, the question has been put, "Has the introduction of gelatino-bromide plates been an advantage or a detriment to the art?" and the replies have been by no means of a unanimous character. One experienced and clever amateur of our acquaintance lately expounded his views in a very pronounced and decided fashion. "It has degraded the art," he said, "and has not advanced photography one iota. It has advanced photographers, if giving to any one of common sense the power of making a presentable landscape with a day's training at the work may be called advancing it. I used to be proud of my camera, and of my skill in using it, but now I am ashamed of it, for every boy and girl in the country can do in ten minutes what it took me years of practice to attain proficiency in, and in consequence photographic kits swarm over the country, and are a nuisance and an eyesore," &c.

WE have noted this speech because it represents the feeling of so many old hands who with labour and loss learned how to make dry plates, but whose knowledge is now simply a dead letter—useless lumber, we have heard them call it. Contrariwise, we are bound to remember what a source of keen pleasure to hundreds is the modest kit so scorned by the amateur we quote, and as to photographs themselves, the walls of the exhibitions tell us how many more good photographs are now produced than within a very short time ago was the case, and we do not hesitate to assert that pictures of great merit have been shown that before the advent of gelatine were impossible of achievement.

THE use of hydroquinone has quickened the demand for caustic alkalis in development, and solutions of soda and potash are now common enough; but it should ever be remembered that when exposed to the air the caustic forms of soda and potash are capable not only of absorbing moisture from the air, but carbonic acid also. The result of this would be that the alkalis would gradually become converted into carbonate, and, contrary to the general opinion, apparently lose a portion of their power. This will be the case not only with the fixed alkalis, but also with solutions of ammonia, unless thoroughly sealed against the action of the atmosphere. The latter chemical would thus lose strength in a double fashion—first, by evaporation, and, second, by neutralisation.

AMMONIA, as we have often pointed out, is far better stored when diluted by being mixed with an equal bulk of water, so as to lessen its tendency to volatilise, which is the greater the greater its concentration. Some photographers store it in bottles secured with a cork; but it is always better to employ glass stoppers, as, in the first case, cork is apt to quickly become rotten, and, in the next, it rapidly loses its protective power against the diffusion of gases. On the other hand, unless special care be taken against its action, any little extra rise of temperature may cause the stopper to fly out, possibly during the absence of the owner, under which conditions the liquid will deteriorate (by losing strength) in a remarkably rapid manner.

IN our own practice we smear the stopper with vaseline, which forms a very efficient protective against evaporation, and if unusual heat at any time should cause sufficient pressure to remove it, the stopper will rarely become ejected—it will simply act as a relief valve and drop into its place again.

THIS vaseline protection, too, is most excellent for bottles containing solution of pyro and sulphite which have a most unpleasant knock

of becoming very tightly fixed after a few days' storage. This, no doubt, is owing to the fact that the oxygen of the air is quickly absorbed by the pyrogallie, with the result that the outer pressure is greater than the inner, and so has to be overcome in removing the stopper, which also, by reason of the pressure, tends to become locked also. The effect, whatever the cause, is very annoying: a slight smearing with vaseline is a complete cure.

THE OCCASIONAL FAILURE OF EXHIBITIONS.

It must be within the experience of all regular exhibitors that it occasionally happens that an exhibition, opening under what might be reasonably considered the most favourable auspices, is from some apparently inexplicable cause a dead failure. Let us try if we can discover some of the common causes of want of success, and perhaps a consideration of them will suggest means by which they may be avoided in future.

The first thing to consider is the question, What is required? What are the objects for which exhibitions are instituted, and how far are they carried out?

The first series of photographic exhibitions, promoted by the Society of Arts before the formation of any photographic society, was intended to diffuse a knowledge of the new art throughout the country. It is, of course, no longer necessary to prove that such a thing as photography exists. The first great object of the exhibitions now held should be to show year by year the advances made in the many departments of the art; the second aim, to encourage and teach those who are beginning and those who are making progress; and the third purpose should be to get together such a collection as will show all the best work done since the last exhibition, and the sight of which shall be worth the fee charged for admission. Perhaps the third object includes the first and second. I think it will be admitted by all that these are the chief excuses for general exhibitions—I exclude from my argument the very useful and interesting semi-private gatherings of local societies—yet the tendency of the management of some recent exhibitions seems to be not only towards excluding the best work, but to prevent any ambitious photographer from doing his utmost to produce anything out of the common run of every-day production. This is done, I admit, from the best motives, the chief of which is the encouragement of new work, but I cannot help feeling that the means employed will tend in the end to impoverish exhibitions, and compel them to deteriorate into such shows as can be seen in the shop windows of professional photographers, and the albums of amateurs, in nearly every town in the kingdom. The apotheosis of mediocrity.

The time of year at which an exhibition is held has much to do with its success. An exhibition held in September or October will be filled with the newest work, while one opening in June will be too early for most of the work of the year, good or bad, and will have to be content with the productions of former years, which have been the rounds of the exhibitions all over the country. And if there is a rule excluding from competition all pictures which have taken champion prizes, all that can be expected cannot, of necessity, be of a higher class than that below the highest. An example of this kind of failure is to be seen in the exhibition now being held at York. No exhibition could have been collected together under better, more enterprising, or more liberal management. It was well advertised, judicious pressure was put on exhibitors to contribute, and gold and silver medals were offered lavishly. Yet what is the result? The poorest show that could be called an exhibition, consisting almost entirely of pictures that have been seen dozens of times, padded with frames of indifferent photographs that should never have been accepted; so poor a show that the judges were, perforce, compelled to withhold several of the medals. And to make matters worse, the best of the old pictures were absolutely excluded by an addition to the rules for the champion classes, which excluded all champion pictures. The champion class was a well-intended invention, designed for the encouragement of those who could not do the best work, by removing prize pictures to a competition among themselves, leaving the ordinary medals to be competed for by those works which came next in quality; in other words, by the best that were left after the best were removed.

There was nothing particularly objectionable about this, except that it tended to too closely follow the example of those schools where every little boy gets a prize whether good or bad; but when medals are offered in a champion class, as they were at York, "limited to one photograph from each competitor which has not taken a champion prize elsewhere," it is a direct bid for second-class work, and it is not to be expected that the pictures which have taken first prizes would be contributed. Besides, what becomes of the meaning of the word champion. And thus the exhibitions are deprived of those very pictures which one would have supposed would have been the greatest attraction to visitors.

As regards the time of holding exhibitions, the season may be said to begin in September with that of the Royal Cornwall Polytechnic Society. This Society was one of the first to offer medals for photographs, and has always commanded the pick of the new photographs of the year. This exhibition may be called, in comparison with some others, small and local, but it has always been supported by the chief exhibitors, and is one of the most interesting shows of the year; and, moreover, it is free, there being no charge made for space. It has never had a champion class, but it has tried another method of handicapping, which consisted in not allowing a taker of a first prize to take another medal of any kind for three years. It was actually a misfortune to take a first prize the first year, as it placed the competitor out of the competition for a time, whereas if he took a second silver, equal in value to the first only in name, he was eligible to take a first the following year. This arbitrary rule failed, as any methods, however ingenious, of preventing the best competitor winning always will do in the long run, and the Society very wisely gave it up.

The next exhibition of the year in point of time is certainly the most important of the season, both for size and quality. It is that of the Photographic Society of Great Britain. To this exhibition, it is not too much to say, everything of importance is sent. And this invariably, with the exception of last year, when the Council tried the experiment of withholding the usual medals which preceding exhibitors resented, and there was a marked falling off in the number of pictures sent, and, in the opinion of many, in quality.

Now, when it is considered that about twenty medals are awarded at each of the two exhibitions I have named, it must be easily seen that a very large proportion of the best pictures of the year have been medalled, and, according to the new rules, thrown out of the running for any but the champion classes; and if the York addition to these rules is to be continued, every one of those pictures that take a champion prize is debarred from further competition. No further handicapping is possible.

After the London follow the Provincial exhibitions, in quick succession. Now it must be admitted that the chief object of these exhibitions should be, and is, as a rule, to get together all the best pictures of the time, whether they have been exhibited elsewhere or not, in order that the people of the district may see for themselves what is being done in the art; that photographers may judge for themselves the direction in which they would prefer to aim and the work they would emulate; and, finally, that the exhibition should be worth the admission fee and be also a financial success. Yet how do they go about it? They put all the obstacles possible in the way of the best pictures by placing restrictions on them. The result is that many of the best pictures are never seen in the provinces. Few photographers produce more than half a dozen of their best in the year, and fewer have any of their first-rate work left unexhibited after the London Exhibition.

As an exhibitor, I have, personally, no objection to the champion classes, when they are not made absurd by restricting them to pictures which have never taken champion medals; but if the object is to get together the best collection of pictures, they are a mistake.

Then follow a few minor causes of failure, the chief of which is the large entrance fees sometimes charged. Photographers, especially amateurs, find the expense of frames, packing cases, carriage, &c., quite enough without having to pay for the pleasure of lending their pictures, as many do, without the hope of any return in the shape of sale or award. And even medals can be bought too dear at times. For instance, I should have been glad to send to the present Paris Exhibition, but when I was asked to send also a cheque for 5*l.* for a small space, I concluded the game was not worth the candle.

Other causes of failure are the time, sometimes months, for which their producers have to lend their pictures, and doubtfulness as to who are to be the judges. Not that I think much of this last cause, for, as far as my experience goes, the judging is always fairly done.

H. P. ROBINSON.

CURRENT COMMENTS.

POSTAL DAMAGE TO PHOTOGRAPHS.

THE amount of photographic damage caused by postal transmission seems to be rather on the increase than otherwise. I hear much of it, and undoubtedly, by your answer to "F. W.," it must only be a sample of one of the petty grievances which do so much to annoy business men. After hearing many complaints about the unavailing nature of card or mounting boards to prevent the obliterating stamp mark of the post office passing through and destroying good, well-finished work, I was induced to try *thin wood*, and, after the practical testing of it for a number of years, it has proved a perfect cure. Many of the complaints were of single pictures, which had the mounts creased and broken by postal rough usage, as well as by the mark of the impressed stamp; but since the adoption of this plan by several of the principal firms they have entirely ceased to complain.

As I do not remember seeing any notice of this, it may prove a small public service to describe the *modus*. The timber used is the finest yellow pine, which is much better adapted by its nature than the cheaper white pine for this purpose, and cut from three-inch boards, with the perpendicular frame saw (not the circular, which makes a much rougher job), into eighteen or twenty thicknesses to the three-inch board. The outside slabs and any blemished ones being rejected, they are then cut to the required size, keeping the grain of the wood running lengthwise with the upper side, on which the address is placed, and crosswise on the lower. The thickness is about that of mill or mounting board, and the weight much less, while, from the spring given by the rough-sawn surface, its resisting power to the stroke of the stamp is much greater. The cost should be no more, if it is not less. "F. W." and others are welcome to the hint.

REVERSING NEGATIVES BY USE OF MIRROR.

In reference to the use of a mirror for reversing negatives, in addition to your own excellent suggestions, this may be noted that it is almost impossible to get a patent plate mirror of any large size to reflect truly. The body of the glass being blown, it is helplessly twisted in the making, and it is in addition much more subject to strain than cast glass, so much so that it will not do for the purpose; yet, strange to say, from its thinness and lightness, that is the kind most invariably stipulated for or used. If the thicker and heavier British or foreign plate glass is taken the reflections will be truer, but from its thickness, and being silvered on the back of the inner reflecting surface, and the separation and duplication of reflecting surfaces, two invariably, and occasionally a third secondary, image of the object becomes visible in certain lights. This is more apparent with some makes of glass than with others, and it is painfully apparent when the surfaces of the plates are not truly parallel and plane. Also the body of the glass is by no means free from strain, as those who have to supply the glass for lighthouses become painfully aware of, in the shape of rejected plates—Trinity House and the Board of Northern Lights being rigidly strict in this respect; I have thought needlessly so.

The only real cure and way out of the difficulty with a mirror, if it must be used, is to silver the mirror on the outer, not the inner, surface of the glass by the pure silver—not the mercury and tinfoil or quicksilver process—and polish the surface as is done in the case of glass specula for reflecting telescopes. This will give a true and sharp image, capable of the most accurate focussing, &c., the reflected image being on the surface of the plane-silvered mirror, there can be no chance of double reflections. Very great care must be used in using and keeping such mirrors.

My own rather extensive practice, for the purpose wanted by "photo litho," has been to use absolutely speckless and spotless patent plate glass for the negatives, and to take the picture through the glass, making the proper allowance in the focussing for the thickness of the glass used. The reason for insistence on pure fine glass is that every air-bubble, speck, or spot in the body or on the outer surface of the glass repeats itself, and generally in a distorted form, in the negative, and so tends to spoil the result.

In the current number of the *Beacon*, noticed in THE BRITISH JOURNAL OF PHOTOGRAPHY for August 9, our friend Dr. Nicol, on making a few rather jocular remarks on spirit photography, and how it might be done *apropos* of the photographic transparency of

some seemingly opaque media, quotes from an article by Mr. S. Ball in a recent number of *Macmillan*: "When the Great Eastern was in Dublin, my friend, Mr. H. B. White, took some pictures of the vessel. She had previously come from Liverpool, I believe, where her colossal hull had apparently been made the vehicle of a gigantic advertisement. Before coming to Dublin, the inscription had been completely obliterated by liberal applications of coal tar, yet the photographic plates *saw through the tar*, and showed conspicuously every letter of the advertisement."

In this connexion, I may relate a similar and quite as authentic an instance—similar, but not quite the same. On the east wall of the General Register House in Edinburgh, at one time, but it must have been many years ago, there was painted in black letters on the polished ashlar sandstone of the curtain wall which encircles it on that, the south, and west sides, an inscription warning people against defacing it under a penalty—that of being fined sixpence. I had seen this when a boy and young man. It had been removed at some time by order, and the paint washed and polished off, so as to be invisible. But one day, while photographing a twelve-by-ten view, that side of the curtain wall came in as a portion of it, and to my amazement the negative showed the erased inscription perfectly visible. A still more curious feature of the case is, that when this was spoken of there had been noticed by many people that, after foggy weather in winter-time, the same inscription could be seen projecting from the wall in letters of hoar frost, and varying from quarter of an inch projection downwards to only the appearance in white on grey on the wall. Whether it keeps up its antics still, or has got worn out from old age and decay, I do not know. As the announcement was rather a ludicrous one, the latter circumstance was much talked of. The letters seemed to have been done in common black oil paint. THERE is a nut to crack for some of your speculative and transcendental readers.

W. H. DAVIES.

THE following four papers are from the "Grand Convention Number" of the *St. Louis and Canadian Photographer*. We are not quite certain whether these are special contributions to our American contemporary in anticipation of the Convention, or are advances of papers to be read at the Convention.

PRACTICAL THOUGHTS ON SILVER PRINTING.

By J. R. SWAIN.

IN hot weather the positive bath should be cooled to about seventy degrees before silvering the paper. Be sure to silver long enough to coagulate all the albumen. No danger of over-silvering. In experimenting the writer silvered six sheets respectively—four, six, eight, ten, twelve, and fourteen minutes on a fifty-grain bath. No difference could be noticed in the finished prints. But in printing, the three last had a greater tendency to turn yellow, but all bleached out alike in the toning and fixing baths. From two to three minutes is about right in summer, and three to five in winter.

If the paper is very dry the time of silvering should be increased. There is nothing gained by trying to dampen the paper before silvering, except probably a minute's time to each sheet, and even that is doubtful.

The paper must be bone dry before fuming, and in damp weather should be dried again after fuming. In very hot, damp weather the paper has a great tendency to turn yellow while printing. The only preventive is to see that the negatives and pads are thoroughly dry and kept dry while printing. Three or four washings are sufficient before toning. No need of any acid or salt being added to either to redden the prints; this is only a waste of time and labour. A small pinch of salt, say fifteen grains to each eight ounces, should be added to the toning bath. The toning bath is simply gold and soda with the salt as stated above. One grain of gold is required for each sheet of paper to be toned. Some claim to be able to tone five or six sheets with one grain of gold, but experience teaches differently.

It is a good plan to learn to tone in a darkened room by lamplight, and to judge of the tone by looking *through* the print instead of looking *at* it. More even tones can be secured in this way, and if one is late, toning can be as successfully done after dark as in daylight. Whatever is done to prevent blisters must be done between toning and fixing. The recently published acetic acid bath seems to be the best at present. The prints after toning and before fixing should be washed through two changes of water, then immersed for a few minutes in a bath of acetic acid two ounces, water one quart, washed once or twice and fixed as usual. Not a single blister has ever appeared in the writer's hands after this treatment. The acid toughens the albumen and gives the prints a rich, bright appearance.

LARGE DIRECT PORTRAITS VERSUS ENLARGEMENTS.

By G. HAMNER CROUGHTON.

ONE of the first things that impressed me on coming to this country was the much larger size of direct portraits made by photographers as compared with those made on the Continent. I had been but a few months in this country when I went to the Convention at Cincinnati, as special correspondent to THE BRITISH JOURNAL OF PHOTOGRAPHY, and in noticing the exhibits I laid much stress on the fact that a large part of them were of heroic proportions. 20 x 24 was small to some that were there exhibited, which, as far as I can remember, must have been quite forty inches in length. I remember making inquiries of the photographers who exhibited these mammoth pictures as to the sale they had for these large portraits, and, without exception, I was told they did not expect to be reimbursed for the expenditure for the apparatus necessary to make such large pictures, that although they might pay as an advertisement, there were very few people who would pay a sum large enough to make it worth the photographer's while to produce such large portraits.

This, in itself, would be sufficient to prevent photographers from catering for this class of work, for if a thing does not pay in dollars and cents, it is not likely to be pushed. Apart from the business point of view, which, after all, is the most important, comes the fact that large direct portraits, when hung at a proper distance for viewing large work, show a heaviness in the shadows that is to an educated eye very disagreeable. Then another objection is that lenses made for such large work must necessarily be of short focus, and exaggeration of the near planes must result. In some of the large heads exhibited this was most distressing, the nose being broadened and enlarged out of all proportion. Next, is the fact that few people will sit sufficiently long, in these days of instantaneous processes, to get a properly exposed negative, and for young children it is extremely difficult to get anything satisfactory over a certain size. Then, again, the price that must be charged for these large pictures, to make it pay, is as much as would buy a well-executed crayon picture. Very few people, who know nothing of the difficulty and expense of obtaining good, large, direct pictures, and the amount of time to be spent in retouching the negative, &c., care to pay as much for what they would call only a photograph as they would pay for a crayon if well executed.

These considerations will always keep the production of this class of portraits in a very small minority, and enlargements will be the rule, with large direct portraits the exception. The advantages of enlargements over the large direct portraits are very many. In the first place, the expense for large apparatus is saved; secondly, it is not necessary to use a short-focus lens for making a cabinet negative; therefore, there need be no exaggeration or false perspective. The expense of large plates—a very considerable item—is saved, and the photographer can satisfy his sitter in expression, light and shade, &c., upon a cabinet-size plate, before attempting to make his enlargement. For children there can be no question as to the advantage of enlargements. To get a lively child it is necessary to use the quickest possible process, and that can only be obtained with small sizes, and it means a very different thing to spoil two or three 5 x 8 plates to having to do the same thing with the larger sizes. Then, again, most of the large pictures are wanted from portraits of deceased friends or relatives, where there is no question of making large direct pictures. Therefore it is necessary that photographers should keep themselves well posted in all that pertains to the production of enlargements. In an establishment where there is so much small work that it leaves no time for anything else this would be of little importance, but in the majority of studios, where there is a considerable amount of time which can be used to some advantage, a method of producing large pictures from small negatives which every one can use, and which requires no expensive or unusual apparatus, is a *desideratum*.

This is either by the gelatino-bromide paper or by the carbon process. This last, however, necessitates the production of an enlarged negative; the results, however, are very fine, but they scarcely pay for the extra trouble in production. The gelatino-bromide process of enlargement is simple in its workings, satisfactory in its results, and lends itself either to simple mending or highly finishing in crayon, or other methods of working. Any ordinary portrait lens will make an enlargement, and there is no other apparatus needed than cannot be found in any ordinary photographer's studio, or, if not, can be made, either by the photographer or a carpenter, for very little expense.

Therefore, there can be no question that, taking all things into consideration, it is better for the photographer to fit up an enlarging apparatus than to spend a large amount of money in buying large lenses, heavy cameras, and all the troublesome accessories needed to produce large, direct pictures.

HOW TO SUCCEED.

By P. ENSLY.

To those who are striving to master the problems in photography and fit themselves for honourable competition for first-class work, let me say in general work adopt and study to master such formulae, and such only, as have been well tried and proven to be reliable. Let experts work out the processes, and when they have made a success of them it is then time for the average photographer to take them up. It is well enough to experiment a little during leisure hours, and help to bring out new ideas, but, when doing regular work, use the formulae which you are best acquainted with, and never discard an old formula for a new one until the new has been well tried and proven to be of greater value than the old, remembering, however, that formulae often have to be varied to suit circumstances.

Nine-tenths of the difficulties in using dry plates, as well as albumen paper, may be avoided by the manipulations. Think not to succeed by sticking to an iron-clad rule under all circumstances. For instance, negatives cannot be treated the same in cold and hot weather. Neither can they be treated the same when over and under exposed. Again, albumen paper must have very different treatment in cold from what it requires in hot weather, also the management must differ in wet and dry weather.

Thanks to our great leaders, they have told us plainly just how and what to do, but there is some knowledge indispensable to success that is not in the market to be bought and sold. It is only acquired by hard study and close observation—in other words, by experience. The successful operator can tell the moment the image makes its appearance on the plate whether everything is working right, and portions his chemicals accordingly. The printer can do the same. To the close observer, evils that beset us in our every-day work have a warning voice; like storms, they never burst upon us without clouds first appearing.

He who loves the work, and patiently and perseveringly studies it for the love of it, will have his labours crowned with success.

THE PIZZIGHELLI PLATINOTYPE PAPER.

By F. C. BEACH.

HAVING experimented lately with the imported paper made in Germany after the special formula of Pizzighelli, I have found it to be remarkably simple to work, and predict a large consumption of it in the near future. It appears to be slightly slower than silver paper, the usual time of printing occupying about twenty minutes in a bright sun. But its rapidity in printing is increased if the sensitive surface is slightly moistened by breathing on it, or holding it over the steam from hot water, or at the mouth of a tea-kettle, before printing. Its simplicity of manipulation is one of its chief merits, and it will keep if encased in a tin box or a wood box well waxed, or in a waxed paper bag.

Taking a sheet from the package, it is slightly puzzling to rightly place it in the printing frame in a room illuminated with yellow light, since both sides of the paper look alike, and it also lies flat. The better plan is to glance at it in shaded white light to know exactly which is the sensitised side.

In printing, I have found that unless a pad, either of felting or a double thickness of paper, is laid over the back of the sensitised sheet, so as to be between it and the back of the printing frame, the air will, in some way which I have not yet been able to explain, affect the paper at the joint of the printing-frame back in such a way as to cause a light streak across the picture.

The printing is carried only as far as it is desired the picture should be. There is no guess work about it. When it is done it is simply put into water containing a trace of muriatic acid, which in the course of two minutes dissolves out the yellow, unacted-upon salt, and causes the picture to appear more brilliant. Thus in two minutes the picture is fixed, washed for three minutes more in one or two changes of water, dried between blotting paper, and is then ready to mount. The result is an absolutely permanent photograph, one that looks like an etching, and is particularly agreeable in comparison with the ordinary glossy silver print. The tone is a brown black, and can probably be varied by the degree of moisture imparted to the surface before placing in the printing frame. The paper is specially adapted for black-and-white subjects and large landscapes.

For the amateur it will be the paper, as no manipulation is required, beautiful prints being so easily made. As a quick means of supplying artistic proofs, it will be an advantage to the professional photographer. The practical success of this paper in our half centennial of the progress of photography is one of the minor things to which our attention is called.

TO REMOVE YELLOW STAINS FROM NEGATIVES.

A CORRESPONDENT in Sivas, Turkey, says it will require several days' journey in his distant land to consult a professional photographer in regard to the information he seeks, and asks the *Scientific American* to tell him how to remove successfully a yellow tinge on one end of a valuable negative.

The cause of the stain is probably due to insufficient fixing of the plate originally. Hence the treatment is different than if it was a pyro stain caused during development. The latter stain can be removed by immersing the plate in a clearing solution composed of—

Alum	2 ounces,
Citric acid	1 ounce,
Water	10 ounces,

for several minutes. The plate should be soaked in water for ten minutes prior to being placed in the above, provided it has been dried and printed from.

Another formula for removing silver stains produced in printing from ordinary silver paper is to mix two solutions—

A. Sulphocyanide of ammonia	$\frac{1}{2}$ drachm.
Water	1 ounce.
B. Nitric acid	$\frac{1}{2}$ drachm.
Water	1 ounce.

Mix equal parts of A and B fresh for each negative, and apply to stained portion, or immerse the negative in the solution. When the stain disappears the negative should be washed, and followed by an application of a saturated solution of chrome alum.

When the stain is caused by insufficient fixing, it is said to be removed by converting the silver in the film into an iodide, and then dissolving out by cyanide of potassium. The method recommended by Mr. Drake is as follows:—Soak the plate for five minutes in clean water, meanwhile make a solution of iodide of potassium, twenty grains to the ounce of water, now put the plate in this solution, and let it stay for ten minutes. If the stain is very old, keep it in for half an hour. Now dissolve half a drachm of cyanide of potassium in one ounce of water. Take the plate and put into this, and gently rub the stains with a tuft of cotton wool (absorbent filtering cotton will do), free from grit, until they are quite gone. If the stains are very old, make the solutions stronger and soak for a longer time.

The stain due from insufficient fixing is usually very difficult to remove. A plan which we have thought of, but not yet tried, is to change the colour by slight intensification.

First immerse the plate in a weak solution of bichloride of mercury and water until the film commences to bleach. Then wash and immerse in a solution of cyanide of silver similar to Monckhoven's formula. The cyanide of silver converts the film into a bluish colour, and might also transform the yellow stain in the same manner.

—*Scientific American*.

JACK AND I IN NORWAY.

IX.—NEDRE VASENDEN—FORDE—LANGELAND—SANDE.

THE Inn at Nedre Vasenden is spoken of in questionable terms by Baedeker as to comfort, general providing, and high charges. As far as our experience goes, we can give a direct denial to this statement, for we had good food, comfortable quarters, and the people were more than ordinarily polite; in fact, we had a good time there. Such a representation, however, tells against the house, for as parties came up we could hear the English asides, as they stayed to change their horses: "No, don't stay here." "It isn't good." "You remember what the guide said about it." "Neither comfortable nor cheap." And then they clear out without breaking their fast, preferring to wait till they come to the next station. All we can say in defence of this house is that things must be vastly changed since the derogatory lines were published, or the writer of them expected more than the case warranted. Do not have any fear of putting up at Nedre Vasenden Inn. Should you arrive there of an evening and wish to halt for the night, I warrant you will be comfortable.

This is a delightful spot for photography. The village lies at the lower end of the lake, which curves round, dotted over with boathouses and boats, and as the carriage-way runs close along the side of the lake, which is rich in overhanging foliage, almost any effect could be produced when we waited for the proper light. We had boats rowed out into the lake to break in on the sheet of water, and thus help to make up our foregrounds. We were very successful here.

Here a rustic wooden bridge across the outlet of the lake divides the village. The flow from the lake pursues its course under the bridge in the form of a river rushing down between the mountains. On some islets in the midst of this stream we came upon a group of wooden mills of the same class as have been previously noted, all built side by side, and working away with no end of fuss. We got a negative of them.

When we had finished our exposures at this place, and before

leaving, we asked the young women of the station if they would oblige us by doing up their hair and putting on their headdress (which was peculiar), and let us make a group of them as they parted with us.

The way these girls do up their hair and the caps they wear, to say the least of it, is very remarkable. The hair is dressed and fixed upon the crown of the head, looking like a monster spinning-top turned upside down, the point standing up in the air. Then they have a black silk bag or cap with which they cover this tower, which of course is broad at the bottom and rises to a point at the top. Some six (all the female population the station could boast) willingly donned their best things and in full war paint came out to be photographed. Since coming home I sent them some copies, so, should you happen to pass that way you will likely see them.

The road from Nedre Vasenden was full of interest. We stopped on the brow of the hill when leaving and took a picture of the village from the height, it was so tempting. Right on to Forde (this is the second place of this name, as previously noted) was verdant and pleasant, with waterfalls and rivers to enliven the way. We stayed at Forde to receive and dispatch telegrams and have our lunch at the hotel, which was a well-appointed house with first-rate service. The village itself was remarkably like an English one. We continued our journey to Langeland—a very rough road—and when we reached that place it looked far from inviting. Our driver said he would take us right on to Sande if we wished—and we wished.

The road improved as we proceeded, terminating in a valley, rich in lakes and trees, houses and bridges, and in their midst the ever-present church, and here was the village of Sande. We got in on the Saturday, and resolved to remain in this place over the Sunday.

Here at Sande we had fallen on a hotel comfortable as a home. The waitresses (a native of this place and relation of the landlord) had just returned from America, where she had been residing for some years. She spoke English fluently, hence our conversation was easy and flowing, and for the time being Jack ceased to construct sentences from the Norwegian vocabulary, which he stuck to through thick and thin closer than a brother.

There is a peculiar decorative effect on the walls of the rooms in many places here which is worthy of notice. The walls themselves are painted a neutral grey tint or cream, and over this tint are trained vinous plants, which trail all over the walls right up to the roof. These plants grow out of small pots ranged along the floor close to the wall. It was new to us and very pretty; it looked like a pattern without a set design, and the whole effect was artistic, for the tracings were thin and lacy, and the leaves were never thrown in clumps. The only drawback that I saw to it was the tendency it would have to keep the room damp.

We again met our American friends here. Thomson was full of a peasant marriage party he had just seen, which he described to me much as follows:—"I guess it was about the most premature exhibition that you ever saw since the flood. There were four boats came sailing down the fjord and landed at the quay—men and women—and the blooming bride, like a queen, wore an immense crown upon her head. Every woman carried her own little trunk—you know the sort of thing—and they had no sooner landed, sir, than each on her own account hurried away to any bit of broken wall or other shelter about, and here in all haste began taking off their outer garments and decking themselves in the finery which they had brought with them in their boxes. This performance took place in the open, mind you, and they put their every-day things into the boxes, leaving them there till they returned again. Then they all gathered together in a crowd, smiling and bright. It was a picture, lad, I can tell you. I was wishing I had had you there with your machine."

During the night I was roused out of sleep by the noise of stolecarries and carriages arriving from Vadhem, the port some eleven miles further on. It was about three o'clock in the morning. I got up and had a look out of the window, and saw a lot of people had come, both ladies and gentlemen. I went to bed speculating on the goodly company we would have for dinner on the Sunday, but by the time we had got down to breakfast they had all gone again except two young Englishmen.

These young fellows were in a rather troubled state of mind, which they ventilated to us during breakfast. It seemed that they had come on to Sande to have a good day's fishing, having heard that the proprietor of the hotel held fishing rights on three lakes quite near, which was true, but it turned out that he would not allow any one to fish on the Sunday, and so their prospect of pleasure was knocked on the head. They had arranged to go on after breakfast, but they were rather in a fix about their stolecarries also. They found out after arriving here that the man who had brought them had swindled them; he looked like a sharper, and talked Yankee. He had accosted the young fellows at Vadhem, stated that he was going their way—had to take the conveyance and horse into the country, at any rate—and that he would take them much cheaper than the regular conveyance; he was going as far as Ardal, and would wait where they stayed, and take them right along all the way. Being strangers the young fellows looked upon this offer as a good chance, and accepted it. They were to pay at every stopping station, so had settled up to Sande. Then it turned up in conversation that they had paid on demand ten shillings for an eleven miles drive, the Government arrangement being four shillings only for two for this distance. Of course, when they found this out, they would not have the man any more, but both

were rather nervous about tackling him; they were but boys, and he looked a tearing, swearing personage, and I did not wonder at their hesitancy. At length they applied to the landlord, and he soon made short work of the matter. Oh, how that fellow swore as he turned his horse's head towards Vadiem again!

This is a trick that is regularly played at some of the busier landing stages. An offer of private conveyance going your way—carry you cheap. When they get the unwary trapped they can charge what they like, being bound by no law or regulation. Beware of such.

The church here is open but once in three Sundays, the minister travelling into more distant villages on the two Sundays between, that being three congregations that he has under his charge. The Sunday we were in Sande happened to be the one that the pastor officiated there. This gave us an opportunity of seeing the service.

The members of the congregation are scattered all over the countryside for miles, and this is the grand occasion on which they meet and converse with each other. All this morning we could see little groups straggling into the village, dressed in their best, then coming to a focus in knots around the church, evidently retailing the interesting items of their quiet lives since last they met. The landlord was saying that most of the love-making was done at these Sunday gatherings—a good beginning for a married life.

The church was built of a light wood, with a red-tiled roof. During service all the men sat down one side of the church, and the women the other—just like a Quakers' meeting. Nails were fixed into the wall along the side at which the men sat; on these they hung their hats and caps.

The service itself seemed to me a blending of Catholic and Protestant. There was an altar with a statue of the Virgin Mary over it, this surmounted by a cross. In front of the altar was a raised platform, shaped half circle and railed round. This space was about twelve feet deep, and here the minister walks about during the time that he is officiating and preaching. The minister is robed in a white gown and wears a large Queen Mary ruff round his neck. His exhortation did not last more than twenty minutes. The singing was very uncultivated and decidedly unpleasant. After the discourse the members came forward to be blessed by the laying on of hands. The husbands and wives came first and knelt down round the railing that enclosed the platform. The pastor then put his hands on the heads of husband and wife and blessed them in a short prayer. Then he repeated this with the next couple, and going on until he had completed the circle in twos and twos. When they retired to their seats another company, equal to the filling of the space, came forward, and so on till all the married people were done. Then came the widows and maidens, and last, the widowers and young men. This part of the service would occupy half an hour.

During the service the congregation are evidently accustomed to take things free and easy, for if any of them felt weary sitting they just stood up and looked about them till they had rested themselves, and then they sat down again. It struck us as very amusing to see the people pop up every here and there in the middle of the sermon, and after their eyes had travelled all over the place, as if in search of some one, to quietly sit down again. It's a way they have; I suppose their fathers did it that way. There were five children christened on that Sunday.

On Sunday evening Jack amused himself with his binocular, taking considerable interest in the burly parson, who stayed in a neat little cottage just over the river from the hotel. He was sitting in a garden plot in front in his shirt sleeves, smoking the pipe of peace. Next morning we found him toiling away on his little farm. It evidently took the pasture as well as the pastorate to square his living.

Our American friends drove on to Vadhem on Sunday night, we promising to meet them there on the morrow, as we intended to take some negatives on Monday before going forward.

MARK OURE.

TIME SIGNALS BY THE MAGNESIUM LIGHT.

HAVING recently seen a magnesium flash light used for instantaneous photography, it occurred to me that the intense light produced could be utilised to advantage for distributing standard time signals by night. I decided to test the principle in a practical manner, and have obtained some very satisfactory results. The ordinary flash lamp, as made for photographic purposes, is an alcohol lamp giving a large flame through which a charge of magnesium powder is blown by means of a rubber bulb held in the hand. On pressing the bulb the magnesium is instantly ignited by being brought in contact with the alcohol flame. A lamp of this kind was fastened to a suitable frame, to which was attached a common telegraph sounder. A heavy weight was suspended over the bulb of the flash lamp in such a manner that it could be instantly released by the action of the sounder, thus depressing the bulb and firing the magnesium. The apparatus was connected with the signal circuit of the standard clock, and a series of experiments was made. By previous arrangement the signals were observed by Mr. H. H. Clayton, of the Blue Hill Observatory, at a distance of twelve miles, and were seen with great distinctness. Rough observations showed that the time lost in the action of the firing mechanism was less than 0.4s. This error was nearly constant, and can be rendered practically inappreciable by properly constructed apparatus, specially designed for the purpose. The

flash light would have the advantage of being visible to the unaided eye at a much greater distance than a time ball.

Being necessarily used in the evening, it would be seen by many whose only leisure time is after working hours. A flash signal fired from a hill or from the top of a high building would be visible in all directions for many miles. The cost of the apparatus is very small when compared with that of the time ball. I think that a system based on the principle which I have described will recommend itself to those interested in time-service matters as cheap and effective.

WILLARD P. GERRISH, *Harvard College Observatory.*

—*Scientific American.*

THROUGH JAPAN WITH A CAMERA.

CHAPTER IX.—SENDAI—MATSUMA—THE JAPANESE RACE.

ON our return the second time, we were informed that "a lodging had been prepared for us," and were taken, on the morning after our arrival, by a deputation from the local government board, to the best tea-house of the town.

From what has already been said of the tea-houses, it will be understood of those which the Japanese would describe as "number one houses," that they are much more pleasant places of residence than hotels; but it is not customary—in fact, I believe it is strictly illegal—to permit travellers to reside at the former places; that is to say, to stay overnight. They are only intended as places of rest and amusement for the daytime. The local authorities have the power, however, of making an exception in the case of those who are on public business. So in Sendai we found ourselves in what was altogether the most comfortable and convenient place of residence that we had been in since we had started on our journey, especially as we had the whole house, which was very large, practically to ourselves, any guests who came in the daytime being, whilst we were there, entertained in a sort of offshoot from the main house, and there being no visitors in the evening.

Two young ladies of the establishment were deputed to attend on us. These were the adopted daughters of the owner of the house. To be childless is considered in Japan the greatest misfortune, and those who have no children of their own almost always adopt one or more of the children of their friends who may happen to be poor, or to have a very large family.

O Takisan (or Miss Bamboo) and Okikusan (or Miss Chrysanthemum) were the names of our especial guardians. They were both full of fun and frolic, and entertained us most royally. They had a number of tricks and games that they showed us. Okikusan, who was only twelve years—by Japanese reckoning, which means eleven years by our reckoning—could juggle with an apple, a two-sen piece, and a piece of paper, keeping them all going in the air at the same time. Both could construct the most marvellous forms out of paper. The frog that they made was, in particular, so remarkable a work of art, that I wish I had kept him. There was a great folding and twisting of paper, which appeared at last to be reduced to a formless mass, but a sudden puff of air from the mouth into a hole that had been left somewhere distended it, and, lo! there was a frog standing on its four legs, with its head so impudently cocked up, that one expected it to jump from the table. But the crowning accomplishment of both young ladies was that they could stand on their heads. This performance they went through with evident pride; first, it is necessary to mention, arranging their garments, so that they took very nearly the form of the nether garments worn by men in Europe. They were very anxious that I should emulate this performance. I am generally loth to refuse anything to the fair sex, especially when represented by young and pretty girls, for all of whom I have a tender feeling; but, really, one must draw the line somewhere, and, at my time of life, to stand on my head for the edification of two little Japanese girls—well! Besides which, I can't stand on my head if I try ever so hard, and, if I did try, I am not going to confess the same to English readers.

Our business was soon done in Sendai, and we made our way one day to a place about twelve miles off, called Matsuma. It is on the seashore, and is one of the most beautiful spots that I have seen in Japan. A large bay is dotted over with innumerable little islands of rocks with what looks like a tuft of pine trees growing on the top of each. The stone constituting the islands is soft, and the water has undermined it into all sorts of fantastic shapes and forms. I had taken my camera with me, but just as I was about to set it up, the sky, which had been clear, suddenly overclouded, and we had scarcely time to run for shelter when a thunderstorm began, which made all photography out of the question for that day.

As we made our way home we observed a curious custom of the country. In front of every house (it was now fair again) was erected a bamboo tree, decorated with strips of brightly-coloured paper and garments of the same material, very like what we find in children's crackers at home. This is, it appears, an ancient custom which is observed yearly on a certain day. The girls of the family make the paper garments which decorate the tree, and, in return, are gifted with the capacity to sew neatly. The boys write mottoes on the strips of paper, and thereby secure a good handwriting. It seems a pity that this simple means of securing a decent "fist" was not known to the writer's parents some twenty-five years ago. It would have saved a world of subsequent trouble to contributors and others.

The day was, it appeared, a sort of festival, and, as we got towards our lodgings, when it was darkening, the houses were all decorated with coloured lanterns and other devices. In front of our own tea-house there was hung up a huge strip of transparent paper lighted with candles in the inside. As was to have been expected, it caught fire, causing no little excitement.

Our tea-house looked out on a sort of square park surrounded with shops and booths, which were all decorated with strange devices, for the most part of paper, with candles burning in the inside of them, and the little Miss Chrysanthemum, who had become quite tyrannical by this time, insisted on being carried pick-a-back all about the place to see the sights. She apparently looked on the writer as a sort of good-natured barbarian, to be treated with some consideration so long as he behaved well; but to be kept strictly under control.

In the evening a third young lady, O Minesan (or Miss Mountain-top) appeared on the scene, and the good lady of the house herself favouring us with her presence in our sitting room, there were games of hide-and-seek and blind-man's-buff, and other childish follies that I had not indulged in for many a year. The great old house rang with peals of merry laughter till, I think, the small hours of the morning; the old lady, the meantime, continually smiling with good nature enough to make her look pleasant, spite of her blackened teeth. The custom of blackening the teeth of women at the time of marriage has, by the way, almost entirely gone out in Tokio, the capital, but is still practised in the country.

There is a great misconception on the part of many foreigners as to the object of the blackening of the teeth. I have seen it repeatedly stated that the Japanese blackened the teeth and erased the eyebrows of the women at marriage so as to disfigure them. A strange idea, surely, that a man should wish to disfigure the woman he takes for his wife, even supposing the woman would submit to it; but the truth is that the two practices alluded to—the blackening of the teeth and the erasure of the eyebrows (false ones being painted in higher up)—was supposed to add to the charms of a woman. This is conclusively proved by the fact that, before foreign customs were adopted, the most fashionable courtesans in Tokio had their teeth and eyebrows treated in a similar manner; but, however this may be, the blackened teeth are, to the eye of an European, a frightful disfigurement, and the custom of keeping the natural colour of the teeth is a foreign importation that few will regret.

I made a few exposures on the young ladies, and am very sorry indeed that one of them resulted in failure, as I intended to use it to illustrate some remarks.

When an European first comes to Japan, he can see but little distinction between one individual and another. The differences between the different Japanese is lost in the great difference between them and Europeans; but after a little time he begins to see that the Japanese consist of two distinct and clearly-marked races. There is the aristocratic and the plebeian type. There is a real and actual class difference, so that, whereas in England, if a thousand children of the poorer classes and a thousand of the upper classes were taken at birth, and were similarly educated in every way, it is doubtful whether the two sets would show any marked difference, and it is certain that of the majority of individuals it would be impossible to say from which class they had sprung; in Japan, if the same had been done before the feudal system was abolished, the difference would have been clearly noticeable in every, or nearly every, individual case.

It is a question, and one which it would be most interesting to have solved, whether these two classes represent two originally different races—a conquering (and therefore, presumably, superior) and a conquered race, or whether the difference has grown up by degrees through centuries, during which the habits, food, surroundings, &c.—in fact, the environment—of the one class was totally different from that of the other, and in which—so strictly was feudalism enforced—the two classes were kept totally separate, to pair from the one to the other being impossible.

Students of Darwin will perceive in the fact that the distinction is not perceptible at an early age, some evidence in favour of the latter supposition. On the other hand, however, it may be argued that all babies are precisely like one another: they are all like so many dabs of putty. (Mothers, please take note.)

O Takisan (or, as I have called her, Miss Bamboo) had a typically aristocratic face, and it was when photographing her in profile that I, for the first time, understood why so many maintain that the Japanese aristocratic class is Jewish in its origin ("lost tribes," of course, some hold). Leaving the head-dress out of the question, O Takisan's profile might have been that of a Jewish maiden of quite pronounced national type. There was the same delicate aquiline nose, and slightly pouting lips; in fact, a Jewish face. The other class much more closely approximates to that of the Negro—there is a low squat nose, and very thick lips of a coarse nature.

This question is a very interesting one, and is one that might probably be elucidated to a certain extent by composite photography. I am glad, therefore, to hear that Professor Hitecock, of the Smithsonian Institute, whom I have already mentioned as at present in Japan, contemplates attempting some work of the kind. It will soon be too late to do it, as with the overthrow of the feudal system, the barrier between the classes was broken down, and the distinction between them will, doubtless, soon disappear.

At Sendai the good people entertained us in "European style." Those

who have read the description of the Japanese style of entertainment will probably think with me that, as an entertainment, the English dinner is flat, stale, and unprofitable compared with it; but I must say that after three weeks on Japanese food, I enjoyed the actual feed immensely, and ate so much that I am surprised that I was not very ill afterwards.

W. K. BURTON.

Foreign Notes and News.

PHOTOGRAPHERS in their travels sometimes run short of magnesium. Messrs. Rossignol & Fleury-Hermagis recommend the following mixture of chemicals, as calculated, on account of the photogenic power arising from its combustion, to help them out of their difficulties in this respect:

Flower of sulphur	40 parts.
Red lead	50 "
Sulphide of antimony	70 "
Nitrate of potash (powdered)	50 "

These substances are to be intimately on a large sheet of paper, or better, in a glass mortar, after having been previously dried in the sun. Ten to thirty grammes of the mixture suffice to illuminate the interior of a crypt, a cavern, &c. It may be ignited by an ordinary match, or, if it has got at all damp, by a piece of glowing charcoal.

ACCORDING to Dr. Zerger, of Prague, photographs of the sun taken on orthochromatic plates, furnish a means of predicting, by more than twenty-four hours, the approach of tempests, hurricanes, earthquakes, &c., a knowledge of whose advent would be obviously of much value to the tourist. These photographs display the appearance of more or less elliptical rings surrounding the solar disc, which, when they grow larger in diameter, announce the approach of a hurricane or other atmospheric disturbance towards the point of observation.

APPROPOS of paraphenyldiamin, Professor Eder, of Vienna, writes:—"According to the experiments which I have been conducting in conjunction with Herr Ritter von Reisinger, it appears that paraphenyldiamin ($C_6 \times 1_4 [H N_2]$), which was manufactured by Dr. Schmeider, in Görlitz, acts as a good developer for bromide of silver gelatine plates. It gives about the same degree of sensitiveness (on testing with Warnerke's sensitometer) as pyro or hydroquinone developers. We employed a mixture of 1 part of hydrochloric and 1 part of a solution of paraphenyldiamin, dissolved in 50 parts of water, and 1-2 vols. of a potash solution (1:10). The development took place with regularity, the colour of the silver precipitate being grey, and the negative of much delicacy. Sulphite of soda keeps the solution colourless for a long time, but restrains the development of the image in a high degree."

DR. CARL FENA gives the following formulæ for a pyrocatechin developer

A.	
Sulphite of soda	100 grammes.
Distilled water	400 "
B.	
Carbonate of soda	100 grammes.
Water	400 "

Take 30 c.cm. of A and mix with 60 c.cm. of B, and add 1 gramme of pyrocatechin. This developer appears to act much more energetically than a similar developer with hydroquinone.

A FRENCH Amateur has tried the following formulæ for a citric acid developer with success:

A.	
Citric acid	25 grammes.
Water	700 c.c.
Ammonia (sp. gr. 0.81)	1 part.
B.	
Ferrous sulphate	1 part.
Water	3 parts.
C.	
Sodium chloride	1 part.
Water	30 parts.

Mix 15 parts of A, 5 of B, and 1 of C. It is probably the cheapest developer that can be used for gelatino-bromide, and is said by its discoverer to give excellent results. Perhaps!

HEAR SALYER recommends the following method of testing citric acid for the presence of tartaric acid. It consists in simply adding to the suspected solution one drop of yellow chromate of potash. If the citric acid be pure, the slight yellow colouration will remain unaltered for several days, even after the addition of some drops of sulphuric acid; if tartaric acid be present, the yellow chromate is converted into a violet salt of chromic oxide. Herr Salyer adds that even half per cent. of tartaric may

be detected in this manner on the solution being allowed to stand for some hours.

THE well-known firm of E. Jaffé & A. Albert, of Vienna, has been awarded the gold medal for photographic exhibits, apparatus, &c., at the Budapest Industrial Exhibition.

IN Germany a new patent has been recently granted to Dr. M. Andresen for the employment of the diamido-naphthalin-sulphurous acids and the amido-naphtho-sulphurous acids as developers for photographic purposes.

THE *Photographisches Wochen Blatt* draws attention to the fact that after toning prints, especially in a gold bath, the action continues while they are being washed, and that this especially takes place where two prints lie one upon the other. Our contemporary recommends the employment of ten per cent. solution of salt, by which the toning solutions are so rapidly removed that the action is brought to an end at once.

Our Editorial Table.

PICTURE MAKING BY PHOTOGRAPHY.

By H. P. ROBINSON. Second Edition, Revised. London: Hazell, Watson, & Viney, Limited, 1, Creed Lane, E.C.

WRITING in another place and at another time *apropos* of the first edition (1884) of *Picture Making by Photography*, we remarked that the reason we attach importance to the teachings of Mr. Robinson is that he possesses a trinity of qualifications: he is a good technical, practical photographer, and in virtue of this he takes, technically, perfect photographs; he is an artist, and therefore his photographs are works of art—by which we mean fine art, in contradistinction to technical art; lastly, that he is not only well conversant with the canons of art, but he is a facile writer and master of the art of conveying his ideas to others in a manner capable of being understood.

In perusing this new edition, we notice revisions of and improvements upon the former one. *Inter alia*, we observe with satisfaction two full-page reductions of, perhaps, as charming works as have ever emanated from Mr. Robinson, viz., his *A Merry Tale* and *Wayside Gossip*. Either of these are as natural and good as if a photographic spy with a detective camera had been dodging the party from behind a tree or a rock and had pressed the trigger at the fitting moment, so entirely free are the components of the group from that hateful idea of being posed for a photograph. But the art of concealing art has here been carried to its highest development, and we do not mind cribbing a little bit from Mr. Robinson's 146 pages to throw a little light upon his method of making a picture. As will be seen, the picture in question is *A Merry Tale*, and the incident is extracted from the chapter entitled "The Genesis of a Picture."

Sometimes incidents you meet with in the streets, or in country walks, will suggest subjects—not necessarily the actual incident one sees, but something that may be worked into some other scene, with perhaps many alterations. Sometimes a fine pose may be seen, or a lovely bit of light and shade; sometimes an expression or a quaint costume; all these things should be noted for future use. No suggestive bit should be allowed to escape; all should be sketched or noted. It is good practice also to try to analyse why the pose is beautiful, or the light and shade effective. This a knowledge of the rules of light and shade and composition will enable you to do, and to do this easily the student will find an added pleasure to his life—another feather to the wing of his artistic flight.

We will now take a picture that has been really produced by photography, and see how it was conceived and finished. To analyse and dissect a picture in a cold-blooded way, as I am going to do now, is to rob that picture of any poetry it may contain, and leave nothing but a mechanical interest; but I know no better means of conveying the information; I will, therefore, take one of my own—that one I have called *A Merry Tale* will be suitable for the purpose. The frontispiece is a reduction of this picture, and will assist the reader in understanding what follows.

In the drawing-room of a country house in North Wales five young ladies in evening costume were amusing themselves after dinner. One of them was relating some funny circumstance to the others, who arranged themselves in a picturesque group round the story-teller. Here was the germ of the picture. A few seconds sufficed to make a sketch of

the composition. The illustration is a reproduction of the jotting in my note-book, and, as I have already said, would enforce the practice of making rough sketches of composition; and light and shade is very useful, especially if accompanied by a few descriptive notes. It teaches the student how to observe, if it does no other good. Correct drawing is by no means necessary; the "effect" is what should be noted. To return to the picture. By an easy transition the mind easily changed the young ladies into peasant girls, and suggested suitable surroundings. A sketch was made of the arrangement, and the dress for each figure decided on. In selecting the costumes, the light and shade of the group, and its relation to the landscape, were not forgotten, neither were the accessories—the baskets, jug, and stick. The colours were taken into account only as to how they would translate into black and white.

It was arranged that the group should form part of our work for the next day; but, as often happens in the mountainous districts of Wales, man proposes and the weather imposes: the morning opened with a deluge of rain, which continued more or less for several days. Those days were not wasted, for young ladies nowadays cannot only play tennis, but some of them can shoot and throw the fly, to say nothing of ratting and ferreting! At last the storms were over, and the sun shone again, but with a great deal more wind than a photographer thinks pleasant. However, we determined that we would have some pictures, good or bad, that morning. We were getting hungry for work, and a conscientious photographer is as anxious to make a good bag as a sportsman, but a photographer's desire for picture making is nothing to that of a set of really enthusiastic models. Mine, I know, go into the business with the greatest energy. Off we started to a quiet lane about a mile away. The photograph conveys no idea of the picturesque effect of the five girls in their humble but brilliantly-coloured garments. The effect of colours under the green hedges and through the fields was quite beautiful. The choruses sung on the way had, perhaps, nothing to do with photography, but the foxgloves and other wild flowers the singers gathered came in very useful in the picture. Arrived at the selected spot, the camera was unpacked, and the models placed approximately in their proper places, interfering branches cut away, and everything got ready, so that the last moments might be devoted to the quite final touches, expressions, and other little things. The sun shone a cold steely blue, and the wind was so troublesome that we had some thoughts of giving it up after all; but we decided we had taken too much trouble to go home without spoiling, at least, one plate.

Now for the arrangement of the group. The girl to the left was sitting up at first, as will be seen in the sketch, but being a young hand at the business, she could not control herself, and, enjoying the fun, threw herself back on the bank screaming with laughter. This was a happy accident, which much improved the composition, and was seized immediately. She was at once shouted to to keep her place, which, being an easy one, required little further thought on the part of the photographer, who could now turn his attention to the other figures. The seated figure, the one in the straw hat, was a steady old stager with plenty of experience and no nerves; she required but a moment's attention. The next figure, always dramatic in pose, and with a charming expression, is, perhaps, in consequence of her other good qualities, rather shaky as a sitter. She required a rest of some kind. The stick was useful here, and was of immense value in the composition. A bit of straight line to contrast a number of curves is always effective. This settled the three figures that were easiest to keep still. The standing pose being by far the most difficult to keep—for a standing figure without a rest often sways like a pendulum—was left until last. The figure telling the story was now settled; the pose came easy, the model being an admirable story-teller, and thoroughly up to her business; but it was necessary to give all possible effect to the hand, for the hand, if well placed, would do more towards showing the intention of the picture than anything else in it. It, in a way, leads the chorus of expressions; it emphasises the situation; it makes you feel the girl is speaking. It was so arranged that, to make it more conspicuous, it should appear partly in sunlight and partly in shadow, and every leaf or twig that came behind it was hurriedly removed. The standing figure, who could not be expected to keep the pose for above a minute or two, was placed last. The jug, basket, and foxgloves, which form the keynote of the composition in the foreground, had been previously arranged, and all was ready. But a last glance from the camera showed the photographer that the tree was exactly over the head of the standing figure, and cut the composition into two parts. This would never do. But instead of moving the model the camera was moved. This corrected the error to some extent. It would have been better to have moved it a little further, but it was feared the other tree would interfere with the story-teller. A few last words—at the special request of the models I use fictitious names—"Now, girls, let-

this be our best picture. Mabel, scream; Edith, a steady interest in it only for you; Flo, your happiest laugh; Mary, be sure you don't move your hand, or all the good expressions will go for nothing; Bee, I will say nothing to you, but leave you to fate. Steady! Done!" and two seconds' exposure settled the matter. I scarcely expected a successful result, the thing was so difficult; but as the wind was blowing almost a gale I did not care to try another plate. As it happened, I found, when I developed the plate a fortnight afterwards, I had got a good negative. The sky was white and blank; but the use of a second negative, delicate and not too obtrusively printed, soon put this matter to rights.

This seems a long story to tell, but the picture was exposed in under six minutes from the time the models first took their places. This quickness is one of the secrets of success, but when your picture is to include figures it should not have the appearance of hurry, for "hurry hinders haste," and, besides, has the effect of hurrying your models: it should be the result of a perfect knowledge of what you want to do. A model should never be kept waiting longer than is absolutely necessary. It is better to give up little things rather than to lose a fine effect.

The lesson to be drawn from this is the vital importance of seizing such ideas as present themselves, and boiling them down or summing them up, making careful notes and taking them (as a Scottish judge would say) *ad arandum*, and finally out of this digested material making the picture.

Starting the work with chapters on "Gelatine Plates and their Uses," and "Our Tools," our author in the former speaks of their value in permitting photographers to introduce figures; and in Chapter XI. ("Figures in Landscape") he reiterates the advantages of this class of introduction. That figures, as he says, "may often be made to tell a story, or illustrate a poem or poetic thought," is an undoubted fact; but we rather wish that he had devoted a chapter to warning photographers against the introduction of figures in season and out of season, for this is a weakness to which many photographers are terribly addicted, and by which many otherwise good landscapes are spoilt. Is it a river? Then, of course, we must have the inevitable fisherman with his rod and basket. A country stile? Then must Joan and Darby be posed there, one on each side, and in all that stiffness engendered by the all-prevailing thought that they are being "took." Even a lonely shore can't be let alone, but some Dulcinea must be introduced in town-made habiliments of latest fashion to mar the loneliness.

In the next edition, which is sure to be called for, we conjure our author to devote a chapter to the abomination of commonplace figures being stuck in, here, there, and everywhere, without "rhyme or reason," to destroy the beauty of landscape nature. "Did you ever see a more beautiful landscape?" asked an artist of us as he stood before a photograph by a young artist in the Newcastle Exhibition, with his thumb broadened upon a certain portion of it. Its beauty was acquiesced in. "But see now," he said, withdrawing his thumb, which had hidden two figures prominently placed in the picture, "it's beauty is all gone; these figures have spoilt it." Now figures are all right enough, and they may be made to enhance the value of a picture, but they must be introduced with exceptional judgment in order to this. They are like sharp edge tools, capable of much evil as well as of much good. Therefore, Mr. Author, in your next edition, please devote a special chapter to the misuse of figures in landscapes. Still, the chapter on figures is valuable and suggestive.

The work contains twenty-one chapters, and takes us through the rudiments of composition, light and shade, models, subjects, animals, the sky, and the other points to be noted when making "pictures by photography." They are written in a terse, vigorous, and healthy style, and now that the technics of photography are fairly well understood, cannot fail to raise the mind of the careful reader above merely clean and faultless negatives.

We are pleased to see that a chapter has been devoted to *Naturalistic Photography*, the "new heresy," if heresy it be worthy of being called. He naturally alludes to the writings of Dr. Emerson, with which he is not in accord. He says:—

In imitating the impressionists, Dr. Emerson has to give up the quality for which photography is distinct from all other means of art—its great facility for giving definition. It is recognised by all artists that each art should take advantage of those features which are peculiarly distinctive in its practice; oil painting has richness, transparency, and depth; water colours, luminosity and clearness; photography has something of

all these qualities, but its most prominent feature is that of definition; yet Dr. Emerson would have us give up this great feature, so that we may imitate the effects of a totally different method of artistic expression. Dr. Emerson has thought fit to write of Mr. Ruskin as a "spasmodic elegant of literature," and a "splendidly false critic," therefore I cannot expect him to treat any word of the author of *Modern Painters* with respect; but the rest of the world still recognise in Mr. Ruskin the greatest writer on art that ever lived, and in *The Two Paths* he lays it down as one of the main principles of all work "that whatever the material you choose to work with, your art is base if it does not bring out the distinctive qualities of that material." And he says further that "the reason of this law is that if you don't want the qualities of the substance you use, you ought to use some other substance: it can be only affectation and desire to display your skill that lead you to employ a refractory substance, and therefore your art will be all base." Now definition is the distinctive quality of photography, and it follows that according to the dictum of our greatest writer on art, naturalistic photography which omits definition is base art. No wonder that Dr. Emerson should denounce Mr. Ruskin as a splendidly false critic!

Naturalists pretend to represent what they see, but healthy human eyes never saw any part of a scene out of focus. The moment they are turned from the object on which they were fixed to find a part out of focus that part instantly becomes in focus. The proof of this simple statement—and any pair of eyes can prove it for themselves—ought to bring conviction of the unnaturalness of naturalism. It is quite true that the planes in nature become indistinct as they recede; this is not because they go out of focus, but is due to the intervention of atmosphere. This effect can be represented in photography without putting the lens out of focus, which is a poor artifice for the representation of atmosphere; nature may have been all wrong when she made what has been thought the most delicate and beautiful organisation in man; but we know what the eye is, and we must take it such as it is, and everybody who has one can tell how much he can see by simple experiment, and that is what should be represented. But I must guard myself against being misunderstood. What the physical eye sees does not mean that the eye cannot be trained to see by the mind. It has been said that the eye only sees about five per cent. of what is before it; this is true in a double sense; but physically the eye only sees an angle of five degrees at one time, but changes so quickly that it practically sees the whole of a scene at once.

The book is well got up, and contains many small illustrations. Price 2s. 6d.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,439.—"An Improved Photographic Camera." Communicated by C. E. Burlingame. F. W. BARKER.—*Dated August 6, 1889.*

No. 12,440.—"Improvements in Photographic Camera Stands." C. H. F. MURRELL.—*Dated August 6, 1889.*

No. 12,450.—"Improvements in and relating to Apparatus for Receiving Coin and for Producing and Delivering Photographs in Exchange therefor." T. E. ENGBERT.—*Dated August 6, 1889.*

No. 12,593.—"Improvements in Photographic Cameras for Dry Plates." F. HOFFMANN.—*Dated August 9, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN OR PERTAINING TO PHOTOGRAPHIC CAMERAS.

No. 939.—ALFRED SMITH, 5, Cambridge Lodge-villas, Cambridge Heath, Middlesex.—*July 20, 1889.*

THE object of my invention is to fit photographic cameras, especially those known as "detective" or hand cameras, in such a manner that a large number of sensitive plates may be exposed in succession without the necessity of opening the cameras.

In carrying out my invention, I construct a box or case of any suitable form, preferably rectangular, in one end of which, and in the lower part thereof, the lens is fitted, with suitable shutters. View finders may also be fitted in the lid of the box.

According to one form of my invention, a plate is fitted vertically in and against side of the case, and preferably about half the length of the same, which plates can be caused to move along the sides by racks and pinions, the pinions being operated from the outside of the case. In these plates are formed a number of corresponding vertical grooves. A horizontal partition is fitted in the case in such a position as to divide the case into two somewhat equal parts, and transversely in this partition is made a long slot, about midway in the length of the case, or the horizontal partition may terminate in this position. The sensitive plates are placed separately in the grooves of the two side plates above the horizontal partition, their lower edges resting on the same, and each plate must be backed by some opaque material, for which purpose I preferably place each plate in an open-faced holder, each holder being placed in the grooves of the side plates. When it is desired to place one of the sensitive plates in position to receive and be acted upon by the light

through the lens, the two side plates are moved backwards until the hindmost plate or its holder arrives at the slot in or at the end of the partition, when it slides downwards in the grooves by gravitation until it is checked and held in the proper position behind the lens, with its sensitive surface presented thereto, and when the desired exposure can be given, after which the two side plates are again moved backward until the next plate or its holder slides downwards in its grooves into position, until all the plates have been utilised. As each plate is backed by an opaque material, no damage is done to those plates which have before been exposed.

According to another form of my invention, each side plate is divided horizontally into two parts, and separately fitted above and below the horizontal partition, and the pinion is mounted between the same and caused to gear into racks fitted to each part. The sensitive plates are placed, as aforesaid, between the two upper side plates above the horizontal partition. When it is desired to place one of the sensitive plates in position, the upper side plates are moved forwards and the lower side plates backwards until the front plate and its holder can slide downwards over the end of the horizontal partition or through the slot therein into position as aforesaid. A stop may be fitted in the lid of the box to ensure that the plates shall so slide downwards when required.

IMPROVEMENTS IN PHOTOGRAPHIC NEGATIVES AND SENSITISED PLATES FOR USE IN PHOTO-ILLUSTRATIVE PROCESSES.

No. 9921. HERBERT DEVERIL and WILLIAM GALLAGHER, Sydney, New South Wales.—July 20, 1889.

This invention relates to improvements in photographic unvarnished negatives and in photographic sensitised plates, by means of which the pictures obtained upon them may be printed in greasy or fatty ink on the ordinary material and transferred to stone, metals, wood, glass, porcelain, or other substances for printing, etching, or engraving, or other illustrative or ornamental purposes, and revealed thereon in minutest detail and with half tones and all degree of shadow clearly defined.

This improvement in photographic negatives and sensitised plates for use in photo-illustrative processes, is comprehended in the obtaining in the negative from which the picture is printed on the usual and ordinary transferring material of non-actinic, opaque, or semi-opaque dots, lines, grains, or suchlike. These dots, lines, &c., may be of a latent character upon sensitised plates, and are developed with the pictures upon such plates after exposure in the camera, or they may be superinduced upon developed unvarnished negatives.

In carrying out this improvement in photographic negatives and sensitised plates for use in photo-illustrative processes, what is for convenience sake termed a "mater" is first prepared. This consists of a sheet of glass or transparent or semi-transparent paper or other suitable substances rendered opaque or non-actinic except in dots, lines, grains, or suchlike, which remain transparent or semi-transparent. This "mater" may be prepared in any convenient manner; for instance, it may be a dry print on thin photographic paper (preferably Rives) obtained from a lithographic stone evenly coated with stiff lithographic ink, or preferably it is an ordinary photographic negative of a drawing, or material, or substance which will give the desired result. Having this "mater" at hand, it is used as desired for converting the "plates" or the "negatives" into suitable means for obtaining the required "transfers."

An ordinary sensitised plate (of gelatino-bromide of silver manufacture), with its face upwards and its back protected with a dark, non-reflecting material, is exposed for a very brief period in an ordinary printing frame under a "mater" (face downwards), to the action of weak white or actinic light, say for from three to twenty seconds, according to the density of the "mater" to the light of an ordinary paraffin candle, and it is then ready for use immediately or at any future time to obtain a picture by exposure in a camera, and which after ordinary development will be seen to consist of a greater or lesser quantity of minute opaque or semi-opaque dots, lines, grains, &c., as are required to produce white dots or grains, &c., in the resulting transfer, and it is printed from upon sensitised transfer paper or material in the ordinary way. Instead of being treated under the "mater" before exposure in the camera, the "plate" may be so treated after exposure in the camera but before development.

An ordinary unvarnished developed negative (having a gelatine film) is immersed in a saturated solution of bichromate of potash for, say, ten to fifteen minutes (the surplus solution blotted off to prevent crystallisation of the salt), and then dried in the dark, when it becomes sensitive to white or actinic light. It is then exposed to strong white light (sunlight) in a similar way to the exposure of the "plates" before described under the "mater," until opaque or semi-opaque dots, grains, &c., appear, such dots, &c., being in fact minute portions of the negative reduced into a resinous substance, which remaining in union with oxide of chromium is insoluble in water. The negative is then washed, and when dry is ready for immediate or any future use in printing a "transfer."

We would have it understood that we do not confine ourselves to the precise manner and the details thereof described of carrying our improvements in photographic negatives and sensitised plates for use in photo-illustrative processes into practical effect so long as the nature of the said invention be retained, but,

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—1. A sensitised photographic plate having upon it latent dots or marks which during development become and afterwards remain opaque, or semi-opaque, or non-actinic, substantially as herein described and explained. 2. A photographic gelatine negative having upon or within the developed picture superinduced opaque, or semi-opaque, or non-actinic dots or marks, substantially as herein described and explained. 3. A sensitised photographic plate for the obtaining of negatives for photo-illustrative processes, prepared in the ordinary manner and before or after exposure in a camera, by an exposure to light under a "mater" or non-actinic sheet, having transparent or semi-transparent dots or marks, substantially as herein described and explained. 4. A photographic gelatine negative for photo-

illustrative processes, prepared by converting minute portions, or dots, or marks of an ordinary photographic negative into a substance insoluble in water, and preferably by treating such negative with bichromate of potash, and exposing it to light under a "mater" or non-actinic sheet, having transparent or semi-transparent dots or marks, substantially as herein described and explained.

AN IMPROVED PORTABLE PHOTOGRAPHIC CAMERA.

No. 11,300. SAMUEL GEORGE HARRISON-DEARLE, 80, Islington, Liverpool, Lancaster, and THOMAS HENRY ASHCROFT, 8, Marine-terrace, Liscard, Chester.—July 20, 1889.

THE object of our invention is to produce a camera in and by which photographs can be taken or obtained while the camera is carried by the hand or otherwise, and these photographs can be so taken or obtained without the knowledge of any bystander, and this our camera can be constructed very cheaply, and can be arranged to receive and use plates of any desired size.

To carry out this object we form a box or case, preferably of wood, and of the desired shape and size, and the outside of this box can be covered with any material, or be otherwise so treated in any usual manner as preferably to look like an ordinary package or receptacle that is usually carried by a handle on or in the upper part or top thereof, and the side of this box can be opened to allow of access to the interior thereof, and the whole box is or may be so constructed as when closed to be light-tight. In one end of this box is made an aperture, behind which is pivoted or centred on the box or elsewhere a circular or segmental or other shutter, wherein is an aperture corresponding with the aperture in the box, and a spring tongue or catch is fitted which can hold and retain this shutter in position to close the aperture in the box; and when this catch is retired a spring applied to the shutter causes the same rapidly to revolve, during which revolution the aperture in the box is uncovered by the aperture in the shutter, and then closed again by the solid part of the same, and the shutter can be revolved back against the spring from the outside of the box by a button on its pivot or centre, or by other appliance, until the catch can again hold and retain the same. The aperture in the box can be masked by one of the ordinary name labels, or otherwise so fitted on the outside of the box as to be capable of being turned back or removed to unmask the same. Behind the aperture in the box and the shutter is the ordinary or other lens mounted on and connected with another light-tight box or camera, so formed and fitted, and so secured in and to the outer box or camera, as to be capable of being lengthened or shortened as may be desired; and in or at the rear end of this inner box are fitted the usual grooves or guides in and along which the dark slides that contain the sensitive plates can be passed, or the rear end of this box can be otherwise fitted as may be necessary for the particular sensitive appliance or apparatus or device that is to be used, and a screen or screens can be fitted to prevent the light reaching the lens even when the side of the outer box is opened. The outer box can, if desired, be so lengthened at the rear of the inner box as to carry a number of dark slides or other desired articles.

Thus, when the shutter is properly set, and the sensitive plate or other article is duly exposed in the inner box, the catch is retired preferably by a wire or pull passing out at the side of the box or elsewhere to the handle, so that an unobserved pressure by the thumb or finger can so retire the same, and the shutter revolves, giving the desired exposure to the plate or article through the lens, and the photograph is taken.

In order that it may easily be known at what view or thing the lens is directed, two apertures are made in the outer box, one being in the front end thereof, the other in the top thereof, and preferably near the corner of the box, both of which apertures can be masked, as is the aperture for the lens; and inside the box is fitted any usual or other view finder, the glasses and lenses, and reflectors of which are so formed and arranged, and the apparatus is so fitted in the box, that on looking down into the aperture in the top of the box the operator can see the view or thing to which the lens is directed.

Though we preferably use a revolving shutter in this our camera, as is aforesaid, we can obviously also use a drop or any other usual kind of shutter when it is desired so to do.

The claims are as follows:—1. A photographic camera substantially as described herein, with a covering such as shall prevent its outer appearance resembling in any way a photographic camera, preferably taking the shape of a picnic basket covered preferably with American cloth, only exposing to view a portion of wickerwork holding the handle, also composed of wickerwork. 2. A photographic camera with the shutter discharged, and working from the handle of the box containing the camera, necessitating the use of only one hand in making the exposure, that hand being the hand holding the said detective camera, substantially described herein.

AN IMPROVED PROCESS FOR THE TRUE REPRODUCTION OF THE COLOURS OF NATURE IN A COMPOUND PHOTOGRAPHIC PRINT.

No. 13,301. HENRY CHARLES BOND, Highland-road, Bromley, Kent.—July 20, 1889.

MY invention relates to an improved process for the true reproduction of the colours of nature in a compound photographic print, and has for its object the obtaining of the required results by natural means, without the use of the brush or any manual application of pigments, such as crystalline, to the finished prints. In carrying my invention into practice, I take three plate-glass troughs, composed of two thin sides cemented together round the rim and held apart by narrow strips of plate glass of suitable thickness, and fill these with liquids, each of such colour as shall transmit all solar rays, except those forming one of the primary colours.

Thus: The first will be filled with a green solution (preferably chlorophyll in alcohol), which transmits all rays but red; the second with an orange solution (preferably ferric sulphocyanide), which transmits all but blue; and the third I fill with a purple or puce (preferably aniline puce dye), which transmits all but yellow, or I may fill the three slides with such other liquids as shall be found to possess these properties.

The first of these colour screens is now hung by loops attached to its upper corners immediately inside the lens of a camera, and a colour-sensitive gela-

time dry plate is exposed behind it, giving as a result a picture in which the red solar rays have had no effect at all.

With the second screen a picture is obtained in which no blue rays take effect, and with the third no yellow rays take effect. On developing these images certain striking differences are noticeable between each. From these negatives prints are next taken by contact, on paper coated with bichromatised gelatine, or on glass coated in the same manner (colotype process), and in the former case the image is transferred to the lithographic stone. Each picture is now inked up with rollers and lithographic ink of a transparent and brilliant character, complementary in colour to the colour of the screen under which the negative was exposed. Each colour is next printed in turn on to the same piece of paper, exactly as in chromo-lithography, and the result is that the red ink takes those parts of the picture where nothing showed through the green screen, and no effect was produced on the green plate: the blue ink takes the parts where the orange cut off the light, and the yellow ink those parts obliterated by the purple screen. The resulting point, if the colours of the colour screens and of the inks have been exactly balanced, will be found to portray all the colours of nature, as the secondary and tertiary colours, and the deep tones of the shadows will be correctly given where the pure primary tints overlap. These coloured pictures may also be printed in gelatine tissue, stained to the requisite colours after development, with aniline or other dyes, and the three skins superimposed, for magic lantern slides and the like.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—The process for obtaining the true reproductions of the colours of nature in a compound photographic print, as hereinbefore described and for the purpose set forth.

[Wherein does this differ from Leon Vidal's method published many years ago?—Ed.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 20.....	North London	Myddelton Hall, Upper-st., Islington
" 20.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 21.....	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 21.....	Bury	
" 21.....	Manchester Camera Club	Victoria Hotel.
" 21.....	Edinburgh Photo. Club	5, St. Andrew-square.
" 21.....	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 22.....	Barton-on-Trent	The Institute, Union-street.
" 22.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 8.—Mr. A. Pringle in the chair.

Mr. Dresser showed some lantern slides of instantaneous subjects, including one of a dog climbing a tree. The exposures had been, some of them, as rapid as the two-hundredth part of a second. The detective camera used for the purpose was shown. The high speed was obtained by hooking an additional spiral spring on to the moving part of the shutter.

Mr. F. P. CEMBRANO said that he could corroborate a remark made by Mr. Cowan at a previous meeting with regard to the eikonogen developer, namely, that the solution with sulphite of soda and without carbonate of soda would develop a plate, and that in a reasonable time.

The CHAIRMAN said that in his experience with eikonogen the images came like those of ferrous oxalate, clear and bluish in tone, but with no density.

Mr. S. G. B. WOLLASTON had had the like experience.

Mr. CEMBRANO said that the addition of a small quantity of bromide gave density. He also thought that there was too much soda in the formula supplied with the eikonogen.

Mr. A. COWAN said that he obtained more visible density in the same time of development than with pyro. If the negative was under exposed he had found it to come desperately dense. He thought some plates worked better with a little bromide, and agreed with Mr. Cembrano as to the desirability of using less soda.

Mr. DRESSER referred to the hydroquinone developer, which he considered useless for instantaneous work, but excellent for positives.

Mr. WOLLASTON inquired whether any member could suggest a practical means for varnishing film negatives (those on celluloid) that would not bear the heating required by spirit varnishes.

Mr. W. E. DEBENHAM suggested the use of a varnish recommended by Mr. Ashman, consisting of japaners' gold size diluted to a proper consistency.

Mr. COWAN thought that that varnish should answer well; it did not require heat, was perfectly impervious to water, and could be laid on with a brush. Another plan would be to use a water varnish, flooding the film with it whilst wet.

Mr. F. A. BRIDGE had found gold size diluted with turpentine form a splendid varnish for Eastman films.

Mr. WOLLASTON said that the tendency to curl of celluloid negatives might be overcome by flooding them with glycerine and water.

A question was read:—"What is the best position for an instantaneous shutter in the case of a lens having spherical aberration?"

Mr. DEBENHAM said, a shutter working between the lenses and opening from the centre.

Mr. R. J. EDWARDS endorsed this view.

The next question was:—"In the case of a lens having positive spherical aberration and used with a diaphragmatic shutter, should the focussing be done with full aperture?"

Mr. EDWARDS said that the diaphragmatic should be set halfway.

Mr. DEBENHAM considered that it should be in an intermediate position, but at what particular point would depend upon details not furnished in the question.

Mr. EDWARDS said that he found, and could prove on the blackboard, that with a passing shutter moving at a given rate, and having an opening of the size of the opening of the lens, there was just twice as much movement photographed when the shutter was close to the lens as when it was close to the plate. He illustrated his statement with a drawing.

Mr. DEBENHAM said that with an ideal shutter—one in which the opening and closing was instantaneous, and the time of remaining open only to be calculated—there would be no difference wherever it was placed. With a shutter having the small opening supposed by Mr. Edwards there would be for each part of the plate a longer exposure when used in the lens than when used next the plate; but, on the other hand, in the last case the plate would be exposed in sections, and the whole time of exposure would be much longer than in the other position. The effect of this was to falsify the result, so that a vertical object crossing the field would be represented as slanting instead of perpendicular. He held that the best form of shutter was one in which the time of remaining entirely open was long in proportion to the time of opening and closing, and that the position which allowed the shutter to be smallest, and, consequently, least liable to vibration, was for it to be close to the lens.

LEWES PHOTOGRAPHIC SOCIETY.

AUGUST 6.—The President in the chair.

It was decided that the future meetings of the Society should be held at the George and Dragon Coffee Tavern, High-street, where both ordinary and committee meetings could be held; and a vote of thanks was carried to Mr. J. M. Smith for lending the Glee Room for ordinary meetings, and also to the President for allowing the use of his room for committee meetings.

An excursion was arranged for August 15, the place selected being Barcombe Mills.

Particulars of the excursion to Sheffield Park on August 2 were given by Mr. J. Tunks. Six members attended and thirty-eight plates were exposed.

A discussion then ensued on *Defects in Plates*. Several members called attention to the marks on the edges of plates caused by packing with cardboard inserted between each plate. The excellent way in which Messrs. Thomas & Co. pack their plates was spoken of, and a wish expressed that other makers would follow their example. Other defects commonly found were discussed. A batch of plates by a well-known maker seemed to be very bad, several members bringing plates which had the gelatine film very much stained, one being a bright crimson; and it was proved that these stains were not owing to development but must be in the emulsion.

Several members brought negatives and prints.

The first annual meeting will be held on September 3.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

AUGUST 8.—The President (Mr. Paul Lange) in the chair.

Mrs. Matthew Webb, Miss M. Jackson, and Mr. H. S. Nicklin were elected members of the Association.

Mr. C. B. READER reported upon the excursion to Hawarden on Saturday, July 27. The party numbered about forty (including ladies). Arrangements had been made for wagonettes to meet the party at Chester to drive to Hawarden, where special permission to photograph had been obtained by the Hon. Secretary (Mr. J. L. Mackrell). After tea several groups of the party were taken. The number of exposures for the day were upwards of two hundred. It is intended to present the Right Hon. W. E. Gladstone with an album containing some of the pictures taken on this excursion.

The President had chosen this occasion for his prize medal, the conditions being that each member was limited to six exposures only, and that six results must be produced to be eligible for competition, the principal point in adjudication to be artistic selection of subject.

The PRESIDENT then stated that the Judges (Messrs. T. Comber, J.P., D. Cunningham, Talbot Kelly, and A. Cox) had unanimously awarded the silver medal to Mr. Mackrell, Mr. G. Latimer coming second in order of merit, this being the second consecutive year that Mr. Mackrell had won the medal for the outdoor competitions.

Mr. LATIMER exhibited his half-plate camera with an adapter he had made himself, enabling him to produce from quarter to full-plate direct negatives with the same. In reply to a question, Mr. Latimer stated that he only used a half-plate single lens for all his work. Stopping down, he found that good full-plate negatives could be obtained. He also exhibited several excellent pictures taken with this camera, including full-plate.

Mr. F. N. EATON exhibited several novelties, including camera stand with self-contained head and rigid adjustment for interior work, cutting shapes and table for making lantern masks, also a number of specialities, forwarded for exhibition by Mr. W. Tylar, Birmingham.

Mr. W. Tomkinson exhibited an instantaneous shutter made by Mr. H. S. Nicklin, an amateur of two months' experience, the special feature of the shutter being the great rapidity at which it could be worked.

Mr. J. A. FORREST then spent some little time in giving his ideas of the great advantage that would be obtained by the members, especially beginners in photography, in giving a course of short lectures during the winter months, demonstrated practically, one evening in each week, in the Association Rooms, on such subjects as art, optics, chemistry, &c., the Association being possessed of such excellent workers in all these branches, that there would (in Mr. Forrest's opinion) be no difficulty in arranging the same.

After a little discussion on this point it was resolved to leave it over for further consideration.

The Hon. Secretary distributed several samples of Mr. Oldham's dry powder developer.

The PRESIDENT made an apology for the non-attendance of Mr. W. B. Beaton who had promised to give a demonstration.

Correspondence.

Correspondents should never write on both sides of the paper.

AUGUST MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—SOUVENIRS OF DAGUERRE.—A RAPID SHUTTER.—A BANQUET AND SOIRÉE.—THE HOLIDAYS.—AN INSTRUCTIVE PROMENADE THROUGH THE PHOTOGRAPHIC EXHIBITION.—THE INTERNATIONAL PHOTOGRAPHIC CONGRESS: ITS FIRST MEETING AND ITS DOINGS.

The Photographic Society of France held their monthly meeting on Friday evening, the 2nd instant, M. Davanne in the chair. M. Balagny made a donation to the Society of negatives obtained at Bry-sur-Marne. These negatives, as well as the proofs, were examined with great interest, bringing to mind, as they did, the souvenir of Daguerre. One proof attracted particular attention. It represented the interior of a cathedral, and the Secretary gave the following interesting notes on the subject. It appears, said he, that the Village Council were in despair at having such a poor place for worship, and endeavoured in vain to raise a subscription to build a church worthy of the village. Daguerre, who was one of the members of the Council, offered to double the size of the church without the aid of the parishioners. His colleagues thought he had gone mad. On a fixed day they were invited to mass, and were surprised and astonished to find themselves in a church unknown to them. Daguerre had painted a canvas behind the altar representing all the columns and archways of a cathedral, in which the perspective was so artistically given that the illusion was complete. Daguerre had, as promised, doubled the size of the village church. The second view represented the exterior of the church. The third the entrance into Daguerre's residence—all that now remains, the house having been pulled down. The fourth, an artistically-made grotto, supposed to have been built by himself. The fifth, the reproduction of his tomb in the graveyard of the village.

M. Flenry Hermagis, the well-known optician, presented an instantaneous shutter placed in the centre of the lens. This shutter is, as it were, fired off by means of a trigger, and is reputed to be the most rapid in the market. M. le Commandant Joly sent a communication on coloured screens. It was recommended to employ in front of the lens a yellow-tinted glass made by a certain house in Paris, who have succeeded, it appears, in manufacturing a coloured glass of the right tint and quality.

M. Duchesne spoke on hydroquinone, and a discussion turned up on the two denominations, "pyrocatechin" and "brenzcatechin," but there was nothing new to be gleaned.

The President informed the members that 100,000 pigeons would be let loose on Sunday morning at nine o'clock in the Jardin des Tuileries—a good chance, said he, to do rapid work.

The President drew the attention of the members to the fact that the International Photographic Congress would hold their first meeting on Tuesday afternoon next.

The President then spoke of the forthcoming fête in honour of the fiftieth anniversary of the introduction of photography. A banquet and reception to take place on the 19th of August, under the auspices of the Society, the Chambre Syndicale, the Photographic Club of Paris, &c. &c. The price of admission to be thirty francs. This heavy sum will keep it very select, but will prevent many from fraternising and deprive them of the pleasure of joining their colleagues, which is to be regretted.

The President informed the members that the next meeting would be in the month of November.

The members of the "Chambre Syndicale de la Photographie," conducted by their President, M. Vidal, paid a visit to the Exhibition last week. The President pointed out and explained to the members all the different processes. No one could do this better than M. Vidal, he being the reporter of Class XII., and naturally his opinion goes very far on the subject. I will not state his opinion on the French section, but will quote the words of *Le Moniteur de la Photographie* as regards the foreign section. "They, above all, admired the artistic proofs of Messrs. Thomson and Vanderweyde, photographers, of London, as well as the polychromic proofs of Orell Fussli, of Zurich. The fine collection of the Geological Survey of the United States was also very much admired.

This impartial appreciation is the more to be noted as England held back as it were, and few would compete. As to quantity, the British exhibition of photography, as I said before, is not worthy of so great a nation; but as to quality, the exhibits, though few, are gems, and have drawn general admiration, which is in itself a consolation.

The system of going round in parties under the guidance of a competent person ought not only to be recommended but encouraged, as something good must come of such teaching.

"Le Congrès International de Photographie" held their first meeting this afternoon under the presidency of M. Janssen. In opening the Congress the President thanked the foreign members for coming so far to assist at the meetings, and welcomed them heartily. M. Pector, the Secretary, then gave the history of the Congress—how it came to be thought of, its failure at Brussels, and its resurrection in Paris. He stated that 300 members had subscribed towards the expenses. Very few foreign members were present. I observed Messrs. Warnerke, La Manna (from America); Gylidon (Sweden); Petersen (Denmark).

After having read the programme, the work began, not in the order as we find it in the preliminary report, but with the seventh and eighth

questions, the study of which was confided to the third commission—M. Léon Vidal, reporter.

The propositions of the commission were accepted; and voted without great difficulty as regards the seventh question. As to the eighth, many difficulties came in the way. In the first place, the Commission proposed that the prefix "photo" should always represent the action of light, natural or artificial, which was accepted.

That between that word and the affix "graphic" a word should be placed, representing the process employed; for instance, the designation photo-collo-graphic will replace such names as glyptographie, phototypie, autotypie, &c. This also was adopted.

An exception was made in favour of the word photoglyptie. A discussion here began. I expressed the desire, if an exception was admitted in favour of that process, that it should be called Woodburytype, in honour to the inventor. The President said that names of inventors could no longer be tolerated; photography takes no longer the name of Daguerre, &c.

The denomination "*Procédé au charbon*" had the honour of a long and painful discussion, no two being of the same opinion. As a half term, "*procédé au mucilage*" was accepted, although I endeavoured to insist upon its being called photo-collo-graphie *au poidres*; some long names, such as photo-chromatographie and photo-chromographie *à la sanguine*, &c., having been mentioned. M. Warnerke gave his opinion that it would be better to shorten rather than lengthen names; he would propose in that order of ideas to call hyposulphite of soda, hypo. "This shop language cannot be tolerated," said the President. M. Cornu proposed that the bureau should make a kind of photographic grammar as it were: in the first column having all the names known in photography, and in the second column the correction of such names according to the rules as set forward by the Commission.

Thus ended the first meeting. The second meeting is to begin tomorrow at two o'clock, at 76, Rue des Petits, Champs.

PROF. E. STEBBING.

LIMELIGHT MATTERS.

To the Editor.

SIR,—Your paragraphs about Brin's oxygen remind me that I have been anxious to ask those of your readers who are in the habit of using this gas for their lanterns what their opinion and experience is as to its *uniformity* of purity or quality since its introduction into regular use. My own, gradually and reluctantly arrived at, is that a great deal of the gas sent out contains twenty to twenty-five per cent. of nitrogen, and is seriously inferior in illuminating power to that made in the old way from chlorate of potash. Several experienced lanternists whom I have asked are of the same opinion, and I also know that at least two London opticians are seriously intending next season to resume the pumping of chlorate gas, if they can possibly manage it, at the sacrifice of considerable profit.

I would not be misunderstood about this. There is no doubt whatever that the Brin process *can*, and often does, produce practically pure gas. The very first lot I ever used of it was excellent in quality, and struck me as better than usual; but this quality would appear to depend a great deal upon the workmen who carry out the process. It is even possible that the impurity I suspect may not be very visible in ordinary lantern work, though several exhibitors have told me differently. But on several occasions during the past twelve months I have been annoyed by mysterious failures to get "a good light" with my projection microscope. One time the light would be very good, and at another time not, under circumstances which seem to me to point conclusively to the oxygen as in fault. I chiefly use gas from bags, for various reasons; and I have noticed that whereas with chlorate oxygen, and also whenever the light from Brin's is good, the hydrogen tap of the jet may be turned full on, and the oxygen has to be turned a little off to balance it for the best light. Whenever I am disappointed in the light, the oxygen has to be turned full on, and the hydrogen turned considerably off to balance it. I fear this leaves no other conclusion open than that the oxygen is considerably diluted, and my object in mentioning the matter is the hope that doing so may lead to greater care being taken to keep up the quality than seems to me to have been sometimes the case. That the gas is *often* all that it should be I know perfectly well, and we all owe so much to Messrs. Brin for cheapening the cylinder supply that it would be a grievous pity should occasional carelessness cause any permanent want of confidence in it.

Zirconia.—Your old correspondent "Free Lance," some little time ago, mentioned with interest a new preparation of zirconia in discs, in platinum capsules, as supplied by Messrs. Schmidt & Haensch, of Berlin. I am sorry to say that much cannot be expected of them so far as illumination is concerned. They only cost ten shillings each—a moderate enough price—and are very convenient for many purposes. But though the reddish colour of ordinary zirconia has been got rid of,

and the thin disc undoubtedly gives a better light than the end of a plug as tested by me before, I am sorry to have to report that the light is still not more than half that of a good lime under a powerful jet. I am glad of the disc for some things, but as an intense light it is a failure.

Messrs. Newton and I have since tested yet another sample—the fifth which has passed through my hands, of quite independent manufacture—also hailing from Germany. This was in plugs, used on the end, and was very dry and friable in texture, but shrank rapidly at first under the jet, showing that it had not been perfectly dehydrated. I feel sure it was not zirconia alone, for not only was there no reddish tinge to the light, but there was not the extreme non-conduction of heat we had always found in zirconia samples; the incandescence extended very much farther back, and there was no apparent separation of a thin disc. Whatever the mixture may have been, it was a decided improvement, and we were both of opinion that while the light was still very far less than that of a lime tried at the same time, this was the best sample we had ever had. The plug was only about three-eighths of an inch in diameter, and this surface was not enough to develop the power of the jet, and we were of opinion that if the sample had been made into a thin disc of larger diameter (which would, however, require a platinum capsule to keep it from falling into powder), it would have done considerably better. We were about to suggest this to the German manufacturers, when we were told that the whole matter had been transferred to the Brin Company. I hope, therefore, that we may hear of it again from them, and give this hint as to the best form for it, because my experience of zirconia has now been pretty considerable.

LEWIS WAIGHT.

August 10, 1889.

A "ROYAL" PHOTOGRAPHIC SOCIETY.

To the Editor.

SIR,—I beg through the columns of your valuable paper to make a suggestion which to me seems particularly appropriate at the present time. The Photographic Convention of the United Kingdom will shortly meet in London to celebrate the Jubilee of photography. I suggest that the members of the Convention use their influence to obtain the permission of Her Most Gracious Majesty to form a Royal Photographic Society on the same lines as the Royal Microscopical, Astronomical, and other scientific societies. I feel that the claims of photography for the formation of such a society are very great, and that the carrying out of this suggestion would only be productive of good results. Recent advances in our art-science have given an immense impetus to the trade of the country, and further discoveries will no doubt tend to increase this trade.

A further inducement to increased labours in this direction would be added by offering as a reward for advances and discoveries a Fellowship of a Royal Photographic Society. During this the Jubilee year, photographers could do nothing better to show their appreciation of our art than by forming such a society, the many advantages of which it is not necessary for me to mention here. Trusting that this suggestion will meet with the approval of your readers,—I am, yours, &c.,

Moseley, Birmingham.

JOHN HALL EDWARDS, L.R.C.P.

MR. PRINGLE AND STEREOSCOPIC PHOTOGRAPHY.

To the Editor.

SIR,—I am sorry to have to ask to occupy your space once more in this matter, but Mr. Pringle makes some distinct charges against me which, with your permission, I will answer as briefly as possible; I shall then have written the last word I intend to write on the subject.

(1.) Mr. P. says: "I deny having made any such statements, or any statements bearing such construction as Mr. Heywood put upon them; and I challenge Mr. Heywood to produce the passages where he finds the statements he fathers on me." I accept the challenge, and give Mr. P.'s exact words along with my words which Mr. P. repudiates; it is unnecessary that I should do more.

(2.) Mr. P. says: "Further, he attempts to make out a case for the stereoscope as an instrument conducing to artistic effect simply by holding up statements of mine—partly paraphrases of mine—to ridicule." I did nothing of the kind; I never mentioned artistic effect either directly or indirectly. In my letter last week I mentioned that Mr. P. seemed to complain that I had not done so, and he complains again that I "decline the challenge." I dealt with the stereoscope, which the article professed to deal with, and with nothing else. In the remarks I made at the Manchester Photographic Society, which has produced this correspondence, I confined myself to Mr. P.'s article, which I found printed in the most prominent place in the paper. Except from the mention of it in the article, I knew nothing of the controversy that was being carried on between himself, Mr. Chadwick, and "F. M. S.," and I know nothing of it now. I took the article as I found it, headed *Stereoscopic Photography*, and I am not going to be driven from that subject into another, even by the sneers of the writer of the article himself.

In contrast with myself, Mr. P. says, "Mr. Chadwick is well up in the subject" (he does not say which of the two); and I am glad to be able to

agree with him, whichever he may refer to. I will agree with him whenever I can. He also says that "he (Mr. H.) confesses that he knows nothing," again, I think, alluding to the "artistic effect." I was not aware that I made the confession, but if I did I am glad I did. An old Greek philosopher, speaking of another person, said, "He fancies he knows something, although he knows nothing; whereas I, as I do not know anything, so I do not fancy I do. In this trifling particular, then, I appear to be wiser than he because I do not fancy I know what I do not know." Perhaps Socrates' words may fit this case.

Now for the passages I have misquoted. Under my own name I place all the passages in my remarks which either make an assertion or use a quotation.

HEYWOOD.

In the number dated June 13 would be found an article signed "A. P." on the subject of *Stereoscopic Photography*.

Mr. P. began by announcing that he was about to write a strong communication, at least one which should not be charged as being "weak and misleading."

The article professed to be on the stereoscope, but it was almost as much on binocular vision; and Mr. P. seemed to complain that the Almighty had given men two eyes when (as we may presume he argues) one would have done better. "The true effect," he says, "of atmosphere or distance is to be attained not by more or less looking round corners, which almost describes binocular vision, but by—" something else, no matter what.

Instead of a stereoscope for producing the illusion of solidity, let a person look at a photograph or a painting through a pinhole and he will have "quite as much [of solidity] as is good for him."

Mr. Pringle objected that "a short lane of trees is often by a stereoscope made to look miles long (!), and this illusion can be produced at will if the worker has any intent to beguile."

Therefore, argues this guileless writer, the stereoscope ought to be discountenanced and classed among other toys like "Rupert's drops, Pharaoh's serpents, suckers, &c."

A stereoscope "might interest a scientific observer for a few times," and "might astonish a child or a savage for a few times," and so on.

But the climax of absurdity is reached when Mr. P. declares that he has not looked into a stereoscope for many years.

PRINGLE.

Thursday, June 13, 1889.
STEREOSCOPIC PHOTOGRAPHY.

Our "F. M. S." is doubtless quite well able to defend his own position, but the stereoscope is a pet version of the present writer, and we trust the genial writer who alludes to the article of "F. M. S." as "weak and misleading" will not have the opportunity of calling our remarks weak, whatever other epithet he may apply to them.

The true effect of atmosphere or distance is to be attained, not by more or less looking round corners, which almost describes binocular vision, but by gradation of tones and proper massing and contraposition of lights and shadows.

But if any reader desires an illusion of solidity he may get it to a certain extent by looking at any photograph or painting through a small hole, made, for instance, by bending his forefinger into more or less of a circle and looking through the little hole inside the circle. He will then see some solidity, not so much as in a proper stereogram, but quite as much as is good for him.

A short lane of trees is often by a stereoscope made to look miles long, and this illusion can be produced at will if the worker has any intent to beguile.

We have no wish to deery the stereoscope in its own sphere—i.e., as an educational or scientific toy. Rupert's drops, Pharaoh's serpents, suckers, gyroscopes, model engines, tobacco-pipe gas factories, shilling telegraphs, pith mannikins, electric cannons, all have their uses; while the kaleidoscope is an intellectual, instructive, varying, and perhaps artistic source of edification.

When we look by a stereoscope at a stereogram, if the instrument and the "picture" are as they ought to be, we see an appearance of solidity, an effect of distance which might interest a scientific observer for a few times, which might astonish a child or a savage for a few times. The effects of solidity and distance may be—often are—grossly exaggerated, so much the more striking and the more educational the experiment. But beyond an optical experiment or an "illusion of reality," it never goes nor can go.

Stereoscopy is entirely distinct, essentially, from "aerial effect" or "atmosphere." Our impression is that the stereoscope destroys any "atmosphere" there may be in the prints. It is long since we looked through a stereoscope, but our recollection is that even if our prints seen with the unaided eye showed "atmosphere," that "atmosphere" vanished under binocular observation.

Mr. Pringle says he did not make the statements as I use them, so we may take it that at any rate he did not mean them, and there's an end of it as far as I am concerned. As he has bated so much of the length of his fish I do not mind knocking off something from the size of my tiger, and will say that his article is not a libel on the stereoscope, as a libel to be a real libel must be wilful.

And now I hope I may venture to look again through my stereoscope. Into it for the last thirty-five years or so I have never looked without wonder and delight, and so long as I live, and am blessed with binocular vision, I trust this same marvel and this same delight may remain with yours, &c.,

ABEL HEYWOOD, JUN.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

To the Editor.

SIR,—Allow me to announce that the Opening Meeting will take place on Monday evening next at St. James's Hall, at six o'clock. The proceedings will include the Opening Ceremony and President's Address, Conversation, and a Lantern Exhibition. Members are entitled to one lady's ticket admitting to the opening meeting on application. Excursions have been arranged as follows: Windsor Castle and Town; Richmond and Hampton Court; Kew Gardens and Observatory; Boat Excursion (down river); Greenwich Hospital. Permission has been obtained to photograph at all the above places.

Papers will be read each evening, followed by a lantern entertainment. Tickets of membership and programmes can be had on application at Tree's Office, St. James's Hall, or to, yours, &c., J. J. BRIGNSHAW, 128 Southwark-street, London, S.E., Aug. 15, 1889. Hon. Sec.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

J. H. MANN.—Thanks. Will you kindly undertake such an article?

CAUSTIC.—Dishes varnished in the manner described will answer every purpose.

CHAS. STEVENS.—Surely it is a mirage; the effect is so singular that we must devote some time to thinking it over.

WILLESDEN.—See leading article on another page. All the patents have expired, your informant to the contrary.

DUNCAN, Stafford-street, Oban, requests "A. Y. F." to write to him anent *Researches on Light*, if not already suited.

E. Y.—From the appearance of the prints we think they must have been tampered with; but it will be very difficult to prove this.

WILLOTT.—Gelatine dissolved in a minimum of water, with an addition of alcohol, forms a mountant that does not cause much cockling.

M. O'MALLEY.—Probably if the plates are kept for a few weeks they will lose their frilling propensities; in the meantime there is no remedy but alum.

A. PRITCHARD.—Sea water will not answer for washing negatives or prints unless it be distilled. Better make friends of the steward and obtain fresh water.

S. E. A.—The presumption is that there is no gold in the old toning solution, but if there be it may be precipitated by adding a solution of ferrous sulphate.

H. B.—In copying such a painting as you describe you will certainly find it advantageous to employ an orthochromatised plate with a yellow screen, not too deep a tint.

C. W. LEE.—The properties of the material are similar to those of all developing agents. It is one of the naphthalene compounds, but its makers have not published the mode of manufacture.

B. E. J.—If you will send us an example of your failures in making enlargements on bromide paper, we shall be able to judge where the fault lies. From your letter we can form no idea whatever.

W. S.—How can you style yourself an amateur and at the same time ask us if we consider your charges for portraits reasonable? The prices seem fair, that is if the work is equal to that of professionals who charge similar prices.

J. WILSON asks which is the better method of making enlargements for cheap pictures—collodion transfer or bromide paper.—The latter, certainly. Collodion transfers are only made on a limited scale now, bromide paper has superseded them.

LUX.—The precise lateral dimensions of the mirror could easily be ascertained by drawing on a sheet of paper a line representing the length of the negative, and then from a point representing the centre of the lens drawing lines touching the end of the negative line and prolonging them to the place where the mirror is to be situated. We think that a mirror about twenty inches wide would serve every purpose.

OLD SUBSCRIBER.—The white spots seem to us to be air bubbles. To prevent them, raise up the paper from the sensitising bath after it has been on it for half a minute and rub the surface with a tuft of cotton wool, afterwards refloating the paper.

FERO-TYPE asks: "Is there any developer for producing pure blacks and whites, and if sensitising solutions are ever used for producing sharpness in ferrotype portraits?"—We are totally unable to understand what is meant by either of these queries.

OUTDOOR.—If you use the vehicle exclusively for business purposes it will be exempt from duty, and you will not require a license; but if you employ it for pleasure, even if only occasionally, then the case is different, and the "trap" becomes liable to duty.

B. J. COX.—The article being patented, you will not be able to construct it for your own use without permission of the holder of the patent. The mere fact of your making the apparatus yourself does not absolve you from legal proceedings for infringing the patent, as you appear to imagine.

NIMROD.—It is quite impossible to indicate the quantity of magnesium that will be required for your group. A suitable means of using it would be to form the magnesium into a taper of five or six strands, and burn as many inches of it as may have been determined by a previous trial.

S. B. J. says: "I remember a few years ago a clearing solution under the title of the 'J. C.' clearing solution was introduced, which at the time was said to be very good; can you give me the formula?"—The "J. C." clearing solution is simply alum, two ounces; citric acid, one ounce; water, ten ounces.

G. G. PERRY.—The best plan will be to copy the faded print, getting the best possible negative from it; then retouch the negative. Or an enlargement may be made, and that worked up in monochrome and afterwards copied to the size required. This, on the whole, will be the better method of procedure if many copies are required and price is not an object.

FELIX asks if ordinary gas pipe—"compo pipe"—will do for the worm of a still he is making for the purpose of distilling water for photographic uses.—What is known as compo pipe is not good, and should be avoided. Fine piping will answer. It may be obtained at the wholesale gas fittings warehouses. It is somewhat more expensive than the commoner article.

A. GOULD.—Eighteen feet is too short for a studio, to work comfortably in. With such a length only lenses of the shortest possible focus could be used in taking full-length figures. As there is said to be plenty of space, the building had better not be less than twenty-five feet long. A few feet more would be a convenience in taking groups. The other proportions are very good, except, perhaps, that the roof might be made a foot or so higher.

RECEIVED.—Wilfrid L. Spence, William H. Rau, C. Alfieri, and others. In our next.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—The usual Thursday evening meeting of the above Association will not be held on the 22nd instant, next week being Convention week.

PHOTOGRAPHIC CLUB.—In order that the members of this Club may have an opportunity of attending the Photographic Convention at St. James's Hall, the usual meeting at the Club will not be held on August 21, 1889. Saturday outing at Broxbourne.

IMPORTANT TO PHOTOGRAPH ENLARGERS.—At the Portsmouth County Court, before his Honour Judge Leonard, the Eastman Dry Plate and Film Company, Limited, were sued by a Portsmouth firm of photographers, Messrs. Symonds & Co., High-street—a firm in a large way of business—for 10*l.* damages. Mr. Browne, who trades in the name of the firm, alleged that four negatives which he handed to Mr. Bellsmith, the defendant Company's traveller, to enlarge were meant to be conveyed by that gentleman to London. Instead, however, the traveller consigned them to the post, with the result that they were broken. He valued the negatives at least at 25*l.*, as he had received orders for that amount already from the sitters. One, he said, in answer to Mr. M. Hyde, his solicitor, was the portrait of a middle-aged lady, and he added, amidst laughter, middle-aged ladies valued their negatives more as time proceeded. Cross-examined by Mr. Hume-Williams, barrister, who was for defendant, he said they were not photographs of celebrities, but of people in a first-rate position. Sometimes they had duplicates of negatives, but they had none of these. The negatives were packed in a cardboard box, which was in turn enclosed in a wooden box. Mr. Williams, for the defence, contended that the traveller merely posted the negatives to oblige plaintiff, as when he called they were ready for the post. He posted them exactly as he received them, and when received at London they were not in a wooden box. If judgment were given for the plaintiff, it would be useless for them to attempt carrying on business under the circumstances. Mr. Bellsmith swore that the negatives were not enclosed in a wooden box, but admitted that when he posted them he thought them safe. His Honour gave judgment for plaintiff for 3*l.*

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1529. VOL. XXXVI.—AUGUST 23, 1889.

WARM TONES IN DEVELOPED PRINTS.

At a recent meeting of the Photographic Society of Great Britain, Mr. Warnerke spoke of a method of securing warm tones similar to those produced upon "Alpha" paper with the ordinary gelatino-bromide papers of commerce. The plan consists in developing in the ordinary manner, and after chlorising—or converting into chloride of silver—the image so obtained, redeveloping with a feeble developer, such as is usually employed for such tones.

Between six and seven years ago we made a large number of experiments with this identical method, being led thereto by an article by Mr. H. Y. E. Cotesworth on *Pleasing Tones with Gelatine Transparencies*, under date February 23, 1883. The details of the method described in that article as applied to transparencies were as follows:—A comparatively slow and clean emulsion was prepared in the first place, and an image produced by any suitable developer. After thorough washing, the plate was treated with, preferably, a solution of chloride of copper until thoroughly "bleached," after which it was again well washed. Then, after a more or less prolonged exposure to the light, according to the warmth of colour desired, the image was again reduced by means of a weak developer of citrate and oxalate of iron combined, as then used for chloride plates.

Practically, this is precisely the process sketched out by Mr. Warnerke, only that his is intended for use with paper, and not glass. In place of the ferrous citro-oxalate developer of six years ago, too, Mr. Warnerke substitutes a very weak solution of ferrous oxalate or of hydroquinone, both well restrained, as is now commonly understood, otherwise there is no perceptible difference.

Though the difference between the application to paper and to glass respectively does not apparently present any theoretical variation in principle, yet in practice there is a very wide divergence in the results obtained, or, at least, in the ease with which the desired warm tones are secured. This arises from the nature of the two classes of image, and is easily explained by a brief reference to the *rationale* of this mode of development.

All who have practised with chloride or Alpha papers in conjunction with any of the weak developers intended to give warm tones, will have noticed that in its early stages the image is invariably of a strongly marked red or pink tint, but that in proportion to the time the developer is applied, so does the colour gradually change to black. It is necessary, therefore, to so prolong the exposure of the plate that the developer shall act quickly through a sufficient depth of the film to give the necessary vigour without running out the black tone.

It is well known that the film of sensitive material upon

paper or opal glass must be, in order to give the best results, very much thinner than is the case with negatives, or even transparencies. In these latter cases, a certain thickness of layer is absolutely necessary to give strength of image, while a positive on an opaque basis requires but the faintest deposit to give the necessary depth without heaviness.

It is clearly to be seen, then, that a developed positive image on paper is in the best of conditions to secure the desired result. A sufficiently long exposure being given to produce the red tone, the action of the developer is complete, that is to say, has penetrated the whole, or nearly the whole, thickness of the sensitive layer before it has time to produce the black colour. But in the case of a transparency, with its much thicker layer of material, no matter how long the exposure may have been, the penetration of the developer into the film, in order to give the required extra depth, is so slow, comparatively, that the silver first reduced at the surface passes into the black stage before the process is complete; and though the underlayers, if they are laid bare, which is not difficult, will be found to possess the red tint, the *tout ensemble*, as viewed by transmitted light, is a tone approaching in all probability closer to black than to red.

With collodion images the difficulty in getting the warm tones in transparencies is much less owing to the greater rapidity of the action of the developer as compared with gelatine; indeed, with collodion it is possible in this manner to produce almost any warmth of tone that can be desired or imagined.

Since Mr. Warnerke's reference to the process, we have repeated our trials with bromide paper, as well as with a suitably prepared bromide emulsion on opal; and with both ferrous oxalate and hydroquinone, properly diluted, have gained first-rate results, capable of being toned with gold as readily as an ordinary albumen print.

Chloride of copper—made by mixing solutions of sulphate of copper and common salt—is perhaps the most convenient bleaching solution, but we have succeeded equally well with bichromate of potash to which a few drops of hydrochloric acid have been added.

ECONOMY IN THE PRINTING ROOM.

GENERAL RESIDUES AND SAVINGS.

"I HAVE only received a few shillings from the refiners for a parcel of paper cuttings weighing many pounds, please advise what steps to take," is a sample of a kind of letter received in scores, and our articles on economy would be incomplete if we did not refer to this phase of the subject, though it has

repeatedly been treated in "Answers to Correspondents." As a preliminary, we would say that if our readers would bear one fact in mind, it would be the explanation to this and other apparently anomalous results: The refiners who undertake this class of work—the extraction of the precious metals from photographers' waste—charge not upon the weight of the metal extracted for their clients, but upon the weight of the material it is extracted from. No prominence has hitherto been given to this important factor in residue collecting, but, as may easily be seen, it governs the whole question when small percentages are under consideration. It has long been known that gold exists in large quantities in the semi-rock formations in this country, but the same reason that has prevented the extraction of gold from this source operates in the printing room. In the cuttings from finished prints there is, in the aggregate, a considerable amount of silver and gold; but it is rarely present in quantity enough to render its extraction worth while. We may give it as the experience of many in a fairly large way of business, that finished print clippings are best used to light the furnace with. There are dissentients to this opinion, but it fairly represents the average. Of course, when all silvered paper, waste prints, unwashed and untuned, &c., are reduced at one time, the aggregate will represent a good round sum; it will generally be found, however, that if all the cuttings of finished prints were kept out the total amount to receive from the refiner would be no less, and often more.

It will be observed we are taking for granted, all through this series of articles, that the residues are not reduced at home, and this simply because not many photographers possess either the convenience or the skill desirable in undertaking chemical operations of this kind. Where these conditions do exist, the extraction of silver from the various sources named is an interesting operation. In some hands it is profitable also; but when against the refiner's charge, which will not average above five per cent. on well-collected residues, there is set the cost of fuel, crucibles, fluxes, loss of time, wear and tear, and occasional loss through accident, economy will often be found to lie on the side of employing a refiner.

When we speak of five per cent. as an average cost on well-collected residues, we do not refer to cases where all the dust and rubbish of the room is swept into the collecting vats, and where any kind of paper is allowed to find its way into the receptacle for silver paper. We knew, for example, of a case where all the wrappings of the gelatine plates were, for the sake of "tidiness," all thrown into the box set apart for collecting silver paper, and where, likewise, all filter papers, from whatever source, were deposited.

What is desirable is that every bit of silvered albumenised paper, every filter paper used for filtering silver and gold solutions, and all waste prints unwashed, should be saved and kept apart. We have seen walls scraped periodically near which paper had been sensitised in quantity; we have seen floors occasionally planed in similar circumstances; and quite recently we had submitted to us a piece of wood from a bench top that had supported the floating bath for some years. The wood felt almost like lead, it was so saturated with silver, and the actual sum obtained for its owner, who had the curiosity to have it separately assayed, was at the rate of close upon five shillings per foot, superficial! It was worth while taking any bench top pieces to obtain such a result as this, though, again, it would, of course, be foolish to do so unless there were very strong presumptive evidence of the presence of a considerable amount of metal.

With our observations in view concerning the refiner's charge being based upon the weight of material received by him, and not upon the silver obtained, our often tendered advice to burn clippings and waste before sending to the refiner's will be seen to be founded upon a very solid basis of fact. It will lessen the charge to a most considerable extent. But not only here will economy step in, for railway carriage charges will be reduced when the photographer lives away from the large centres, and has to send his residues by rail. Here let us interpolate a little advice: If there is the slightest reason to anticipate that the value of the parcel sent is over ten pounds, it must be decreased and paid for, as unless this is done the provisions of the "Carriers Act" will come into force; whether justified by law or not, the companies will decline to pay anything at all if a lost parcel be over ten pounds.

We will not here discuss the legal point, we simply advise the best plan to pursue. We were recently told by the representative of one of the largest refiners in the country that a bag of silver paper was missing, and upon inquiry was found to have been invoiced as an empty. At the *dépôt* it was assumed that the contents were waste paper, and they were emptied amongst a heap of refuse and lost! To narrate this is sufficient warning "what not to do." We have now finished treating the question of residues, and will in our next article look upon the subject of economy from an entirely different standpoint.

THE Photographic Convention for 1890 is fixed to be held in Chester, as a locality near to and easy of access by Liverpool and Birkenhead photographers, and as an admirable centre for attractive excursions.

IN his admirable historical *resumé*, given in course of his presidential address at the opening meeting of the Convention on Monday evening, Mr. Pringle has—of course quite unintentionally—omitted giving due credit to one by whom the preparation of gelatine emulsion was so far improved as, in a practical manufacturing sense, to have been in a sense revolutionised. Mr. Charles Bennett was most unmistakably the first to publish a method by which the extreme sensitiveness now characteristic of the gelatine plate was obtained, but his method necessitated a "cooking" of the emulsion which spread over several days. This, it can readily be seen, interposed a serious difficulty in its preparation. But this difficulty was overcome by Mr. W. B. Bolton, who in 1873 proposed a modified method of arriving at a sensitive result in a short period. This he did by subjecting the emulsion to a moderately high temperature for a few hours. This was published in our pages at the time. Its influence was so important on the preparation of highly sensitive emulsion that we think it right that due credit should be given in as public a manner as possible to Mr. Bolton, whose name has in this connexion been omitted from Mr. Pringle's list. Those who wish to have a "full, true, and particular" account of the history and progress of both collodion and gelatine emulsion photography are referred to the leading articles in our ALMANACS for 1879 and 1880.

WE have frequently advocated the more extended employment of photography in cases of litigation; but now we fear in this direction it is falling into ill repute. It appears some of the Courts will not now receive it in evidence of personal identity. In the recent Maybrick case, the Judge refused to receive a photographic portrait as evidence, remarking that as the Divorce Court did not accept photographs, he would not. If photographic portraits are not to be received as a means of identification in the Superior Courts, why should they be accepted in the Criminal Courts? The identity of many criminals is established by means of photographs taken of them while previously in jail. This being the case, it may be asked, Why should photographs be accepted in one case and rejected in another? Possibly retouching, or rather that class of it which destroys all likeness and renders the faces of human beings like those of the wax

figures one sees in hairdressers' shop windows, may have something to do with this.

In the trial above alluded to, much in the medical evidence turned upon the post-mortem appearance of certain portions of the viscera. Had photographs been taken—on orthochromatic plates perhaps—they might have proved of much assistance. The presence, or absence of certain spots or markings would have been beyond doubt. In such cases it is manifest that the negatives must be taken by one who is skilled in this particular class of work, and, furthermore, that they must be absolutely untouched.

PHOTOGRAPHY is employed extensively in illustrating pathological works; but it goes without saying that a few touches of the pencil by one ignorant of the subject might be the means of entirely altering the character of the appearances. In such a case, photography, instead of being an assistance, might become positively misleading.

THE better class of illustrated periodicals are making more and more use of process blocks. Some of these are really very good, and others are just the reverse. When the blocks are made from drawings specially made for the purpose, as a rule the result, if well printed, is excellent; but in many cases where the blocks are made from negatives from nature, they seem to be, more or less, failures. The uniform network, or the dots, give the work too mechanical an appearance; furthermore, more often than not it clogs up in the printing. This is well exemplified in some of the recent issues of the illustrated papers. By the way, we have seen some excellent woodcuts which have been considerably marred by the introduction in the background of a mechanical network similar to that in photo-blocks. It would almost seem that engravers were imitating photo-engraving.

THE Photographic Society of India has announced its intention of holding its third annual exhibition. Particulars of exhibits must be sent to the Executive Committee not later than October 15, but English and European exhibits should be dispatched not later than October 1, those from America being sent a fortnight earlier. All pictures and apparatus must be sent, carriage paid, addressed to the Exhibition Committee, 29, Chowringhee, Calcutta. Medals and certificates of honourable mention are to be awarded, should the judges deem the exhibits of sufficient merit.

In the French Chemical Society's Bulletin, pyrogallol and sulphite solution was recently recommended for a new use—a reagent for detecting copper. M. Aliamet having stated that a saturated solution of sulphite of soda containing a little pyrogallol struck a pink colour with salts of copper. Every photographer is acquainted with the peculiar but evanescent pale rose colour taken by pyro-sulphite solution when mixed with water, and Messrs. A. & P. Buisine have shown that the copper reaction is quite useless—that any salt solution will produce the pink tint; even distilled water is sufficient for the purpose, with the familiar effect we describe above. They explain that the colour is due to the oxidation of the pyrogallol in the sulphite solution, which is always slightly alkaline. What is really remarkable, they say, is that colour should be produced in the presence of sulphurous acid.

THE CONVENTION.

ACCORDING to previous announcement, the Convention held its opening meeting on Monday evening. We noticed, among those present, many members and friends from not only various parts of England, but also from Scotland and Ireland. This is, perhaps, the more remarkable, inasmuch as the general feeling is that the time selected for the meeting this year has not been that which would have best suited the general convenience of the members, many of whom can much better spare a week in June or early July than in August.

There is a fine show of pictures and apparatus of the most improved forms in the hall, of which we shall speak further on.

At half-past seven the Council took their places on the platform, and the meeting was constituted by the retiring President, Mr. J. Traill Taylor, who was in the chair, formally vacating it in favour of the new President, Mr. Andrew Pringle, by whom it was assumed, and who then, after a few preliminary remarks, addressed the meeting as follows:—

I am aware that the President of a learned or artistic body, on an occasion such as this, is usually expected to deliver a weighty address on some subject chosen by himself as being specially within his province or specially congenial to his taste; but in this year, the fiftieth, as I hope to show, of practical photography, the course clearly indicated for me to follow will be to trace before you the history of photography from its birth as a practical science to this, its "jubilee" year. A more momentous story, more gigantic and sudden strides, more at once of patient labour and of brilliant genius, will not be found to mark the history of any science than that of photography. If any science can be compared in these respects with photography it must be that of spectroscopy, and the two have, for evident reasons, gone hand in hand together.

It is difficult to realise here and now that fifty years ago, had the whole world been searched, half a dozen men could not have been brought together able to start or discuss any topic concerning photography, while in this country alone we have now at least ninety societies, numbering many thousands of members, every one more or less conversant with some of the many photographic processes in use in our day. I have been unable to ascertain with anything like exactitude the number of persons now actually engaged in the production of photographs, in the manufacture of photographic materials, in photography as a livelihood, as a recreation, and as an adjunct to other sciences. I can only say that to-day photography supports, amuses, and helps tens of thousands in this country. Let us now look back fifty years.

In 1839 Louis Jacques M. J. M. Daguerre, after many years of labour, partly in collaboration with Joseph Nicéphore Niepce, obtained from the French government a pension for the production of the process we later knew as Daguerreotype. It is said that in January, 1839, Daguerre communicated the details of his process to Arago, a famous scientist of that time, but what we know is that on this very day, the 19th of August, fifty years ago, and probably about this very hour, Daguerre's process was fully divulged to the Académie des Sciences in Paris. But it would ill become me, for the sake of "making a point," to ignore the claims of our own countryman, several of whose processes we are working to this day, while Daguerre's process was never known to most of us, and was long ago relinquished by all of us who ever knew it. On the 25th of January, 1839, the great chemist, Faraday, described to the Royal Institution Fox Talbot's process of photogenic drawing, and on the last day of the same month Talbot himself read a paper on the same subject before the Royal Society, saying that he had produced results practically the same in 1835. Talbot used sodium chloride and silver nitrate on paper, these salts being not unfamiliar to us at the present time. And, farther, when, in 1841, Talbot's claim for patent protection was opposed, it was proved that the Rev. J. B. Reade (the "good old rector," as I have heard him called) had during, if not before, 1839 sensitised his wife's white kid gloves with silver chloride, and, as a result of these experiments, had been led to use galls to render the action more rapid. Talbot's claim in this case was upheld, but in 1843 he made a less successful application for protection, when he claimed the use of sodium hyposulphite as fixing agent; but it was clearly proved that in 1839 Sir John Herschel had shown the use of our familiar "hypo" in photography, having many years previously discovered its solvent action on silver haloids. During 1839, too, Herschel used glass as a support for his sensitive film, though it was not till later that a "vehicle," as we now call it, was used to bear the sensitive salts on the glass. Dr. Pye, in 1839, sensitised paper with sodium phosphate; and, lastly, in this same year Mungo Ponton published in Edinburgh his experiments on the action of potassium chromates on gelatine. Either in 1839 or 1840 *sel d'or*, the hyposulphite of gold and sodium, was used as a toning agent for Daguerreotype plates. Thus we have not only the Daguerre process, but the silver chloride process, a development process, the fixing process, the use of glass, the principle of a vast array of gelatine printing processes, and, perhaps, the foundation of our toning process, all bursting upon the world in one year; and surely I may say that we celebrate with justice the jubilee year of photography.

I must not weary you with details too minute of the course of events following these I have mentioned. I will try merely to point to the most conspicuous landmarks of our history. 1840 saw bromide, and 1841 chloride, added to our silver haloids, the former by Goddard,

the latter by Claudet. Claudet was one of the two photographers then in business in London; Edinburgh had a photographer, Birmingham had one, and in Britain there were only these four.

In 1841 the term "negative," now so well known, was first used by Herschel, and Petzval designed lenses having their visual and actinic foci coincident.

Talbot's calotype process held sway for some years; until 1850 the paper constituting at once "vehicle" and "support" was not even waxed.

We now come to a very important era. In 1849 Le Gray suggested that collodion might furnish an excellent *menstruum* for our silver salts, but the general opinion is that the credit of the collodion process is due to Fred Scott Archer, who certainly used the wet collodion process in 1850, and published his method of using it in 1851. But our friend W. K. Burton has heard the late J. G. Tunny, of Edinburgh—who was a patriarch in photography—say that before Archer's publication Le Gray furnished him—Mr. Tunny—with a practical collodion bath process, and, further, that Le Gray developed with sulphate of iron. For many years wet collodion reigned supreme, and with good reason, for it was a process capable of yielding the very finest results. But the inconveniences attending the use of this process, the vaporous exhalations and the staining propensities of the bath solution, as well as the necessity for cumbersome tents and other paraphernalia, set a cloud of experimentalists to search for some method to obviate these troubles. From Taupenot's process, 1855, to Abney's albumen beer, 1874, much valuable work was done, but in the opinion of most competent judges not one of these processes, not one, indeed, of all the other collodion processes, yielded results equal, on the whole, to the wet collodion process.

The first photographic exhibition was held at the Society of Arts in 1852; the first photographic society was the Photographic Society of London, dating from 1853; the first public photographic periodical was THE BRITISH JOURNAL OF PHOTOGRAPHY, which started as a monthly in 1854.

The next era with which we have to deal was that of collodion emulsion. On September 9, 1864, B. J. Sayce and W. B. Bolton published their unwashed collodion emulsion process; soon after this Sayce seems to have retired from the photographic world, but Bolton has from time to time ever since shone out in some new or improved process. In 1874 he gave us his process for washed collodion emulsion whereby, instead of having to wash each coated plate, we were enabled to wash our emulsion in bulk, and, further, to preserve it in the dry state for a long time.

We have it on record that in 1868 W. H. Harrison made an emulsion with gelatine, silver nitrate, and cadmium bromide and iodide. Mr. W. Jerome Harrison in his admirable *History of Photography*, to which I am indebted for much valuable information, mentions this experiment of W. H. Harrison, and rightly points out that most writers have overlooked this fact of an early attempt at a gelatine emulsion. [Extract from BRITISH JOURNAL was read.] THE BRITISH JOURNAL OF PHOTOGRAPHY, September 8, 1871, contains an article by Dr. Richard L. Maddox, proving for the first time that gelatine emulsion was a fact practicable and accomplished.

A word on Dr. Maddox—my guide, philosopher, and friend. Though for over forty years he has suffered from a distressing malady—always in discomfit, often in agony—these forty years, and more besides, have been wholly devoted to science, and the results of these labours have been ungrudgingly given to the world without thought of gain, and with too scanty recognition.

In 1873 we find Burgess advertising gelatine emulsion, and Kennett obtaining protection for a gelatine emulsion pellicle requiring only to be melted and poured on a plate. Various modifications were introduced during the next four years, but the great event that brought our negative process to the point where it now practically stands took place in 1878. Very many in this audience will remember the surprise created when on March 7, 1878, Charles Bennett showed at the South London Photographic Society negatives on gelatine bromide emulsion produced under conditions that would have been totally inadequate to produce a useful image on any plate previously prepared. Bennett, in a truly magnanimous manner, did not hesitate freely to give his process to the world in THE BRITISH JOURNAL OF PHOTOGRAPHY, March 29; and so fully was his method described, that many present to-night were able almost at first trial to produce results similar to those of the discoverer. Bennett, by prolonged action of moderate heat on the emulsion, altered the molecular state of the silver bromide in such a way that the sensitiveness to light of the silver haloid was vastly increased, and in process of time it was found that a much greater heat applied for a much shorter time to the silver bromide in a less viscous solution of gelatine effected the same desirable change, and in this position our gelatine bromide process

may be said to stand at the present day. Monckhoven, in Belgium, showed that a similar result to that obtained by boiling may be achieved by the use of ammonia, but I may say, speaking for myself, that it seems to me matter for regret that the injurious ammonio-nitrate process was ever made known, for I am convinced that the use of it has done much mischief to commercial gelatine emulsion plate making.

In the details of gelatine emulsion, many improvements have from time to time been suggested. Iodide was added by Abney, chloride was also used, and considerable ingenuity has been shown in contrivances for getting rid of the bye products of the decomposition taking place at emulsification. King used dialysis, Wratten precipitated by alcohol, Plener separated by centrifugal force, and again, speaking for myself, Plener's system elaborated by H. L. Henderson is the one that for certainty, simplicity, and regularity commends itself to me.

Regarding negative processes, it may be said that while processes now obsolete rendered magnificent results (though doubtless the fittest only have survived to attract our admiration), still to-day we get results equally good in all cases, with much more ease and rapidity, and we can now in certain branches achieve results wholly beyond the reach of any process except the gelatine bromide in use to-day.

In printing processes our great want, our great aim, and our great achievement during these fifty years have been in the direction of permanence of result. The albumen paper, in its virtues as in its defects, stands pretty nearly where it stood half a century ago, but we have now several processes of indubitable permanence—the platinotype process, patented by Willis in 1873; the carbon processes, founded on Ponton's discovery of 1839; and the gelatine bromide, and perhaps gelatine chloride processes of later dates.

Paper and other substitutes for glass have always exercised great influence on outdoor photography; from the days of Melhuish's roller slide till the advent of the Eastman-Walker roll holder; from Talbot's calotype to the present day of celluloid films, the matter has been steadily kept in our view. The public mind is now on the alert for a process, said to be achieved, yielding a transparent film capable of being wound on a roller and exposed in a roll holder.

In the province known as photo-mechanical printing we have made enormous strides, but as this subject has never occupied my attention I refrain from discussing a subject of which I am ignorant.

A shortcoming of photography, if possible more serious than want of permanence, has been incorrect translation into monotone of certain colours. Colours found in nature and in painting giving effects of brightness to the eye are rendered by ordinary photography as dark, while certain colours more or less sombre to the eye in nature and used as low tones by painters are represented by ordinary photography as high lights. I have deliberately left orthochromatic, or, as I prefer to call it, colour-correct photography, to the end of my remarks on our technique, because this line of research is at present engaging our chief attention, and because in this direction certainly lies our next great advance.

In 1873 Vogel discovered that certain dyes make photographic plates more relatively sensitive to some of the less refrangible rays of the spectrum. In 1874 Becquerel used chlorophyll, and in 1876 Waterhouse used eosin with collodion plates. 1879 Ives published his system of using chlorophyll obtained from the blue myrtle. On January 8th, 1883, Taillier obtained provisional protection for the use of eosin with gelatine plates, ammonia being used along with the dye. This patent stands at this day, and is worked by an English firm. On December 4th, 1884, Dr. Eder read a most important paper on the subject before the Vienna Academy of Science, and since then he has published several papers, all of the greatest value as contributions to the subject of colour-correct photography. The eyes of photographers in this country were first opened to the advantages of orthochromatic photography by the exhibits at Pall Mall of Dixon and Gray, whose work, however, seems to have been stopped by the Taillier patent I have mentioned. Dr. Mallman in the same year, 1886, gave a valuable paper to the Photographic Society of Great Britain, showing ways of using various dyes so as to produce effects in colour-rendering equal, if not superior, to the results obtainable on commercial plates. The next year saw the entrance of our friend C. H. Pothamley into the arena of orthochromatics, for in that year he read a paper to the Society of Chemical Industry, wherein he described his repetition of Eder's experiments, and his investigation of the group of eosin dyes. Also, he exhibited comparative results which went to prove that the relative sensitiveness conferred by the dyes was even greater than had been supposed. In 1887 Mr. Bothamley first flashed upon our astonished senses at the Glasgow Convention, as all who were present cannot fail to remember. Since

that time he has been the leader of British research into colour-correct photography for general purposes, while Capt. Abney's attention has been turned to the more special line of spectrum photography. I do not hesitate to say that to colour-correct photography we must look for the next important era in photography.

There is a name I have only mentioned casually as yet, but photography must never forget how much it owes to Abney. That scientist does not, I believe, claim to have initiated any absolutely new line of departure, but there is hardly a branch of our science on which he has not left a permanent mark.

Carey Lea's researches have been always valuable. And there is another friend of ours, a particular friend of my own, far distant geographically, but doubtless present in spirit with us now. William K. Burton is young in years—still younger in photography—but he has brought to bear on photography a genius and an energy that have marked his footsteps wherever in our march he has trod.

And close to me is another landmark of photographic progress, not a landmark either, but rather a series of milestones. For a quarter of a century and more Traill Taylor has sat in the Editorial chair, and taken cognisance of every event that has influenced our career; and not a mere idle watcher is Taylor, but an active helper, especially in the branch most congenial to his taste—optics.

I have endeavoured to trace the astounding advances scientific photography has made during these fifty years. Artistic photography hardly permits of similar treatment. But I believe that our art has kept even pace with our science. We see many artistic photographs of bygone years just as we see many unfaded prints, but the average of artistic production has advanced just as the average of technique. Connected with the art education of photographers during these past years must ever be the name of Robinson; by precept and by example he has led us in the right way, even by provoking rivalry and eliciting contradiction he has served us, for his rivals have produced works that, with all their faults, will eventually work for the good of photographic art.

The questions I now venture to ask are searching ones, the answers I shall supply no less momentous if I reply correctly. Might we have advanced more rapidly in science and in art than we have done? I think we might. What have we lacked in past, and what do we require for future advance? *Training.* We require training in science and training in art. Mr. W. E. Debenham has stated, and Mr. C. H. Bothamley has corroborated the statement, and my wish is to emphasise it, that there is in our ranks a sad want, an almost total absence, of scientific methods of research and logical report of our investigations. We are not trained to scientific investigation; we lack the patience to eliminate *singularities* in the causes of our variations in result; we jump at conclusions without safe ground to jump from. Photography is far behind every other science in this respect; papers such as we read and write would never be accepted or attended to by societies cultivating any other science, so far as I know.

So, too, in art, Mr. Robinson has said, Dr. Emerson has shouted, that we want art training; we trust to what we are pleased to call intuition; we despise and shirk study, or, what is far worse, we make no pretence of art, and shoot promiscuously with hand cameras at all and sundry over the face of the whole globe. If photography is to advance we must train ourselves to advance it.

Is there a mind anywhere incapable of finding work or pleasure or help in photography? Is it possible to find a being dead to every branch of our art-science? Surely our resources are wide enough. From the immeasurably great celestial bodies to the infinitesimal microbe everything visible is open to photography. Whatever the eye can see, aided or unaided, photography enables us to depict, and much that the eye cannot see photography will catch. Stars too dim, flight too rapid, wave vibrations too frequent or too far separate for our eyes to appreciate, are all within the recording power of photography. The lightning flash, the quiver of the insect's wing, the cloud-capped mountains, and the bowels of the earth, are all alike amenable to our science. Photography links together the past, the present, and the future; the absent with the present, the dead with the living. Fifty years ago what poor man had a portrait of his wife or children? what mother could look on a picture that reminded her of the features of a son in foreign lands? what lover could carry near his heart *her* portrait? Now, what cottage so lowly as not to have its portrait album, rude though the portraits and rough the album? Art, or, if you prefer it, portraiture, was then for the prince or the plutocrat, it is now for all. This is not a small matter that photography has accomplished, and you and I have helped photography to bring it about.

What science is there that can dispense with photography? Certainly no practical science. The astronomer needs us, the mechanic needs us, the microscopist calls on us, the physiologist

and the pathologist appeal to us for help. The artist has learned many lessons of us, and will learn more. Truly, the influence and the use of photography are universal.

Every one now before me has adopted, or may adopt, some special branch of photography as a profession, as a recreation, or as an aid to some other science. To every one, therefore, I say train yourself to make the best of what you undertake; there is no necessity to undertake too much, but let us have no dabbling nor smattering; make scientific experiments, reason logically from the experiments, and let the world have the benefit. Whatever we may do for photography, photography has done much more for us. There is an old proverb and a homely one, but I commend it to-night to your attention with all the force of which I am capable: *Whatever is worth doing is worth doing well.*

A vote of thanks to the President for his address was proposed by Professor C. H. Bothamley, of the Royal Yorkshire College, Leeds; seconded by Mr. A. Tate, of Belfast.

Thereafter the meeting resolved itself into a *conversazione*, during which there was an organ recital by Mr. James Loaring, L.Mus., F.C.O.

At nine o'clock there was a lantern exhibition on a 25-foot screen. This was conducted by Mr. F. A. Bridge, who, in an admirable manner, gave a running comment on the pictures, which consisted of a selection of views and scenes taken by the members and others during and illustrative of the previous Conventions in Derby, Glasgow, and Birmingham, and the surrounding countries. An agreeable feature connected with this was a running piano accompaniment, introducing airs peculiar to each locality and country, Miss Louisa Pyne presiding at the instrument. The pictures exhibited were by Messrs. R. Keene, A. Pringle, J. W. Ramsden, H. Stevens, J. B. B. Wellington, G. W. Watson & Co., and others.

On Tuesday there was an excursion to Windsor Castle, which, although the weather was far from being what could be desired, was very well attended. This was under the leadership of Mr. F. P. Cembrano.

In the evening the President took the chair, and Mr. J. Traill Taylor read the following paper:—

LENSES FOR HAND OR DETECTIVE CAMERAS.

By J. TRAILL TAYLOR.

A HAND camera implies the extreme of rapidity in its action, as, unlike others, it is held in the hand during exposure instead of being supported on a stand.

To this end the lens must possess certain characteristics—a large angular aperture to ensure luminous intensity, and conjoined therewith a form by which the illumination will, as far as possible, be evenly distributed over the area of the plate. But a large aperture, while securing intensity and consequent rapidity, is unfavourable to other requisites, such as depth of definition, and must therefore be subject to limitation.

The acme of rapidity will be found in a portrait combination, but there are two objections to its employment in outdoor or landscape work. Its components being placed one at each end of a rather long tube, the illumination, great in the centre, necessarily falls off rapidly towards the margin; and when to obviate this defect a stop is inserted, then not only is the special advantage of employing such a lens lost, but a positive evil, a flare spot in the centre of the plates, is also imported, which becomes of an increasingly pronounced nature the more the aperture in the stop is reduced.

Still, this lens is invaluable for operations which are conducted in a weak light, or when the scene or subject is not spread over an extended area, but is confined mainly to the centre of the plate. With a lens of this class the shutter must be driven with great rapidity, for as its angular aperture is, say, $f-4$, its intensity exceeds by four times that of the popular lenses which work at $f-8$, or squaring these apertures, as 16 to 64.

When employed with full aperture, its great light-transmitting power renders the portrait combination invaluable for many purposes. There is one use in particular to which it may be applied when fitted to a hand camera. In many of the narrow and dark courts and alleys of cities such as London, scenes of life, in no place else obtainable, are to be found almost at every door. Here, inversely speaking, the very aristocracy of low life and squalor are to be found rampant. But scenes such as these defy the best efforts of the ordinary detective camera, for, owing to the high walls and the narrowness of the courts, the light which reaches these doorways is too feeble to permit of ordinary instantaneous photography being practised with any measure

of success. Here the portrait lens proves the friend in need; for as I have proved amid the purlieus of Drury Lane, which stand proudly pre-eminent over all the slums of the metropolis, there is no scene which cannot be obtained by its agency, and whereas, on an open landscape scene, only a very limited portion of the field would be sharp, here, owing to the convergence of the subject and the well-known law of conjugate focus, the field on the sensitive surface is flat and the picture sharp up to its very margin.

Before dismissing the subject of the portrait combination as a means of securing snap shots, I would allude to the value of the invention of Piazzi Smyth, the late Astronomer-Royal for Scotland, for flattening the otherwise round field of a portrait lens when working at open aperture. It consists in inserting immediately in front of the sensitive plate a plano-concave lens of suitable curvature and dimensions, its concave surface to the front. Into the optics of its action I need not here enter, beyond saying that it prolongs the convergence of the marginal rays in so much greater ratio than the axial ones as to bring both centre and margin to a focus on the same plane, and thus solves the problem of a flat field with full aperture.

I here submit snap shots taken by a portrait lens to show its inconceivable rapidity when used aright.

The lens which of all others is most employed in detective cameras is that introduced by Professor Steinheil, of Munich, in 1865 or 1866. It is now manufactured by every optician, and is known by a hundred different names, to each of which the prefix "Rapid" is usually attached. Its component lenses are symmetrical, or nearly so, and its images are orthographic or rectilinear, or, in other words, non-distorted. Formed of two kinds of flint glass, instead of the usual flint and crown, it is aplatic, that is, works without a stop with an aperture equalling usually one-eighth of its focus. When a larger aperture than this is employed it is not infrequently termed a Euryscope. Its superiority for landscape or group purposes over the portrait combination consists in its greater covering power with any given aperture.

It is with the smaller lenses of this class that we have mainly to do with hand cameras, and fortunately small ones are amenable to proportionately larger apertures than those of greater dimensions. I possess two paired lenses of this class, which are employed either in a binocular or one or other of my detectives, the apertures of which are $f=5.65$, the focus being 6 inches. The tubes of these particular lenses are unusually short, and hence the illumination is excellent, even at the margins. This leads me to speak of the effect of the length of tube in preventing equality of illumination. The longer the tube the more circumscribed will necessarily be the area of illumination, and rays transmitted obliquely through a tube are much more attenuated than central ones. An axial ray is all right, and it correctly represents the angular aperture of the lens; but in proportion to the obliquity of light from the object so does the intensity diminish, until at length it is cut off and total darkness results. Pictorial effect demands the equalisation of the lighting. This may be effected by the insertion of a stop, not in this case to improve the marginal definition, but to subdue or diminish the lighting in the centre.

But in all cases where a lens is mounted at opposite ends of a tube a sometimes distressing number of reflections are formed. Just take up such a lens and direct it to a gas flame and you will observe at least four images, and, in most cases, a fifth one, between the lens and the eye. Every such image impairs crispness, by which I mean intensity of illumination as against a contrasting blackness. The Americans have coined a name for this, which they call "cutting," whence their term that such and such a lens cuts sharp—by which they mean that it gives sharp definition of a bright something as against something adjoining which is dark. Each and every reproduction of a luminous image between the lens and the focal plane means a lowering of the brightness of the subject all over the plate by the diminution of the darkness of the shadows, and this condition prevails no matter whether the lens is stopped closely down or is worked at full aperture. I am not now referring to a central flare-spot, which is caused by the posterior one of these reflections and which is easily prevented, but to the effect of these reflections over the whole surface.

It is this inevitable effect of having such a combination of lenses in a tube which led experienced opticians to speak of the superior pluck and brilliance of the image obtained by single achromatised lenses, and this leads us to consider the application of single lenses for detective cameras. That such a lens gives brilliance is shown in the foregoing remark. But it gives an equality of illumination surpassing that of all others of the doublet form, unless such doublet be considerably stopped down so as to cause the margin to be impressed by a ray equal to that by which the centre is produced. I am not here taking into consideration the diminution of the light, caused either by its transmission obliquely through a circular hole or of its further at-

tenuation by having, owing to its obliquity, to travel a greater distance than the central rays ere it reaches the margin of a plate, although I quite recognise these as well as the hypothetical loss caused by the oblique incidence upon the lens itself. The single lens, when skilfully constructed, can be made to work with a large aperture—much larger, indeed, than is necessary for many subjects in bright weather.

The one fault possessed by a single lens is that of inequality in its ratio of refraction from centre to margin, producing thus an increasing compression of subject towards the sides of the picture. But in a landscape such distortion is not recognisable. What is all-important in a small photograph, especially one intended for enlarging, is sharpness. There is no negative so distorted but what, in course of reproduction, the distortion may be eliminated. Not so, however, with those in which there is any falling off in definition. This cannot be cured. If the light permit, the distortion of a single lens may be minimised by bringing the stop nearer to the lens. There is no doubt that, as regards defining power and intensity of light, single lenses will answer quite well for hand cameras.

Another class of lens—the simple, non-achromatic lens made of one piece of glass only—is now being resuscitated for detective work. The main difference between an achromatic and non-achromatic lens in photography is this: In the former the visual and chemical foci are brought to a focus on the same plane, whereas with the latter there is usually a distance equalling a thirtieth of the focus between these foci; hence to obtain definition it is necessary, after making the image visually sharp on the ground glass, that the sensitive plate be placed, not on that focal plane, but on one a thirtieth nearer to the lens. By adopting this precaution a very excellent degree of sharpness may be obtained. For cameras in which the focus is fixed, or is effected by measurements and without a ground glass, there seems no reason why simple lenses may not be employed, nay, for that matter they are employed in hand cameras, and that, too, somewhat extensively, as witness the Kodak, Lilliput, and other American cameras, as well as some others in this country. The simple lens can undoubtedly be made to produce extremely sharp work, capable of being several times enlarged without much falling off. Owing to its very simplicity the simple lens possesses excellence *sui generis*; there are the fewest reflections from its surfaces, and it is thin, and therefore little absorbent of light. I have used such lenses a good deal, made by past-masters, such as Joseph Zentmayer, Thomas Ross, J. H. Dallmeyer, Steinheil, and Morrison, some of these constructed for tentative purposes, others commercially. While I do not recommend the employment of simple lenses on theoretical grounds, in practice they may be made to answer quite well. I here submit what may be termed the *reductio ad absurdum* of this class of non-achromatic lens, namely, the two glasses of my *pince-nez* stuck by sealing wax on perforated circles of wood which fit a mount. This objective, when proper allowance is made in the focussing, gives a sharp bright picture, free from distortion and works with a drop shutter.

The President said that a departure had been made from the custom at previous Conventions, and that the paper just read by Mr. Taylor had been printed and was in the hands of those members who applied for them, and this course would be followed with all other papers.*

Mr. Conrad Beck and Mr. T. R. Dallmeyer followed with remarks which we are unable to give this week.

The next paper was—

FALSE RENDERING OF PHOTOGRAPHIC IMAGES BY THE MISAPPLICATION OF LENSES.

By THOS. R. DALLMEYER.

PORTRAIT LENSES.—A good many rules have been laid down in order to obviate the shocking examples one often comes across in portraiture, as well as in "wide-angle" pictures, and I have thought it well to explain the cause of these failures and to endeavour to arrive at a sure means of preventing the bad results thus produced. In portraiture it was advised, many years ago, that in taking a portrait of a given size the focal length of the lens employed should be at least double the largest dimension of the image. This rule was laid down to avoid as far as possible false rendering in perspective.

To start on first principles, take a case of a large head, life size. It is well known to you that in taking such a portrait the camera must

* It had originally been intended by the Council that no publication of any papers should be made until after the close of the Convention, but, on more mature consideration, it was thought well that the press should not be fettered in the slightest degree. Hence our publication of two papers in this number.—Ed.

be wheeled out to double its equivalent focal length and the subject placed at the same distance on the other side of the optical centre of the lens. This particular distance, viz., double the focal length of the lens, holds a very important position in its relation to the law of conjugate foci, in that any other point nearer than this will produce an enlarged image upon the screen, and that any point more distant than this will be represented by a reduction in the size of the object; hence, if the eye of the sitter be focussed for full face, the nose of an ordinary person projecting in front of the eye must necessarily be enlarged, and the ear, further away, must be reduced in scale. By what is called *straining* a lens, these effects of contrast become more and more apparent, and hence it is that although there is a drawback in using long-focus lenses on account of their lack of depth of focus generally, still, the longer the focus of the lens employed, in the given case of portraiture, the better, in that these contrasts are not so marked.

To repeat what is deduced from this generally, it is apparent that the more a lens is strained, i.e., used under conditions farthest away from those for parallel rays, or giving it a temporarily lengthened or forced focus, the more pronounced will be the false rendering. As an example of this, I have in my possession a number of old *carte-de-visite* photographs that were taken when the *carte-de-visite* was originally a rage in this country, and I believe first taken up by the late Mr. T. R. Williams. In these *carte-de-visite* most of the subjects are full-length figures and placed at such a distance from the *carte* lens that there was hardly a perceptible difference between the focus for the subject and the focus for parallel rays. Since that time, I do not say invariably, but in *carte-de-visite* taken with lenses of the same focus, there has been a strong movement towards having much larger heads, accordingly bringing the subject very much nearer to the lens, and when this is the case the palpable difference in the conjugate point for the foreground and the background necessarily gives upon the plate an exaggerated perspective. This is sometimes an artifice of the photographer to flatter, for we have all often seen hardly recognisable portraits of thin-faced subjects that have come out comparatively full-faced, simply due to pushing the short-focus lens close up to the sitter.

It appears, then, that for ordinary portrait work it is best to limit the amount of angle taken in, as far as possible, by employing lenses whose foci are at least twice the length of the image, and also to have the subject at such a distance that there is not a too remarkable difference between the corresponding conjugate points of the fore and backgrounds. While speaking on this head, it follows that, theoretically, an enlargement from a portrait taken under the most favourable circumstances is truer in drawing than a direct large head. This arises from the fact that in making the small portrait, taking it for granted that all the rays are practically parallel, they are received accurately upon one plane.

I do not propose to discuss here the *pros* and *cons* of direct large heads as against enlargements, for there are many other reasons coming in, which, at the expense of theoretical benefit, have proved that a direct large head, when taken under the most favourable circumstances, that is, with a lens of long focus, is undoubtedly much more pleasing than an enlarged small image.

View Lenses.—The whole of false impressions given in views, outside the question of imperfectly corrected lenses, hinges on the point of the amount of angle that is allowable to be included on a given size of plate. I have once before pointed out that, from a scientific point of view, a theoretically perfect instrument would be a pin-hole camera having the section of a mathematical straight line for an aperture. Such an instrument would give any amount of latitude in focus and angle of subject included. At a given distance the image or impression received upon the plate thus obtained must, of necessity, be absolutely correct from the one point of sight, but that it be a true rendering of the subject in the image thus obtained from the ordinary distance of vision does not follow at all. Such an instrument can do what the eye of itself can never do. For example, the whole horizon of 360°, by a very short-focus arrangement, could very nearly be taken in in two views of angles approaching 180° each. To imagine the result is somewhat difficult, but as the eyes cannot take in without movement more than from a quarter to a third of the 180°, the subject thus taken would hardly be recognisable from the ordinary distance of vision.

In this connexion the correct amount of angle to be included is, then, the point to be settled. With regard to views, as well as in portraiture, rules of thumb have been laid down, and the reason for this is only due to the desire to make it impossible for the lens to include angles which the eye of itself cannot possibly take in. I think it may be taken for granted that no picture should include more than an angle of 60°, and it would be safer still to never

employ a lens of shorter focal length than the larger dimension of the plate, or slightly over 50°; but it is very evident that the longer the focal length of the lens compared to the greater dimension of the plate, the more pleasing will the perspective become, provided there is sufficient subject of interest thus included. The ordinary distance of vision is about 15 inches, and at 15 inches I am of opinion that the most pleasing size of picture at this distance would be about 10 by 8 inches, but not exceeding 12 by 10. If, then, it can be decided once and for all what is the extreme amount of angle to be included, and this, or always less, is included, we shall never be pained by seeing pictures that, if they are true in drawing from the point of sight of the lens itself, are nevertheless distinctly untrue from the ordinary distance of vision. Taking numerous cases of the falsely rendered results one sees of architectural subjects and interiors on the one hand, and "wide-angle" landscapes on the other, where the distance is dwarfed and does not hold its true value compared to the foreground, it should be borne in mind that if those views could be comfortably viewed at the distance of the focus of the lens they would be true, but angles of 70° to 100° it is impossible, without movement of the head, to appreciate even at that distance. There are other subjects in connexion with artistic treatment of subjects where the form and construction of the instruments employed necessarily come in. Some are self-evident, such as distortion and imperfection in correction for other than central pencils, which of themselves will necessarily give untrue rendering in the structure of the image. Putting a lens entirely out of focus must necessarily destroy structure, but the introduction of spherical aberration in many instances may still maintain the structure of the image but produce a softer effect. I think that this is the only legitimate form of aberration to soften images, although I maintain, at the same time, that a perfectly well-defined or sharp picture throughout is not of itself at variance with softness due to conditions of atmosphere and lighting, the latter remark being, I think, particularly applicable to studies of landscape without prominent figure.

In subject photography in combination with landscape, the employment of a long-focus lens has an important bearing on the standpoint of some of our leading artists, in that the main object or subject of interest focussed for is better defined than either foreground or background, which are subservient, and lead up to the main feature, this of course being dependent again on the position of the conjugates. To obtain truer values also with the long-focus lens in *landscape work*, the subject chosen for the foreground should be sufficiently distant that the correct amount of definition for this should be consistent with that of the most extreme distance or parallel rays, this being often easily attained with large aperture; but if the limits are wide, can only be arrived at by the use of diaphragms.

Another important feature in the employment of long-focus lenses is that it is always much more easy to attain equality of illumination for the whole of the plate, and in this way allow for every part of the subject to receive its full share of light to the extreme edges of the plate, and thereby allowing true values in light and shade.

I have continually used the word long focus in respect to view lenses, but by long focus I simply wish to be understood to mean long focus in the sense of comparison to the base of the plate that it is worked upon. No matter what the form of lens, on a given plate all lenses of identical focus would give exactly the same rendering of perspective. By the optician, lenses are designated "wide angle," "narrow angle," &c., merely from the fact that according to their name it is possible to use them under circumstances for which they have been particularly designed. Records of buildings and interiors, and wide-angle views, are, of course, interesting in their way as mementoes, and lenses are constructed to enable photographers to obtain results that cannot otherwise be obtained by using lenses for their truest rendering.

In conclusion, I would only impress once more upon you that the so-called wide-angle lens should never be employed to its full extent where it is possible for the subject to be treated by a so-called "narrow-angle" or long-focus lens, or the "wide-angle" lens under such conditions that it *practically* is a narrow-angle one.

On this paper some observations were made by Mr. Conrad Beck, Mr. Taylor, of Leicester, and Mr. Gotz.

The usual lantern exhibition was then given.

WEDNESDAY.

The Annual Business Meeting of the Convention was held at 2 p.m. in the Society of Arts Hall, the President in the chair.

After the preliminary business it was announced that delegates were present from the following Societies:—Oldham, Dundee, Manchester Amateur, Ulster Amateur, Yorkshire College, Lewes, Hud-

derfield, Glasgow Photographic Association, North London, London Photographic Club, Camera Club, and London and Provincial.

The President said the next business was to determine upon a place of meeting for next year.

Mr. J. Traill Taylor, in proposing that Chester be the next place of meeting, spoke of its advantages. The fine rooms of the Natural History Society would, he doubted not, be obtained for the meeting. It would also be a fitting place of outing for the numerous brethren in and around Liverpool, whose co-operation should be sought. This was seconded by Mr. Cembrano, and supported by Messrs. George Mason, Bothamley, Samuels, and others, and was carried unanimously. Resolutions bearing on this were proposed by Mr. Bothamley, seconded by Dr. Fallarton, and adopted.

Messrs. W. Benham and Phipps Lucas were elected auditors.

It having been felt that the time of meeting of the present Convention has been fixed too late, it was suggested that, if possible, it be held next year during the end of June or beginning of July.

In the evening the following papers were read:—*Desensitising and Resensitising Albumenised Paper*, by A. Haddon, M.P.S.L.; and *A Suggestion for a Method of Ascertaining the Comparative Rapidity and Printing Value of Gelatino-Bromide Plates*, by Edward Dunmore.

Mr. E. Muybridge then gave his famous lecture and demonstration on animal locomotion. The hall was crowded and many were unable to obtain seats. Mr. Muybridge's remarks and illustrations were of the highest value, but when the animals were shown on the screen in actual (thaumatropical) motion it "brought down the house." Nothing could be better. We shall take early occasion to give a description of the means and appliances by which these wonderful pictures were obtained.

On Thursday excursions were made up the river to Kew and Hampton Court in steam launches, with papers and lectures in the evening.

The Annual Dinner takes place this (Friday) evening in the Café Royal, Regent-street, at six o'clock. An excursion to Gravesend takes place during the day.

The fine display of apparatus and pictures will be described next week, when we will also publish the remainder of the papers that were read.

ECHOES.

"PROFESSOR" HENRY J. NEWTON has been treating the Society of Amateur Photographers of New York to a lecture on the "*Early Days of Amateur Photography*," in the course of which I find "the steam-engine, the electric telegraph, and photography" classed together as "the three great discoveries of the present century." Shade of Worcester! This will be news to thee! I think it must be nearly two whole centuries since you did your share in "discovering" the application of steam to mechanical purposes, perhaps more.

The lecturer says truly, speaking of the bygone days of thirty odd years ago, "that to be a successful amateur photographer meant something very different from what it does to-day." Quite so, but if modern success depends on making pictures on bought plates, receiving medals that belong really to half a dozen other people, and compiling historical or scientific papers to read before "the society," then I should prefer to cast in my lot with the unsuccessful one of years that are gone, when you had to "know how to make a'most everything connected with the production of a photographic print," and frequently had actually to make it. Those were the days when some real credit was attached to the production of good work.

I do not very much like the methods of producing warm tones in transparencies, given in a letter in the issue of July 19, by Mr. Charles Whiting. In the first place, the tones obtainable by acting directly with a sulphide upon an image composed of any of the silver haloids, is, to my idea at least, most unpleasing even when brown tones are liked, which they are not nowadays. The colours so produced are quite different from those obtained by "toning" a metallic image with the same agent. Then, again, the foxy-brown tone given by ferri-cyanide and uranium is simply hideous for any artistic purpose, unless it be very favourably modified by Mr.

Whiting's addition of gold; but the deposit being opaque, it ceases for all practical purposes to be "a warm tone" when projected on the screen.

"Free Lance" has got on to the "eternal ten per cent. solution" question once more, but I do not think his proposal adds much that is valuable to the solution of the difficulty. Ten per cent. solutions, for developing purposes at least, are almost invariably required for use in small if not minute quantities at a time, not in ounces or half ounces. In following Mr. Haddon's plan, ten minims of the solution would contain one grain of the substance, but by "Free Lance's" plan, only a little over nine-tenths of a grain. The ten per cent. solution system cannot be worked for all purposes with the same solution; for developing purposes, Mr. Haddon's method is, I think, the best; if you want to use your stuff by ounces, then adopt "Free Lance's," or, better still, weigh out an ounce right away.

In a paper on *Photographing Interiors*, "W. R." speaks of the possibility of giving several successive exposures by means of magnesium, and especially of securing views of other rooms through doorways opening out of the principal one. This is done by exposing in the first room—I presume closing the doorways in some manner—and after inserting a smaller stop, flashing off a quantity of magnesium in each of the additional rooms. This sounds very ingenious, but how about cross-lighting and half a dozen other objections? A similar method is adopted for combining with an interior a view of the landscape through the window. I should like to have the "pulling to pieces" of the lighting of one of such pictures. Mention is made of using a small stop to ensure definition in the landscape; but what about the definition obtainable with the smallest stop through ordinary window glass?

I am really glad to see the Editor taking up the question of exposure by rule, with exposure tables, &c., which is a subject I have myself referred to previously. Exposure tables and actinometers I hold to be the most mischievous things ever introduced to the amateur, not because there is any harm in exposing correctly or in knowing the precise value of the light, but because they simply will not perform what the ignorant amateur expects of them, namely, relieve him of all responsibility. In the hands of the inexperienced they do more harm than good by preventing the attempt to gain experience, while the practised hand, who alone knows how to properly apply them, can work better without them, *pace* the instance mentioned in the editorial article.

I have read with great interest Mr. T. N. Armstrong's articles on the *Deterioration of Dry Plates*, because I have myself studied the subject with pretty well the same results, namely, that some plates will keep any reasonable time, while others will not keep at all. Like Mr. Armstrong, I started with the opinion that a properly prepared plate should keep, under proper conditions, practically, for ever; and though I have found that films prepared by first-class makers do break down, and that proportionately to their rapidity, I do not attribute the fact to the *rapidity*, but to a failure to exercise *extra* precautions in the process of manufacture.

That "ammonia" plates should succumb more readily than "boiled" ones, for instance, I can quite conceive, but I do not set it down as a matter of necessity. The use of ammonia places the emulsion in a condition in which it is more prone to rapid decomposition than an ordinary "boiled" one, and in which, moreover, it actually contains more decomposed or, at least, soluble matter. Similarly, a rapid emulsion boiled for a long period, or "cooked" at a high temperature, will differ materially in its condition from one digested for a short period or at a comparatively gentle heat. This altered condition absolutely necessitates more careful and thorough washing to remove the soluble and decomposable matters, but, unfortunately, such emulsions are in the worst state to bear thorough washing, and so come off with only just sufficient to pass muster. Such, at least, is my view, and I still believe that a properly prepared gelatine plate, no matter how rapid, ought to keep indefinitely. I am borne out in this by the fact that I, some months ago, found a packet of plates that must have lain *perdu* for over four years, and which were at the time they came into my possession, perhaps, the most rapid ever made, and would compare with the quickest of the present day. These, on exposure, proved to be absolutely as good as when newly made. A few days ago I exposed half a dozen plates whose packing label bore

date "Feb. 1886," and while of the highest rapidity, the quality was everything to be desired.

I note Mr. Armstrong's remarks on the folly of leaving plates in the slides, and also on the effect of emanations from the lining varnish on the sensitive films. Though injurious action may and very probably is so caused, I do not think matters will be greatly improved by Mr. Armstrong's expedient of lining the slides with sensitised paper and exposing to light. Surely no more dangerous substance could be placed in contact with a film of gelatine, especially when it has to be submitted to the action of an alkaline-reducing agent, than a hygroscopic material rich in silver nitrate. If everything were perfectly dry, matters would be bad enough, but as in ordinary circumstances that is an impossibility, I fear Mr. Armstrong's remedy would be worse than the disease.

In his *Photographic Uses of Uranium*, Mr. Thomas Bedding mentions the addition of uranium salts by Colonel Wortley to collodion emulsion, and goes on to say that the same principle was also utilised in connexion with gelatine. The latter is scarcely accurate except in so far as Colonel Wortley did mention such an application, and actually, I believe, exhibited before one of the societies a bottle said to contain gelatine, silver nitrate, and uranium nitrate, to show the preservative action of the last named. But Colonel Wortley never to this day explained how he got the uranium salt to mix with the gelatine without coagulating it, so the method can scarcely with truth be said to have been "utilised."

Paul remarked to Festus, on a memorable occasion, that much learning had made him mad. I do not mean to say that Professor Pickering is in the same condition, but I felt very like Paul must have done when I read the Professor's description of an "Easy" (sic) "*Method of Determining the Sensitiveness of Photographic Plates.*" To "boil the method down," it consists in making a series of stellar photographs of the region about the pole star, and counting the stars represented in each photograph, those plates containing the greatest number being proportionately the more rapid. Professor Pickering himself speaks of the difficulty in accurately focussing in his *easy* method, but, passing that over, I cannot see what data the photographer, whether ordinary or astronomical, would have to work upon in fixing proportionately the sensitiveness of any two plates. We should have to mark them, like brandy, as so many "stars."

What useful purpose is or ever can be served by such contributions as that of "R. W. H." on *A Day's Outing with the Camera in Kent*? It gives no information that could guide, or is likely to attract, an amateur in search of "fresh fields" to go over the ground. It is not up to ordinary guide-book form, and seems only written with a view of publicly recording the writer's gratitude for a day's drive.

JUNUS.

ROUND THE FLEET WITH AN INSTANTOGRAPH.

ARMED with a light quarter-plate camera, fitted up on the instantograph principle, and favoured with a bright sun and a moderately calm sea, I set forth, on the morning of the 31st ultimo, from Southsea Pier, to view the magnificent fleet of ships of war then anchored in the Solent to await the inspection of the Emperor of Germany and suite previous to their dispersion and departure for the summer manœuvres; and surely never did prouder armada ride on the bosom of the deep! Over one hundred mighty ships of war, whose united armaments were potent to demolish every vessel that floats, or destroy every maritime stronghold on the face of the earth, were drawn up in magnificent array—every ship fully equipped and manned, and ready to do battle to the death with either King or Kaiser.

The vessels—"like leviathans afloat"—lay in three lines, anchored between Ryde on the north shore of the beautiful Isle of Wight, and Gilkicker Point on the mainland of Hampshire: arranged in squadrons comprising vessels of various kinds and dimensions, and including first, second, and third-class ships of war, coast-defence ships, gun vessels, cruisers, and last, but not least, thirty-eight first-class torpedo boats—black, murderous-looking craft, that plough their way through the water as though instinct with life, and aflame with the spirit of destruction. I gazed with admiration and delight at the

marvellous array before me, and Swain's poetic and patriotic lines rose to my mind as I beheld it:—

"The ships, the ships of England! what British heart is cold
To the honour of his native isle, to the deathless deeds of old?"

Once on board my steamer—a tug boat called the *Conqueror*, and hailing from the Thames—I applied myself to the important business of securing a favourable standpoint for myself and camera. Having at length secured a snug corner, with a paddle-box as a point d'appui on my right hand, I fired many noiseless, but not ineffective shots at the grand vessels as they passed in review before me. There were at least a dozen steamboats conveying passengers to view the fleet, plying between Ryde and Portsmouth, for more than a week, at various charges. These completed the tour of the armada in from an hour and a half to two hours, commencing the trip by skirting the line of ships nearest the mainland, and steaming between the second and third lines on their return. This offered the best chance to the photographer, for the sun shone brightly upon the ships in the middle line, including the flagships *Northumberland*, *Anson*, *Hercules*, &c., and those turreted monsters the *Devastation*, *Hero*, *Australia*, and others, lighting up their iron sides, showing all their fighting gear with the greatest distinctness, and causing every gun, spar, and rope to stand out in bold relief against their surroundings.

As a great many of these vessels were of enormous length, and as our steamer generally passed them pretty closely, I used a single wide-angle lens, working at about *f*-12, and a drop shutter with its motion reversed, and accelerated by an indiarubber band. This arrangement I found quite satisfactory, and I lost very few pictures through under exposure, or failure to get the whole of the subject into the picture. It will, of course, be understood that my apparatus was manipulated throughout without a tripod, an adjunct which would have been quite useless on board a vessel literally packed with human beings—indeed, to such an extent were the boats crowded, that no passenger cared to risk the loss of his place by vacating it even for an instant.

The naval inspection, which all the world and his wife came to see, was originally to have taken place on Saturday, the 3rd of the present month, but on account of the unsettled and stormy weather then prevailing it was postponed to the 5th. The Emperor of Germany and his fleet of eleven or twelve ships duly arrived at Spithead on the afternoon of the former day, and were welcomed by a salute from the big guns of the British ships, which made, as a Portsmouth *gamin* described it, "no end of a row and smoke."

The beach at Southsea, on the 3rd, was lined with thousands of spectators, who remained upon it "from morn till dewy eve" in the vain hope that the promised inspection would come off. They strained their eyes with every species of "spy glass" to obtain a glimpse of the Kaiser and his following, but they were, for the time, doomed to disappointment, although their enthusiasm was in nowise damped by the humid and gusty weather. On the following Monday—the day of the inspection—two miles, or thereabouts, of the beach at Southsea literally swarmed with excursionists and others, who were determined this time not to be defrauded of their promised treat. Between four and five o'clock in the afternoon a salvo of artillery was again fired, and the deafening sound made the welkin ring. The sailors, who could now scarcely be distinguished through the smoke, manned the yards of the vessels, the Imperial party proceeded through the fleet and steamed on to Osborne, the crowds sent up cheer upon cheer, and the inspection of 1880 was a thing of the past.

If the fleet formed a glorious and imposing spectacle of which every true Briton has a right to be proud, it was scarcely less interesting to behold the myriads of smaller craft flitting eternally to and fro on the glistening waters of the Solent, or the great troopships, such as the *Tamar* and the *Serapis*, steam along—the last-named conveying the "Faithful Commons" to the rendezvous at Spithead. These, however, on account of the postponement of the ceremony, did not take part in the actual inspection, as they had to return to their parliamentary duties.

I obtained, on both days, some successful shots at various sections of the crowd on the beach, and, altogether, the event and its sur-

roundings will not readily be effaced from my mind, or from the memories of all who took part in it, whether as photographers or mere spectators.

C. R.

COLOURED PHOTOGRAPHS.

V.

MORE than at first may appear possible depends upon our closely following these rules as to the general disposition of the complementary colours. Is only by strict adherence to them that we can count, with any degree of certainty, on securing a general *harmony* in our picture. Thus, should we not do so, and through carelessness or want of knowledge place in juxtaposition colours which are *not* complementary one to the other, it will be found that they mutually destroy the natural and inherent beauty which they severally possess. To realise this more clearly, let us wash in a *blue* in close or immediate proximity to a *purple*, and we will find that they mutually detract from each other's individual value or beauty. The reason for this is not very difficult to discover, the purity of tint in each case being marred by its companion. On close examination it will be found that the yellow rays emitted by the purple will impart a somewhat greenish tint to the blue, while at the same time the orange rays thrown out by the blue endow (anything but advantageously) the purple with a slight russet tinge. In both cases a very serious disadvantage, as the purity and natural beauty of both tints, though perfect in themselves, are marred by being placed in immediate proximity.

This rule holds good, also, in the placing of *neutral tints* in contact or close proximity to full hues or tints. These neutral tints should invariably incline in tone to the complementary of such hues or tints as they may be placed besides; for failing this we are sure to defeat our wishes by losing the harmonious effects without which no picture can be deemed successful. As an example of this, take an *olive* tint when placed in contact with a *yellow*. In order to produce the best and most harmonious effect it should incline rather to *purple* than to *green*, the former being the complementary to yellow.

There are many other points well worth our consideration besides the simple contrast of hue or tint. There is the contrast of *intensity*, the skilful treatment of which will at times secure many valuable effects. This will be easily seen if we place two tints of the same colour, but of widely different degrees of intensity, side by side: the deep tint will appear to deepen still more in tone, while the light tint will seem to become still lighter, this apparent difference in intensity being most observable at the points of absolute contact.

All colours when brought in contact with pure white gain depth, for the very simple and obvious reason that the white assumes the complementary tint of the colour placed near it. On the other hand, with black the effect is the reverse, the colours placed in contact with it appear weaker and less powerful in tone. There is a wide difference, however, in the effects produced by the various hues placed in contact with black or on a black foundation. The intensity of the black is considerably influenced and materially modified by contact with such colours as have a luminous complementary. Thus, when purple comes in juxtaposition with black, the depth and brilliancy of the latter is very considerably discounted, owing to the tinge imparted to it by the yellow rays emitted by the purple. Should either blue or green be the colours coming in contact a similar result will follow, the black losing quality by partaking of a rusty tone, caused by the orange or red rays thrown out respectively by these colours. When black, however, comes in contact with red, yellow, or orange, such is not the case—quite the contrary, it becomes more intense and strikingly effective.

All pure colours will be found to gain brilliancy and beauty by the close proximity to or absolute contact with *grey*, which may be considered as a mixture of black and white.

Supposing that we have mastered the difficulties in the way of securing that harmony resulting from the skilful placing in juxtaposition of such colours as mutually lend a charm to each other, also the harmony resulting from judicious contrast, be it of intensity or otherwise, we must not consider that our task, even in this direction, is at all complete. There still remains what may be termed the harmony of analogy. Now this is obtainable by a combination of the various gradations of any one colour in its own scale, or of the hues and tints in the order in which we may observe them in the solar spectrum.

By the skilful arrangement of analogous tints in their most favourable and harmonious relations (and their variety is almost endless) the most charming and effective results may be secured. There are obstacles, however, in the successful carrying out of this treatment,

which render it more difficult of accomplishment than the other two. The effects in question are not so striking—more delicate and subtle as it were—and so demand a greater amount of sound, artistic feeling and keen appreciation, combined with still more skilful management, to secure those really happy and successful results which should be the alpha and omega of the student's efforts.

The laws which regulate the harmony of colours are *not* the outcome of an over-excited brain, or the result of some extremely sensitive organization, which, being endowed with a keen appreciation of the beautiful, has left these rules behind for the guidance of less gifted followers. On the contrary, this harmony is inherent in Nature, and it is she herself who lays down these laws for the guidance of those who seek to reproduce her.

It will require but a small effort to find ample and pleasing examples of the various kinds of harmony. No one can gaze on Nature and fail to see them at every step. This is true alike if we stroll through the fields and make landscape our study, or in the London streets, where, in the study of portraiture, we observe the endless variety of the human face as we pass along, and are forced to confess it an exhaustless study. What a striking study of the harmony of analogy is to be found in the contemplation of the beautifully blended and delicately graduated colours of the rainbow! If, perchance, this most wonderful study of colour and harmony should not have received due attention from any reader, let me advise that the next opportunity be taken advantage of. I cannot think of any combination so complete and so thoroughly showing the balance as well as the harmonies of the various colours. One of the most beautiful rainbows I ever saw was in Dublin Bay lately—the brilliancy of the colours was more than an artist dare put in a picture.

All the principles to be acquired by such observations of Nature are of the utmost value to the art student, and should never be neglected when opportunity serves, whether his ultimate goal be landscape painting or portraiture. Needless to say, it is of greater value in the former branch, but it will be found of considerable advantage also in the latter, and must of necessity in all cases exalt the artistic feeling of the student.

The instruction to be gained from the careful study of almost any landscape is more than considerable. One sees the blue and atmospheric effects of the extreme distance blending softly and harmoniously with the cool greens and greys of the middle distance, while these in turn melt as it were into the warmer and more positive greens, yellows, and browns of the foreground. If on such a landscape we happen on a *setting sun*, what a change, and how still more beautiful the effect. There is a warm glow imparted to the whole scene, every object seems to be beautified by a golden light and a purple shadow. In such a scene the willing and observant student will find endless varieties of effects. In Nature, harmonies of contrast are not hard to find; they are visible and varying at every step; from the wild moor to the fertile valley everything suggests beauty and harmony. One sees the ever-varying forms of the yellow gorse mingling with the purple heather, the scarlet holly berry with its deep (and complementary) green foliage, and the rose, of whatever hue, and its green leaf in harmonising contrast.

In literature the saying goes that "Truth is stranger than fiction," and I, for one, believe it. So, too, in art, the wildest dreams of an artist (worthy of the name) will never suggest anything apparently so impossible as will equal the incredible freaks of Nature as regards both drawing as well as colouring. For wildness of idea and execution I do not think the late Gustave Doré could be well surpassed. He has left us some of the most extraordinary effects in the way of clouds—studies which appear absurd almost, on account of their seeming extravagance, and which I confess appeared to me *impossible*. Yet, the autumn of the year I *was* so impressed with Doré's works, I saw and studied the most extraordinary forms and combinations of clouds I ever saw in my life. They recalled the studies in question, and, I must say, for *extravagance* left them far behind. For violence of colour, too, I may cite a view I had of the Welsh mountains in the early morning. I never saw such strength of colouring, and if transferred to canvas few would believe it real or as in Nature; yet notwithstanding its strength and assertiveness it was harmonious.

All that I have said may be summed up in almost one word—*study*. Study Nature, for she is the only fountain of real knowledge, and if closely observed will teach all that I have tried to place before you. Such principles as are here laid down are only those dictated by Nature, and without observing which we can never truthfully or successfully reproduce her in a picture. As I before said, these hints mostly refer to landscape, but when carefully considered will be found to possess the utmost value in surmounting the difficulties that from time to time will crop up in the painting and arrangement of draperies, accessories, and the general tone and influence of the background.

Much value and beauty can be given to the complexion by the clever and artistic colouring employed in the background, and much depends upon it in producing not only a pleasing, but a perfect and harmonious picture.

Much of this may appear unnecessary, strictly, while on the topic of "colouring photographs;" also, as colouring is mostly employed for *portraiture* in this line, much will appear superfluous, but in the end it will not be so. The object I have in view is to produce a first-rate work (may I say a work of art?) on a photographic base. This must be reached by easy and patient stages, and I trust will be found worth the trouble. Think what an advantage it will give you in the treatment of a picture to have a thorough knowledge of the art generally to support you! How much more easily and successfully will you gain your effects, and, above all, how much more harmonious and artistic will be your picture when finished! If you have any doubts of the value of all this, let me ask you the question, How often can an ungainly figure be made *presentable*, if not absolutely *graceful*, by the artistic treatment of the surroundings?

Another advantage (and though last not least) that is assured by a thorough knowledge of the principles of colouring is *breadth*. As an example of this I can give an experience I had with an artist, some few years ago now, and which will, I think, prove satisfactory on the point. I had an order for two portraits, to be completed by a certain date, companion pictures of husband and wife. I could not possibly get them done in time myself, so I was obliged to give them to a friend. Now, if ever a man knew thoroughly how to treat a background and make a *picture*, no matter what the size, my friend did. Yet, strange to say, in this case, by some unaccountable accident, he painted the backgrounds differently—so differently, indeed, that the pictures did not seem to have been painted on the same size canvases. In fact, you might measure the pictures, find they were the same size, then retire a little distance, look at them, and not believe they were the same size. One treatment, as it were, dwarfed the canvas, while the other gave the idea of *breadth*. When I drew his attention to it, he altered the defective one and made a most successful pair of portraits. It was a pure oversight that let him make such a mistake. Each was *perfect by itself*, but as a *pair* faulty. So much for *breadth*.

This will show, however, that an artist who thoroughly understands the principles of his art can produce on a certain size canvas an effect that will make it appear double the size, and invest it with general importance. In art let us never be afraid of knowing too much, but rather always try to learn more. I have had a fairly long experience in some branches, yet I am always open to learn, and often find strange experiences which repay me for my watchfulness and disposition to still learn.

REDMOND BARRITT.

CLOUD EFFECTS.

THE subject of clouds in landscape photographs crops up, perhaps, as frequently as any subject connected with the pictorial phase of photography. There are many persons who hold the theory that ultimate perfection in a landscape cannot be obtained unless the clouds are rendered as they existed at the time the landscape was photographed—that is, taken simultaneously with the landscape. There is also an equally strong contingent holding a very different opinion. Of the two, I cannot help thinking that, from a practical point of view, those who entertain the first are not close observers of nature for one thing, and somewhat lack artistic appreciation for another. In nature it seldom happens that the forms of the clouds arrange themselves to the landscape with the *best* pictorial effect. Any one studying the matter will soon perceive this. Divest clouds and landscape of colour, and imagine them in monochrome, as represented by photography, and then decide if the position of the clouds, with respect to the landscape, is exactly, or anything like pictorially, as good as an altered position would make them. Cloud effects have, for many years, been a favourite study of mine, and but very seldom have I seen them fit the landscape, so to say, in the *most* satisfactory manner. We may often see splendid cloud effects to wonder at and admire; that is, however, quite a different thing to pictorially and photographically suiting the landscape over which they float. Generally, splendid displays of cloud-forms are looked at without so much as giving the landscape a thought. If it did come in for a share of observation, the probability is, it would owe great part of its beauty to the effect of the clouds above it, and not from any pictorial value in itself. Now, here comes in the principal difficulty and difference. When we are selecting a view for a photographic picture, we desire that the *view itself*, without the consideration of clouds, should compose artistically, and that the principal points of interest shall be centred in this landscape. To do this, certain conditions

must be complied with; the light must fall at some particular angle at some particular time of day and year; its quality must be good, and the foliage must be still. Suppose we are fortunate in getting all these conditions fairly at the same time, it is a thousand chances to one that the clouds will not be present in the best form, *if at all*; the probability is so remote that it is scarcely worth considering. If clouds *do* happen to be right—they do sometimes—well and good, make the most of the opportunity; but it would be a rather hopeless task and waste of time to wait for such a combination of circumstances, especially when clouds can be afterwards added, selected of the exact form and quality to best suit the view, with very little trouble. The only exception that can be taken to this is in the case of sea views, where the water portion is always suitable on account of its power of reflecting light, and its general similarity of form: it is, in fact, a permanent foreground, always ready when wanted, the only thing being to select the clouds whenever they are sufficiently attractive, and the light falls on the water in the most effective manner.

Perhaps, as examples of clouds and landscapes, we cannot do better than study Constable's pictures; he frequently chose large masses of brightly lighted cumulus clouds, whose rounded forms harmonised and contrasted so well with the foliage of the sylvan scenes he loved to paint. This is a kind of cloud, perhaps, best of any for photographic purposes. The pale white cirrus, or the mackerel sky, so often seen at the season of the year when photographers are chiefly occupied with outdoor work, never make any photographic effect worth looking at: they are, in themselves, deficient in contrast, and only add an appearance of spots or smears to the photographic sky, and one that can be matched without detection by the most elementary dodges: a wisp of cotton wool, or a few dabs of colour on the back of the negative will, nine times out of ten, produce quite as good an effect. There seem to be but two kinds of cloud that are photographically useful, viz., the cumulus and stratus forms combined or separate, and the cumulus by preference. It must be understood that I am writing only of clouds in *connexion* with landscape, and *not* as studies of themselves. The criticism, unfortunately too often well founded, that printed-in clouds—clouds taken at some other time and place to the landscape—are untruthful to nature, *entirely* depends for its value on the selection and the skill shown in printing, and not on the process itself. Of course, if the clouds are lighted from one direction and the landscape another, and the clouds happen to be such that particularly emphasise the direction of the light, it is both inartistic and untruthful, and the critics are right: but, providing they are chosen with proper regard to lighting for one thing, and their height above the horizon for another, the printing also being well done, it would be very captious criticism that would raise any objection. My firm opinion is that the most experienced photographer, or artist, could not, in such case, detect *any* points that would be different from a picture that had both clouds and landscape taken at the same time, and with one exposure. The joining of sky and landscape is frequently managed in such a bungling fashion that the most casual examination proclaims the two exposures. A dark cloud enveloping a light building, or other object, that may project above the horizon, is bad enough, but when the clouds are so deeply printed as to be much darker than the middle tones of the landscape, the whole thing becomes absurd. Top-heaviness, is perhaps the most frequent fault in printed-in skies. No definite rule can be laid down as to the depth of printing a cloud negative should have, so much depends on the rest of the picture and effect desired. Dark clouds are generally only suitable for night effects, moonlight scenes, and so forth. Sunset pictures, with *very* dark skies, are untruthfully rendered for the sake of effect, the little splash of light somewhere in the picture being thus wonderfully increased in brilliancy by the gloomy surroundings. Moonlight, alone, will give such great contrasts, for we all know that no matter how dark a cloud appears when the sun is above the horizon, the whole landscape is tolerably well lighted, and in these latitudes for some time after the sun has set. It is only by moonlight that these great contrasts exist. Twilight is a weak diffused light with no bright points, whereas moonlight is a weak direct light with bright points, deep shadows, and little connecting half tints. The manner of imitating a moonlight effect is by under exposing a landscape, with the sun obscured by clouds directly in front, or nearly so, and with water to reflect some of the light, by preference in the foreground or middle-distance. By this means we get great contrasts and little detail. A real moonlight would not be recognised as such, unless the source of light was in front. It is seldom advisable to show either the real sun or moon in the picture, not on account of blurring or reflection, but simply because of the small size these objects are rendered, conveying an impression contrary to accepted ideas. To give

a popular idea of sun or moon, they must be represented many times larger than they would correctly be: painters frequently represent them twenty or thirty times their proper diameter, or even more, yet the effect is neither incongruous or apparently wrong, it only shows how false impressions can be, by habit, preferred to correct ones. A sun represented a sixteenth of an inch in size on a 15×12 landscape would look an insignificant dot, and by the majority of people be considered absurdly small, yet it would be fully as large as a correct representation of the sun ought to be. Distant objects that *we know* are large, invariably give a wrong impression as to size if correctly represented; it is so difficult in such cases to dissociate the real and ideal. We have, in fact, been educated to a certain way of thinking, and stick to it. This exaggerated method of estimation applies to many things other than painting and photography: the real seldom equals the ideal. Perhaps such expanded ideas are a gain to happiness—who can say? It may be a compensating law of nature to encourage perseverance, that all things we are striving after seem larger and better than they prove to be when the striving ceases and the end is gained. At any rate, the representation of distant objects on too large a scale is a pleasant fiction, and I do not think much advantage would be gained by altering it.

Clouds have been almost exclusively used as adjuncts to landscape pictures. They may, however, be used with advantage as backgrounds for portraits to either half or three-quarter length sizes, with a very pretty effect. Portraits in outdoor costumes are very suitably backed with clouds either for solid or vignettéd prints; the different gradations of a suitable cumulus cloud can be advantageously contrasted with the lights or shadows of the dress or figure, and entirely obviate that inlaid appearance so often seen with perfectly plain backgrounds. A delicate retiring background gives great solidity to the figure, and this is why plain graduated grounds suit almost all subjects. The clouds have the advantage of breaking up the uniform level surface without in any degree interfering with the relief, and the whole picture may be printed light or dark, according to circumstances, without destroying this retiring effect. In a well-known picture by Sir Joshua Reynolds, clouds form the only background, and have been utilised by many figure painters to give the effect of distance. The use of clouds in this manner suggests a landscape, although none be present. One precaution must always be taken—never to print the clouds too dark at the upper part, or the whole effect is vitiated. Nothing looks worse than to see a picture overwhelmed with dark clouds, like smoke from a chimney on fire, for no matter how beautiful clouds may be in themselves, they must always, to be pleasing, be subservient to the landscape or figure with which they are associated, and had much better be printed too light than too dark.

If prints are to be mounted it is surprising how slight a tint in the sky will show distinctly. Mounting shows up detail in every part of the photograph that, maybe, is hidden and lost in the unmounted picture. Rather darker printing for pictures intended to be kept unmounted is the general rule, as by this means they look somewhat richer and brighter. It may be borne in mind that a very small portion of suitable cloud in the right place will be one of the most important points in the whole picture. In adjusting clouds to the landscape quantity is nothing in importance compared with suitability—a merely plain tint is infinitely to be preferred to the most beautiful clouds if they are out of keeping with the subject. In printing no sharp-edged mask should be used; a folded cloth laid over the negative and print is all that is necessary, so that the sky and land may be *very gradually* vignettéd into each other. The little time clouds require, or ought to require, to be in printing compared with the landscape will not injure any of the darker parts, even if they encroach on them; it is only when white or very light objects extend above the horizon that any special masking is required, and this may be met with a bit of paper folded to the shape of the object and laid outside the negative in addition to the cloth. Like most other things, correct judgment must be exercised, which, combined with a little practice, renders the work of printing-in clouds quite easy, and the results undistinguishable from pictures where the land and sky have been taken by one and the same exposure. The principal indication of such double printing will be that the clouds are more suitable to the picture than they probably would have been in reality.

EDWARD DUNMORE.

THE SHARPNESS OF PHOTOGRAPHIC PORTRAITS AND ITS INFLUENCE UPON THE ARTISTIC EFFECT.

"A QUIET illumination, energetic technical execution, handsome results?" Much is said about the distribution of sharpness, but it is very seldom that mention is made of the influence of the same upon

the artistic effect. To comprehend correctly this very sore point in photography, let us look on a large head about half life-size or more. Here it is extremely difficult, no matter how carefully we draw the focus, to obtain the artistic rest, it being in the nature of a double objective, that the sharpness extends too much upon a certain surface but not upon the body.

If we look, for instance, at the head of an old man whose hair and beard are mixed with grey, the retoucher will surely almost despair in trying to sharpen hair and beard, because, by the incapacity of the objective, a considerable part is of an entirely inextricable representation, which may even be increased to an enormous extent by the incorrect treatment of the illumination. In smaller portraits we do not observe this so much, and it can be corrected with less trouble by retouching, but the only resource, to evade it on large heads, is by taking a smaller negative and then enlarging it; or, according to Fritz Muller (who was the first to draw attention to it), the front lens of a five-inch portrait objective is reversed, admitting hereby a much longer focus than there is no necessity to come so near the subject to be photographed to obtain the desired size, and thus distortion is avoided. On the other hand, depth of illumination is gained, which by a very uniform sharpness characterised by a delicate gradation, impresses the portrait with the stamp of artistic softness, esteemed so highly in the drawings of the best French artists. If the illumination is correct by application of such a lens, that is to say, that besides the face particularly, the hair will appear naturally, neither black without detail, nor with white spots, such portraits will be unparalleled in their way and require very little retouching, and here alone is proven the superiority of the high combination lens. Because the less retouching is required the better the likeness will be, just as a drawing will be of a higher value by having the least number of lines applied in its production. The single lens, of course, possesses less strength of light than the double objective, but this is, nowadays, sufficiently balanced by our present very sensitive dry plates. But, besides this, the rays of light have to pass only one lens, whereby the light interrupted by the second lens of the double objective is regained, and this is quite a considerable amount.

The illumination has also a controlling influence upon the sharpness, as, for instance, a head (at least on a small scale on account of the objective), and may be so reproduced by illumination, that every single hair, and all other outlines are sharply visible, but a soft illumination will always appear more natural; yet by *correct application*, it can even be considered as the means to idealise, which is never *prejudicial to the likeness*, and thus it has the peculiarity to reproduce softness with definition, and any wrinkled faces with fine gradation. This peculiarity could be ascribed to an effect similar to aerial perspective, the latter having such an evident similarity with it, and the beauty of both being due to very delicate aerial reflections, which we should also try to obtain in every background, and which are produced by placing the background always vertically, at least one to two metres distance, to obtain less sharpness (but still well defined) than in the foreground—"the arrangement"—and finally by bringing the illumination in harmony with the foreground. Those who understand it give to the foreground a distinctly expressed sharpness, and subordinate the middle ground and still more the background accordingly, by a gradual building up of the arrangement, and will impart to their results a fine artistic hue. The sharpness of the background should never be equal to that of the middle ground, and that of the latter should never reach the sharpness of the foreground, as we frequently see; where, for instance, a group is taken with too small an instrument, and where to obtain more sharpness in the lower parts, the ground glass with the upper parts is placed more backward; thus the background will appear sharper above than below. For the same reason the background should always stand vertical to the apparatus, as otherwise the linear proportions, as well as the aerial perspective, will be defective, in consequence of which, the natural as well as the artistic effect will be totally ruined.

BRUNO SAEMANN, *Mullhausen.*

—*Anthony's Photographic Bulletin.*

JACK AND I IN NORWAY.

X.—VADHEIM, NÆRØ FJORD, GUDRANGEN NÆRSDAL, AND STALHEIM.

We got some good pictures of Sande, landscapes full of interest but scarcely so characteristic of the country as many others we had already got. The Sande pictures were more cultivated scenes, lacking the grandeur of the rugged and mountainous parts of the country.

We started for Vadheim—a run of eleven miles—and we just timed ourselves to catch the boat; but it was late, and we had to put in some two hours before it made its appearance. The name of the steamer was *Fram Naes*, a good boat, but awfully crowded, both with cargo and pas-

sengers. There were a lot of Bergen girls on board, with their fancy kerchiefs on their heads, and the everlasting umbrellas in their hands. This article is said to descend from the mother to the daughter as an heirloom, and they were not much to look at either, being as baggy in shape and as nondescript in colour as the veritable Sarah Gamps.

This trip from Vadheim to Gudvangen took us twenty-four hours, and if it were possible to be more amazed by nature's eccentricities than we already had been, it was on this journey, the Naerø Fjord on the way to Gudvangen being without doubt the most impressive series of wonderful effects that even this country can boast. Barren mountains, thousands of feet high, blackening the waters beneath with their reflections, and keeping the light of heaven from descending to their bases; cottages away up two and three thousand feet, looking like toy houses from German toy boxes set down there on the real hills. These shaky-looking things placed in such precarious positions look like a tempting of Providence, for a feeling takes possession of one that a stiff breeze down the gorge would blow the whole farm (for so they name it) to utter destruction, and to try and track the tracing that is pointed out as the road to such a place is almost impossible, the line of it getting quite lost amongst the rocks and boulders that fill the way. The flat parts of the mountain on which such a cottage is fixed look no larger than an ordinary dining-room table. These are the sort of places that they say the children reared in them when out playing are roped to the lintels of the doors to prevent their falling over and being lost for ever. A creepy feeling comes over one when contemplating such places on their fragile footing, buried in shadow, and the reflection comes, "What a poor, miserable, lonely existence! Without companionship, without intercourse." And still they love such homes.

We got a good few pictures on the way, the quay at Underdals being specially successful.

To show how methodically good business-people the Norwegians are, I would cite one case with regard to our telegraphic arrangements. We asked the people at home to telegraph to us at Gudvangen, and it turned out that there was no telegraphic station at the place, but to overcome the difficulty they telegraphed as far as the line would go, and then posted the messages on to Gudvangen, which reached us on our arrival, and without any extra charge.

When we reached the hotel at Gudvangen Jack met two friends with whom he had spent some time at this same place in the previous year. The "Hullo! how do you do?" sounded very much as if they had just been parted for a day or two. They had been fishing but not catching fish, for the weather was far too bright and good. One of these friends was complaining bitterly; he was like the man in Dickens's story who went out to fish for one special perch, but failed to pull him from his watery way. So Jack's friend had been after one fish every day for a week, and had not been able to catch him, although he could see him plainly enough every time he went to try.

The nearness and height of the mountains here quite dwarfed all minor objects, but the air was so clear that very small things could be distinctly photographed at considerable distances.

Next we went through the Nerødal, a mountain pass about seven miles in length. This pass, in its vast and gloomy magnificence, defies description. Rocks huge as houses strewn like pebbles all over the bottom of the gorge, showing the devastating work of many storms, when these rocks had been riven from their holds and tossed about like playthings. The rushing of the river and the perpetual lashing of the falls sounding on the ear like music appropriate to the weird surroundings.

The wealth of subject in this glen, all of a rugged nature, would supply work for the camera for months, and still leave work for months untouched. We could but taste the flavour of it and go on. When we reached the other end of the dal the views were so many and so beautiful that here we halted for an hour or two to bring with us some of the most catching impressions.

Here the way to Stalheim Hotel comes into view, the twining road right in front of us looking almost perpendicular, and zigzagging up hundreds of feet. We had to walk up that wall-like way. After toiling half up the height, we came upon two waterfalls, one on either side the way, with tremendous volumes of water falling from them. We waited on the stolecarré that came trudging up behind with our traps, and made negatives of these, the Stalheim Fall and the Selvé Fall, one of these having a fall of 1000 feet, the other probably 200 feet less. When we reached the top of the road we could see the Stalheim Hotel standing up in the distance on the top of the mountain. We made a picture of it and its surroundings from that spot, after which we found that we were at the end of a "twenty-four band," and had to wait till after dinner to recharge the slide.

This hotel was the most splendidly appointed of any we have yet visited in this country. The dining room was done up with all the latest improvements in furniture, fittings, and appliances, as complete as any dining room in any first-class hotel at home. A verandah was built out from the dining room and covered in with glass, which formed the most charming of coffee and smoke rooms, from which the views all round were magnificent. The drawing and other private rooms on the ground floor were furnished in the most perfect taste, and on the same floor there was a lavatory fitted with all the most improved apparatus. To come upon a house like this on the mountain's top, thousands of feet above the sea level, was rather a surprise.

The girls who waited upon us had each a special duty to perform, and the dinner was served quietly, quickly, and bounteously. We met an American who was taking pictures here with an "Anthony's Detective Camera," and he told us that he had been fairly successful.

The only place we could get convenient for changing our roll was down in the wine cellar amongst hundreds of bottles of wine; they locked us in to perform our magic in the ruby light, feeling sure, I suppose, that we would not make free with the liquor.

Looking down the Naerødal from the front of the hotel was one of the most comprehensive and impressive pictures that could be imagined. Jack took two or three of this view for the special purpose of enlarging on his return, viewing it from a hill about a mile back from the gorge. Mountains from three to five thousand feet high, standing up on either side, forming a shape like a V, with no more room at the bottom than will let the water flow, mountain on mountain standing out clear and defined and stretching away for six or seven miles, with patches of snow and sunshine, and the bald weather streaks on the beaten rock, with here and there a tree, and hundreds of little waterfalls losing themselves in the breeze, whilst along the mountain side comes into view the yellow-marked carriage drive as it twines in and out. This is a rough outline of the subject, and we got good pictures of it.

We took a negative of the waiting-maids serving coffee, but on development we found that they had moved. I was sorry it was a failure.

We started from Stalheim for Vossavangen, and had not proceeded far down hill before we met our lady and gentleman friends of the *Norge* spinning along on their tricycles. They had come from Voss and were bound for Stalheim. They said that they had had a good time, and that in all their journeys only one horse had been frightened by their machines. We stayed for a little at Opheim, next at Venge, then continued our journey, reaching Vossavangen that night, a run of close on forty miles.

We intended to stay at Fleischer's Hotel, but when we reached Voss we found that it had been burned down, and that he was occupying temporary premises in an old schoolhouse that he had transformed into an hotel for the time being.

Mr. Fleischer is known all over the country as a model landlord, and we found, even in this makeshift place, that the visitors' comfort was his first and great consideration. How he managed to stow the customers away was a marvel, and still there was an air of comfort reigning all around. Fancy, in the room where we slept there were eight beds (of course the room was large), and the washing apparatus was arranged on tables down the centre of the room.

A word here about the beds, or the above statement might be misleading. The beds are made very much on the same plan as berths in steamers, only with a headpiece, and standing on four legs, a sort of long box really, into which the mattress and clothes are placed, and you rather lie in it than on it. These bunks are usually made for one person, but in some places I have seen them with a telescopic drawer in front the broad way, which could be pulled to double the width, thus making a bed for two.

The mattress on which you lie is in most cases a very innocent affair. At one of the hotels I stayed (not this one) the mattress seemed so thin that I complained to the landlady about it, when she came, lifted it out of the bed, and threw it over her arm, as easy as if it had been a muffler, when the chaff or whatever stuff was in it dropped down to the ends, leaving the centre quite guiltless of any stuffing whatever. It looked just like a monster purse of the long, old-fashioned kind, with a little money in either end. Away she walked without a word, nor did she look the least surprised, and sent me in another one, which possessed the advantage of really having something in it to lie on; it was well stuffed.

But to come back to Fleischer's house. There was nothing of that kind there; stuffing all round was well attended to. We thought that we would like to give him a picture of the ruins of his late hotel, and went and had a look at it, but it had been so completely burned down there really was nothing left to photograph, not even ruined walls. He is, however, having the new house raised on the spot, which is of more importance to him and visitors.

In a letter I had from him the other day, he said that his new house would be ready by the first of May, and that it would be fitted with eighty beds.

Should you visit Voss, go and see Mr. Fleischer, and you will find in him one of the jolliest of fellows—one who is never better pleased than when putting and keeping his visitors right; and if you wish to know what you should go to see, and how you should go to see it, in this the most lovely of districts, apply to Fleischer; he will show you how to do it, and no man knows better.

MARK OUTE.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,816.—"An Improved Method or Device for Producing a Portrait by Shadows." A. BARTON, C. ARNOLD, and H. HOPKINS.—Dated August 14, 1889.

No. 12,890.—"Improvements in or applicable to Optical or Magic Lanterns." A. WRENCH.—Dated August 14, 1889.

No. 12,883.—"Improvements in Cases or Covers for Holding Books, Cards and Photographs, and for other similar Purposes." H. D. DICKINSON.—*Dated August 15, 1889.*

No. 12,913.—"Improvements in Projecting Lanterns." Complete specification. H. C. NEWTON.—*Dated August 15, 1889.*

No. 12,921.—"Improvements in the Production and Representation of Instantaneous Photographic Pictures." W. DOBSON and W. C. CROFTS.—*Dated August 15, 1889.*

No. 12,922.—"Improvements in or appertaining to Magic Lantern Slides." H. B. SHARP and W. CHEFFINS.—*Dated August 15, 1889.*

No. 12,972.—"Improvements in Magic or Optical Lanterns." J. H. STEWARD.—*Dated August 16, 1889.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 26.....	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 27.....	Great Britain (Technical).....	5A, Pall Mall East.
" 27.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 28.....	Burnley	Bank Chambers, Hargreaves-street.
" 28.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 29.....	Halifax Photographic Club.....	Mechanics' Hall.
" 29.....	Liverpool Amateur.....	St. George's-crescent North.
" 29.....	Oldham	The Lyceum, Union-st., Oldham.
" 29.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 15.—Mr. A. HADDON in the chair.

A telegram from Mr. Friese Greene was read, expressing regret at being unable to attend that evening for the purpose of introducing his photographs on opal cards, and postponing the demonstration till that day three weeks.

Mr. W. ENGLAND, on his return from the Paris Exhibition, showed an appliance which he had brought over, called a *porte-rondou*. The object of the contrivance was to enable a lens to be temporarily mounted upon the camera without the necessity for having separate fronts for every flange. To accomplish this object a short tube was used, the inside of which must allow the largest flange to pass it; a second short tube fitted into the first by a bayonet joint, and held firmly in place a disc of ebonite against a shoulder in the outer tube. The disc of ebonite had to be cut so as to allow the back of the lens tube to pass through it, and the flange of the lens being screwed on to its thread until the disc was bit firmly between the flange and mount; the disc was then put into the short tube first mentioned and fixed by means of the bayonet joint.

Mr. A. COWAN said that for cutting circles in ebonite he had found it useful to employ a pair of wing compasses, one point of which had been sharpened; this sharp point in a few revolutions cut completely through the ebonite.

Mr. COWAN then showed some plates developed with eikonogen in comparison with others developed with pyro, bromide, and ammonia, and with pyro and soda. With the latter, and with eikonogen, he considered that for bringing out an under-exposed image there was an advantage over the ammonia and bromide developer of three to one.

A plate was shown having spots of partial opacity all over. It was stated to be the only one out of a dozen packets that had exhibited this peculiarity.

Mr. S. G. B. WOLLASTON thought that the spots were due to imperfections in the glass, and that there were depressions corresponding to a certain amount of alkali left in the glass at those places, which alkali had induced more powerful developing action and caused the spots.

A question was read:—"What is the practical maximum and minimum focus requisite for a half-plate camera?"

Mr. F. A. BRIDGE and Mr. F. P. CEMBRANO said that the range should be from three to sixteen inches.

The CHAIRMAN said that it was desirable that the camera should be long enough to use with one of the lenses of the double combination, and for that purpose eighteen or nineteen inches would not be too long.

Mr. W. E. DEBENHAM agreed with the Chairman as to the length desirable. For general use with an outdoor half-plate camera he preferred a lens of nine inches focus, and to use one of the components of this instrument the camera should be at least as long as the Chairman said, unless, indeed, an adapter was used.

Mr. A. PRINGLE showed a chronograph which he considered peculiarly adapted to photographic work. It was simple, and not expensive, and would time from one-fifth of a second up to ten minutes.

The subject of dust spots appearing on plates which had been carefully dusted before being put in the dark slides was introduced.

Mr. BRIDGE said that these spots frequently arose from the sharp edges of the glass chafing and cutting the wood of the slide.

Mr. WOLLASTON said that he prevented this evil by wedging the plates firmly into place with pieces of a common match.

A question was read:—"What is the best method of mounting prints which are highly glazed so that the gloss may be retained?"

It was suggested that the patent adhesive mounts should be used.

Mr. MACKAY said that it was not necessary to get the patent mounts, as any one could prepare them. Some years since it was endeavoured to obtain a patent for adhesive mounts, but the patent was refused on the ground of triviality.

Indiarubber mountant was suggested, but Mr. BRIDGE said that five times

out of six the prints would soon peel off. A better plan was to use starch paste containing alcohol in large quantity. This was prepared by making the paste very thick to begin with, and adding alcohol while hot. It must also be used hot.

Spirit gum, such as used by actors for fixing moustachios, &c., was mentioned as probably answering to the requirement of the question, and an inquiry was put as to the composition of the mixture, which, however, was not answered by any of the members present.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

AUGUST 12.—Mr. Cherry in the chair.

Mr. S. T. Chang was elected a member.

Mr. CHERRY gave a report of the outing to Welwyn, and presented the Club with a portrait of Mr. Valentine Blanchard, executed in oils. He also exhibited some large direct portraits printed in silver.

Mr. Chang exhibited several views of the cycling camp at Godalming, taken with a detective camera and printed on aristotype paper.

At the next meeting of the Club Mr. E. T. Hiscock will demonstrate the platinotype process, printing in sepia also on fabrics. Visitors invited.

BRIGHTON PHOTOGRAPHIC SOCIETY.

AUGUST 13.—The President in the chair.

Mr. Simeon Norman was elected a member, and Messrs. Mitchell, Tate, and Webber were elected to fill vacancies on the Council.

Mr. J. E. MAYALL delivered a lecture entitled *A Spectroscopic Examination of Colour and its Adaptation to Photography*, which was illustrated by diagrams and several specimens coloured by his patent process.

At the conclusion of his address an animated discussion ensued.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

AUGUST 15.—Mr. E. H. JAGUES (Vice-President) in the chair.

The following excursions were announced:—For September 7, to Wren's Nest; for September 21, to Kenilworth.

Mr. Walter Griffiths offered as a prize for the Stratford excursion one of his new lantern-slide cameras. This camera was exhibited and explained by the HON. SECRETARY (Mr. J. H. Pickard), showing how easily and readily lantern slides can be made by reduction with this instrument. There is no focussing required. The negative is placed in the slide at one end, the dry plate at the other end of the camera; it is then taken into the light and exposure given, the ordinary development to follow. The simplicity of the instrument and the slides produced and shown upon the screen were much commented upon.

Mr. J. EDMONDS then read a paper on *Light, Lenses, and Stops* [this will appear subsequently], illustrating the same with the lantern and diagrams, and concluded with showing a number of pictures on the screen, taken under certain conditions bearing upon the subject and remarks *re* lenses, &c.

A discussion followed, which was adjourned to the next meeting owing to the lateness of the hour.

The subject for the next meeting is *Lantern Slide Making*, by Mr. Jagues.

DARLINGTON PHOTOGRAPHIC SOCIETY.

AUGUST 12.—Mr. E. ENSOR presided.

Mr. W. GARRITE BREWIS opened a discussion on *Vignettes and Vignetting*, and illustrated his remarks by several specimens and apparatus used in producing the same.

It was decided to hold an exhibition of "holiday work" at the next meeting, each member to send in two prints.

Samples of Oldham's dry powder developer were distributed amongst the members.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

AUGUST 15.—Mr. S. W. ALLEN in the chair.

Mr. W. Booth was elected an ordinary member.

The HON. SECRETARY read a mass of correspondence relating to the forthcoming Exhibition, and the promises of support from some of the leading photographers of the day were gratifying to the Council.

The Society having gained some practical and useful knowledge from their first experience last year, will make every effort to give satisfaction both to exhibitors and visitors.

Several practical suggestions by the photographic press are receiving careful attention.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Monthly technical meeting. Tuesday next, August 27, at eight p.m., at the Gallery, 5A, Pall Mall East.

SAFE TRANSPORTATION OF SULPHURIC ACID.—Herr Bickmann has patented, in Germany, a process for enabling sulphuric acid for manufacturing purposes to be safely transported. He takes advantage of a property of certain salts—of which alkaline sulphates are representatives—by which they give up their water of crystallisation when heated and take it up again when cool; and he does so by mixing the salts in an *anhydrous* condition with a calculated quantity of sulphuric acid. The whole mass becomes granular, or may be formed into cakes; and when heated the whole liquefies and may be used as if it were sulphuric acid, for the presence of bisulphate of soda does no harm.—*Scientific American*.

Correspondence.

Correspondents should never write on both sides of the paper.

POSTAL DAMAGE TO PHOTOGRAPHS.

To the Editor.

SIR,—For many years I have had to transmit through the post numerous articles far more fragile than photographs, and now adopt the plan of attaching a tying-on direction label, with the stamps affixed, to the extreme corner. Her Majesty's servants will then most likely take the package safely in the left hand while aiming their blows at the "Queen's Head" which it is their duty to deface.

If some such plan were adopted in transmitting photographs through the post, viz., the stamps affixed to a loose label, I feel sure there would be less cause for complaint against the postal officials, who can have no malicious intentions in damaging photographs, while it is unreasonable to expect that they can adjust the force of the blow to the nature of either the contents or the covering of the package.—I am, yours, &c.,

Edinburgh, August 16, 1889.

W. II.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—In your current issue you reviewed a new edition of one of Mr. H. P. Robinson's works, and quoting his condemnation of the theories advanced in Dr. Emerson's *Naturalistic Photography*, you seem to concur in it. I may, perhaps, misunderstand your critic, but apparently he thinks that the "new heresy" has been stamped out by the prancings of the mighty ones of the old school.

I believe that this is very far from being a true version of the case, for, as a matter of fact, the large majority of press notices have been favourable, and so far as I have been able to discover the opinions of the best artists among amateur photographers, unbiassed by previous utterances, they are for, and not against, the book. However, I am far from wishing to enter into a general discussion of the said work, nor would I willingly endanger the dignities of controversy; but the question of sharp focus seems to me to have been so much misunderstood, or so badly misinterpreted, that the true bearing of it has hardly yet been apprehended, and, with your leave, I will advance a few suggestions on this subject.

Now, the state of the case is this: The scientific basis of the theory no one has yet ventured to assail. It is a verifiable fact that the eye looking at the central point in any scene does not see any detail in the surrounding accessories until it shifts its glance to them. Are we justified in using this scientific fact in making pictures with the camera?

Authority I shall not here discuss at any length, for it would occupy a volume, and is after all not conclusive. The only painters who have used full detail are the Pre-Raphaelites, ancient and modern, and the old Dutch school, and, on the whole, Meissonier and his imitators. Against these set Michael Angelo, Giorgione, Titian, Rubens, Van Dyck, Tintoretto, Velasquez, Reynolds, Gainsborough, Turner, Constable, Crome, Millet, and Corot (to pick a few of the greatest at random). Did these painters slur minor detail because they were unable to render it?—did they not rather render it fully in their earlier periods, and gradually grow looser in their treatment of it when their powers were matured and their knowledge at its height?

Next, what object is there in putting details out of focus? Why not put in a small stop instead of a big one? An artist making a picture is imposing his idea of the scene upon the spectators: he conceives it as a subject; arranges the portions of it so as best to express his meaning; and, in a word, he gives you his version of the incident. Must it not be of great help to him to be able to show you what part of the picture he regards as most important and what other parts are merely accessory? It is true that he can employ lighting and composition to some extent for this purpose, but in photography his control over these is very limited. But by judicious use of focus he can always direct your eye to that subject for the sake of which he took the picture, and not allow your attention to be diverted by the beautiful intricacies of wholly subordinate details. Thus, in a ploughing picture you do not want to see every clod all over the field as sharply rendered as the straining horses or the guiding man, as if the ploughman were set to cultivate a field of lava.

To put the actual subject in focus and let the unimportant details be less sharply focussed thus seems of service when the picture is all that we would choose, but this course is of still greater value when some parts of the picture are such that they would be wholly suppressed or widely altered by a painter. The photographer cannot omit them, but by taking the sharp edge off them he can render them harmless and unobtrusive, and all this, in both cases, not by taking any liberties with nature, but by transferring to paper exactly what the eye sees when it looks at the point at which the artist intended it to look.

Mr. Robinson's contention that photographs should be sharply focussed because rendering of detail is the distinctive quality of photography does not amount to much. I always have thought that the essential advantage of photography was the absolute accuracy with which it rendered the form of everything in front of the camera, and I never heard of any other artist than Mr. Robinson valuing a photograph artistically as such for any but this reason; but this does not prove that it is necessary to give every detail equal sharpness.

That softness of focus "must not be carried to the length of destroying the structure of any object" is a point on which Dr. Emerson has strongly insisted, and in few respects has greater injustice been done to him by his opponents than in their constant disregard of this reservation. As long as structure is not destroyed it is not easy to see how the use of a shallow focus can be abused.

I can only plead my interest in this subject as my excuse for addressing you. If I have not bowed to Mr. Robinson's authority, I am sure he is honest enough to prefer truth to flattery.—I am, yours, &c.,

August 20, 1889.

GRAHAM BALFOUR.

BLACKING THE INTERIOR OF DARK SLIDES.

To the Editor.

SIR,—Mr. T. N. Armstrong has some remarks in your issue of August 9th on the subject of the blacking in dark slides spoiling plates kept in them more than a few hours. This is rather an important subject, and it was years before I found out the cause of sometimes a batch of negatives turning out useless. It was, I now believe, when they had remained in the slides more than an ordinary time. I should be glad to know what one ought to do to a slide that fogs plates. Probably the best course would be to remove the offending substance with sandpaper. Which of the materials in the blacking is it that produces the fog? Why do makers persist in blacking the insides? No light ought to get in, so that no reflection will occur with a properly made slide. Chemical action of the stuff hinges are made of is another source of trouble. American cloth is fatal. One ought to be able to expose a plate without muffling up the camera in the focussing cloth, but I doubt if any apparatus would stand it.—I am, yours, &c.,

F. J. QUICK.

Camera Club, 21, Bedford-street, W.C., August 21.

PORTABLE CAMERAS.

To the Editor.

SIR,—In your issue of the 16th instant is published a specification (No. 11,300) of "an improved portable camera." Part of the description is that of one light-tight box sliding into the other, apparently for focussing purposes and compactness for portability when not in use. I have had a camera on the stocks for about a year with this arrangement, which has been freely described and shown to my photographic and other friends, and also been exhibited at the Photographic Club. It seems to be essentially the same as described in the above-mentioned specification, with the exception that the shutter is behind the lens, and the label disguising the front thereof springs up and forms a sky shade instead of moving to one side, and that the method of setting and releasing the shutter varies.

I have found a finder quite superfluous, and my camera is also arranged for use as an ordinary camera with a focussing screen.—I am, yours, &c.,

HENRY E. DAVIS.

Paulatin Club, 39, Fitzroy-square, W., August 21, 1889.

PACKING DRY PLATES.

To the Editor.

SIR,—In your issue of the 9th instant I notice with pleasure the comments of Messrs. Armstrong and Dunmore on the various methods of packing dry plates. This is a subject, which, in my opinion, stands greatly in need of discussion, as is testified by the all too numerous methods adopted by different manufacturers.

Each of the above-mentioned gentlemen—one directly, the other by inference—condemns the grooved box system, and this quite corresponds with my experience. In fact, owing to this packing, I have been obliged to abandon the use of my sometimes pet plate, the —.

As an amateur, detesting much luggage, I have to carry four or five dozen plates every summer crammed into my portmanteau, which is subject to the usual operations of the baggage smashers, and the consequence was, under favourable circumstances, half a dozen or more plates broken or scratched, owing to pressure on the half-filled cardboard boxes. This sometimes on the return journey! And, besides, one dozen plates in a grooved box occupy the same space as two dozen packed closely. Hence, after some experimenting, I have settled down on a plate packed rationally, and now I never have a loss by breakage while travelling.

If, then, it be conceded that close packing is the correct plan, both for keeping and carrying, it only remains to settle on the best method to adopt. One is the face-to-face arrangement in pairs, either with a paper disc or sheet, or else without any separator at all, between adjacent plates. For my part I don't like this style, as in the dim, religious light used for changing there is occasionally a slight—very slight—difficulty in distinguishing the film side, and also a chance of getting one's fingers over the sensitive surface, for sometimes the plate is face up, sometimes face down, in the box.

A much better arrangement would be to have the plates all film down, then there can be no mistake; and, further, it is possible to lift them out by the pneumatic holder—by far the best plan.

For separating, the most convenient arrangement would be a continuous strip of pure tissue paper zigzagged between the plates, so that by lifting the free end the plates come up one at a time, and all film down. In this

connexion the suggestion of the Editor, *re* gummed strips, might be worked in.

Then for the boxes. Here I must confess to a decided partiality for the method adopted by Thomas; as all may not know it, here it is:—A strip of orange paper, first of all, of equal width with the plates, completely encloses them in the long direction. This parcel is placed in an open box, and the whole then wrapped in strong, black, glazed paper. This package, now presumably light-tight, is next slipped into an envelope box open at one end, and this again, open end first, into another envelope. Thus it is a moral impossibility for any light to strike through the three cases to the plates. I should add, however, that the black wrapping above-mentioned has lately been improved upon (?) by the substitution of a semi-transparent paper of a non-actinic colour for the black opaque one previously used.

If there is any better packing in the market I would be glad to hear of it, as I have only tried half a dozen or so different makes. If there is not, then the above plan should be more generally adopted.

I trust that others who have suffered loss of time, trouble, and money through badly or irrationally packed plates will ventilate their opinions for the benefit of photographers in general and travellers in particular.—I am, yours, &c.,
WILFRED L. SPENCE.

Manchester, August 19.

Exchange Column.

*. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, a camera and lens in exchange for a quantity of plates, dishes, printing frames, &c.—Address, CHARLES JOHNSON, Wincanton, Bath.

Exchange half-plate Meritoin with three double backs, lens, and tripod, for quarter-plate set.—Address, MERITOIRE, Rock-cottage, Instow, North Devon.

Brocaded silk studio curtain, eleven feet by five feet, and porcelain lip tray, 17×14, in exchange for Victoria camera and nine lenses, dark slide, &c.—Address, H. T. AULT, 15, Warfe-street, Newcastle, Staffordshire.

I will exchange boat, oar, and water-piece, studio table, 12×10 camera, and rustic bridge, for interior backgrounds, posing chair, or other outdoor accessories.—Address, F. C. D. HURN, 10, Cowl-street, Shepton Mallet.

Wanted, whole-plate brushier, half-plate portrait lens, and studio accessories, in exchange for a quantity of developing dishes, retouching desks, and enlarging cameras.—Address, B. P. C., 71, Montague-street, Blackburn.

For exchange, exterior background, brushier, ten-inch roller, sociable tricycle, and bassoon; wanted, exterior and interior backgrounds, and cabinet and carte enamelling presses (Marion's preferred). Photographs exchanged.—Address, J. H. G., 36, Commercial-street, Brighouse.

Exchange balustrade, pedestal, and vase for a different set. A Grubb's 1½ portrait lens, Voigtlander's ditto, three and a quarter inches diameter, ten inches focus, and 12×7 hot roller offered as exchanges; want a good upholstered armchair or other interior accessories.—Address, ATKINSON, Photographer, Workington.

Answers to Correspondents

*. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

J. Stuart, Glasgow.—Two photographs of timber merchants at York Hill.
W. S. Keddie, Warminster.—Photograph of the interior of the "Minster," Warminster.
R. Whitehouse, Manchester.—Photograph of Bowden Hall.

W. K. B. (Tokio).—New and excellent model selected. Despatched ere this meets your eye. Will write.

F. E. S. (Dorking).—When you are in London give us a call, and we will give you the required information.

A. Z.—The new film is not yet in the market, we believe. It will be, we are informed, in a very short time.

YORKS.—The "peculiar marks" are what is known as "pitting." We have seen other examples on the same brand of plates lately.

S. CRESWICK.—All things being equal, one lens will be as quick as the other; that is, if both be used with an aperture of, say, *f*/16, there will be no difference in their rapidity.

D. McINTIRE.—There is no recognised system of book-keeping amongst photographers. Almost every one has a system of his own, which he has adapted to suit his requirements.

W. THOMAS.—The copyright in Hogarth's works has long since expired, consequently you can make lantern slides from them. Not so, however, with the other works named; for these you will have to obtain permission, and we are very doubtful if it will be accorded.

E. WORDERSON.—The fault must be yours. We have never heard of any one else failing with the process, which certainly does all that is claimed for it. We ourselves never had a failure with it, nor should we expect to have. Try again, and follow implicitly the instructions as they are given.

J. W. CARTER.—Obtain any elementary work on optics. In this column we cannot enter into such things as the construction of optical toys.

WADEEN.—You must not imagine that because you have been granted a patent that it is of necessity a valid one. If any one has used publicly or sold, as you say is asserted, a similar contrivance prior to your patent it will invalidate it. Few patents can be considered really valid until they have been litigated.

A. H. C.—1. The camera sketched as No. 2 is the more portable, but we prefer the square bellows, as it permits of using a pair of lenses for stereoscopic work while the conical bellows does not. Furthermore, the No. 2 form is not so convenient when using a wide-angle lens.—2. The longer-focus lens will cover the plate the best with a large diaphragm, but it will not include quite so wide an angle.—3. The paper named does not require any special treatment from other bromide papers. Employ the developer recommended by the makers, the formula for which is sent out with each parcel of paper.

A. BLACKLOCK writes: "I recently ordered some ready-sensitised paper from a London firm, and upon opening the parcel I found it had a most disgusting odour. I have never had ready-sensitised paper before, as I have always used — paper and sensitised it myself, and that never has any smell whatever. I have made a few prints on the paper, and it appears to work all right; but do you think that prints made on such paper are permanent?"—Opinions on this subject are somewhat divided, but paper of this description is largely used. We have in our collection some prints on similar paper which show no signs of fading, although they are a dozen or more years old.

S. A. H. writes: "It seems to me that the only plan for securing a perfectly flat surface with films is to expose behind a glass plate. Is there any real objection to doing this? I believe that in the old calotype days cameras were frequently made with the focus arranged specially for this mode of exposure. When the gelatine film has been cleaned off from the celluloid (Carbutt's make) I find this substance most useful instead of tissue paper for printing, and if it could be kept flat would be a most excellent substitute for the usual ground glass for focussing."—In reply: There is only this objection, that there will be a very slight loss of light by reflection from the covering glass. The old calotypists were very particular in selecting glass free from colour and blemish.

Z. BLUNT asks: "Could you kindly inform me, in your 'Answers to Correspondents,' the following? I am a printer and toner; I have a toning bath made of acetate of soda and gold, in all to two gallons of water; now, I have on an average one and a half quires of paper to tone a week, and make two or three tonings of it; how should I keep this in good working order? I am going to make up a new bath, and want it to be good; how much acetate should I put in to start with, and how often should I add more, and in what quantities (purple tones required)?"—Thirty grams of acetate of soda should be employed for each grain of chloride of gold. As the bath becomes exhausted more gold must be added, in the proportion of one grain for each sheet of paper toned. Occasionally a little more acetate of soda must be added.

F. J. is a photographer in a country town, and has lately taken to supplying photographic chemicals, plates, and paper. This, it appears, has given annoyance to a chemist and druggist close by, who has threatened proceedings against him if he sells things of a poisonous character, such as bichloride of mercury, cyanide of potassium, &c. Our correspondent asks if he can do any such thing; if so, where he can obtain a license to sell the chemicals, and what is the cost.—Certain poisons named in the schedules of the Poisons Act, amongst which are the ones referred to, can only be legally sold by properly qualified pharmaceutical chemists, and by them only under certain restrictions. Any one else vending the poisons is liable to very heavy penalties. There is no license which will exempt the vendor from the penalties when he is not a qualified pharmaceutical chemist.

E. D. writes as follows: "I have lately experienced great difficulty with my toning. I use the borax bath—one and a half drachms of borax, two to three grains of gold, and fifteen ounces of water. I use this bath warm, and put in about six prints (whole-plate) at a time, keeping them well on the move. Lately, quite half the prints in a batch go as the enclosed. The curious thing is the straight stains across the prints at different angles. The toning and fixing dishes I use are not big enough for the prints to lie anything but square, so cannot account for these marks appearing as they do. During my last toning I kept one print in a long time, as it had been over printed, and eventually took it out and hung it up to dry without fixing or washing. This print had no stains on it, so I conclude they must come after leaving the toning bath. Would they be likely to appear during washing, between the toning and fixing? I use plenty of hypo, and do not think the prints ever stick together whilst toning. The remedy for the above annoyance would oblige."—The stains are caused by the prints being contaminated with hyposulphite of soda before they are put into the fixing bath. Probably the dishes in which they are washed after they are taken from the toning solution are not perfectly clean. Care and cleanliness will avoid the trouble in future. The change was made the first week in April.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1530. VOL. XXXVI.—AUGUST 30, 1889.

SOLUTIONS OF THE CAUSTIC ALKALIES.

A WEEK or two since we mentioned the uncertainty that may arise from the deterioration of solutions of sodium and potassium hydrate, now so commonly employed in place of the carbonates in development, and pointed out that this may arise from absorption by the solutions of the carbonic acid always present in the atmosphere. The affinity of such solutions for carbonic acid is so powerful that potassium hydrate, or a mixture of potassium and calcium hydrates, is employed by chemists in all delicate analytical operations where a current of air is to be employed for freeing it from all traces of carbonic acid. Our contributor "Junius" has pointed out a useful method of remedying or preventing this deterioration, based on the circumstance that calcium hydrate has a still more powerful affinity than either potash or soda for carbonic acid, and when brought into contact with the carbonates of those bases, deprives them of their acid and leaves them in the free or caustic state.

It has appeared to us probable that the plan thus mentioned by "Junius" may prove useful in many instances beyond those where it is employed for remedial or preventive purposes. The hydrates of sodium and potassium are not everywhere obtainable of anything like reliable quality; almost any country chemist, it is true, can supply "liquor potassæ," the pharmaceutical solution of potassium hydrate, but even if it be comparatively freshly prepared and free from carbonate, it is not an easy matter to the ordinary photographer to convert it to terms of a practical formula. But the carbonate of potash, and especially of soda, can be obtained anywhere, and of fairly reliable value; and starting with these as a basis, the photographer never need be at a loss to supply himself with a trustworthy solution of the hydrate. We therefore propose to give simple directions for operating with these substances, and the relative quantities to be employed.

Carbonate of soda in crystals, or ordinary washing soda, as most commonly employed, consists of the anhydrous salt, together with ten equivalents of water of crystallisation, or 106 parts of carbonate of soda and 180 parts of water, and the proportion of sodium hydrate present is 80 parts. Therefore, 286 parts of washing soda, or 106 parts of the anhydrous salt, are required to produce 80 parts of the hydrate; or, in approximate figures, $3\frac{1}{2}$ parts of soda crystals contain 1 part of caustic soda.

With these figures to work upon, let us proceed to make up

the formula for use with hydroquinone known as Thomas's. This consists of—

Sodium hydrate	160 grains.
Water	20 ounces.

We therefore take three and a half times 160 grains, or 560 grains of clean crystals of washing soda; in selecting these, the large, clear crystals should be chosen, as the white, powdery portions which have effloresced or lost a portion of their water of crystallisation contain a relatively larger proportion of alkali, and will therefore vitiate the calculation. One ounce and a quarter of the crystals will represent the quantity required, only short about thirty grains of the full theoretical quantity, and for the sake of clearness and "round numbers" may be taken as sufficiently near the mark. This is to be dissolved in half a pint of water, preferably hot.

We next turn to the calcium hydrate, which, as pointed out by "Junius," must be freshly slaked or hydrated; we therefore start with the "quick" lime. Comparing the equivalents, we shall find that 56 parts of quicklime are equal in combining power to 80 parts of caustic soda, or seven-tenths of the weight; and that therefore for the above quantity of material we require 112 grains of lime. But as an excess of the lime not only does no harm, but is rather desirable, we may weigh out, say, half an ounce, which is nearly double the theoretical proportion. This is slaked by pouring upon it in any suitable vessel, *not* of glass, sufficient water to cause it to swell up and crumble, giving off at the same time great heat and considerable quantities of steam. When the action has ceased and all is quiescent, the hydrate is beaten into a smooth paste and the solution of washing soda mixed with it and boiled for about ten minutes in a porcelain evaporating basin or an enamelled iron saucepan. It is then allowed to cool down, the volume made up to twenty ounces and allowed to settle.

There is no necessity to remove the sediment, which, as mentioned by "Junius," settles—the calcium hydrate being in excess—to keep the solution in good condition. If a portion be required in a hurry, or before it has had time to clear, it must be filtered through "glass wool," as even in weak solution the caustic alkalies act powerfully on filter paper.

To make a solution of potassium hydrate of equal alkalinity, 276 grains of *dry* carbonate of potash, or five drachms, will be required. If the pure anhydrous carbonate be obtained, it will be advisable to dry it by spreading it on a plate in a hot oven

for an hour or so. If, however, the crude carbonate of the shops be in question, the drying is a matter of the utmost necessity, as owing to its deliquescent nature, the quantity of water present is always large.

The remaining operations, as well as the proportion of calcium oxide to be used, are identical with those already given.

NEGLECTED PROCESSES.—LAMBERTYPE— CONTRETYPE.

The Lambertype is often confounded, especially on the other side of the Atlantic, with the chromotype process, while, as a matter of fact, it bears no relation to it whatever. Our older readers, particularly those who have paid heavy fees for licenses to work them, will not require reminding that M. Lambert, when he was here some twelve or fourteen years ago, introduced three distinct processes—namely, the Chromotype, Lambertype, and the Contretype. They were, however, all based upon the carbon process. The chromotype, perhaps the best known of them all, was treated upon a fortnight back; the others will be referred to here.

The Lambertype process proper is a method of producing enlargements in carbon—introducing or changing backgrounds, printing in portions from second negatives, &c.—in such a manner that no hand work is required on the ultimate print. The process, we believe, was never carried out in the manner its originator intended, owing to a tissue suitable for making the transparencies not being forthcoming. The tissue desired was one in which the colouring matter, preferably a red, was in a somewhat coarse state of division, so that in the enlarged negative a manifest grain or stipple was obtained. By this means much labour might be saved in the finishing and a more artistic result secured.

The main feature of the Lambertype process was the method of working up or retouching the enlarged negative. In a word, it consisted in expending the whole of the work on the negative instead of on each individual print. We well remember, at one of the Photographic Society's Exhibitions, some examples were shown, which were, so far as the prints were concerned, absolutely untouched. In some of these, not only had the backgrounds been changed, but also portions of the dress as well, still no joins were perceptible. Some of those examples were taken from small paper prints, yet no one would have suspected that they were not from original negatives, but for the intimation that that effect on the mounts.

The process is, or rather was, worked as follows:—An enlarged negative was made from a carbon transparency in the ordinary manner. In the development, however, it was kept very thin, so thin indeed that, in its then state, it would be far too feeble to yield a presentable print. This negative, after varnishing, was covered on either side with a thin translucent paper. This, to an extent, increased its density, but, of course, uniformly all over alike. The negative was then placed on a retouching easel, back upwards, and the lights and half tones strengthened roughly with a coarse stump charged with plumbago until sufficient printing vigour was obtained. Then the negative was turned over and the finer details strengthened, and the high lights put in with a fine stump or with a lead pencil, as the case might be. Sometimes, if still further printing vigour was required, it was obtained by cutting away portions of the paper on the back side of the negative corresponding with the deepest shadows.

The Lambertype process of finishing may, in fact, be termed

a mechanical method of intensifying the negative, and on those portions alone where it was necessary. It is scarcely necessary to explain that a certain amount of skill and artistic ability is requisite to execute the work satisfactorily, though not more than is possessed by every skilful retoucher.

The method of changing the background or printing in portions from a second negative was unique. The outline of the subject desired to be altered was traced on the paper at the back of the negative with a fine pencil. The negative was then placed closely into one of the angles of the printing frame, and the tissue—for this method was only designed for carbon printing—was placed upon it. This was also pressed closely into the same angle and the frame closed. The outline was then gone over with an opaque oil colour mixed with a non-drying oil on the glass of the printing frame—which, by the way, was rather thinner than usual—for a quarter of an inch or so, keeping very slightly without the pencil tracing of the subject. A rough paper mask was then placed on the glass to cover up the remaining portions required to be blocked out. After printing, the paint and mask were removed and the outline painted over afresh, this time keeping a little within the pencil line. The negative was then removed from the frame and the second one introduced. The tissue being again closely pressed into the same angle of the frame secured accurate registration. A rough paper mask, to protect the portions already printed, was laid on as before, and the second printing then completed.

The principle of this method of masking is this:—The light creeps under the painted lines and paper mask, so that the two printing are, as it were, vignettted the one into the other, hence no juncture is perceptible.

Frequently, when the enlargement was from a paper print, M. Lambert partially printed the picture—say to the extent of three-fourths—with the tissue in contact with the negative; then a thin sheet of glass was interposed, and the printing completed through that. By this dodge the granularity due to the original became imperceptible. It was by this method of working that M. Lambert's enlargements from paper prints so closely resembled those from original negatives. The Lambertype process might well be described as a series of very ingenious and useful practical dodges.

The Contretype process, which, by the way, never received much attention, was a simple one for reproducing negatives by the carbon process. But in this case the transparency was made in a tissue of a red colour, and the pigment therein was so proportioned that a somewhat high relief was obtained, even from feeble negatives. This transparency could then be easily intensified with the permanganate of potash. This is not the case with a transparency from a weak negative, printed in a tissue highly charged with opaque pigment. From the intensified transparency the negative was printed either in the same or any other tissue. This, in turn, could afterwards be intensified or not, as circumstances required.

IN a footnote last week we then quite misapprehended the position of the Council of the Convention in regard to the publication of the papers which were contributed. On entering the Council Room on Tuesday evening we were informed by a fellow-member that the distribution of printed slips of the papers to those in the Convention, the press included, might be considered as a rescinding of the previous determination to withhold publication till after the close, and this we considered justification for giving two papers in our last. We only learnt after the JOURNAL was at press that no such rescinding

of the original intention had been made, and we immediately saw that, however undesigned, we could be open to the charge of not having kept faith, the photographic press not being in the same category in this respect as the general press. We are sorry for this misapprehension, but it was entirely unintentional.

Among the many causes of discrepant results in photographic operations, that of impurity in chemicals has been frequently dwelt upon, though, within our own knowledge, it has often been the cause of serious trouble, if not of actual loss. It is, however, not only photographers who suffer this way, for we note quite recently in the published account of an investigation by Mr. D. J. Carnegie, M.A., upon certain iron and iodine reactions, that his own experiments and, in all probability, those of his predecessors on the same ground, were at first vitiated by the presence of a foreign substance in a presumably pure sample of the salt he was using, a salt, moreover, of constant employment in photography—iodide of potassium.

THE salt in question is of such importance in photography that we consider our readers will be interested in the portion of Mr. Carnegie's remarks bearing upon it, the more so as it may have a bearing upon the condition of bromides as well as iodides. He states that after making numerous experiments, whose results did not satisfy him, he subsequently found that their cause to be the "presence of an impurity in the 'puriss' potassium iodide used. It is well-known that commercial KI frequently contains KOH and K_2CO_3 ; but this impurity is apparently not confined to the commercial article, for samples of the purest KI supplied by two of the best known British firms contained respectively 2.3 per cent. and 1.0 per cent. Now the extreme importance of this impurity in iodometry has never, I think, been sufficiently emphasised; the text-books, in the fervour of their warnings with respect to the evils arising from the presence of iodate in potassium iodide, have completely overlooked quite as formidable an impurity. Both KOH and K_2CO_3 , 'fix' free iodine, and it therefore follows that all iodometric estimations (even the simple standardisation of thiosulphate against pure iodine dissolved in KI), unless special precautions have been taken to the contrary, are vitiated in varying degree by the alkalinity of the impure KI."

THESE remarks will also assist in clearing the ground to describe a new method of testing volumetrically for silver. It would, perhaps, be difficult to find a simpler process than the ordinary chloride of sodium precipitation, but as it is never advisable to be tied down to a particular formula or mode of operation, it will be interesting to note this new method. It is founded on the reaction between starch and iodine, and is just as applicable to silver as to mercury. M. Carnot writes:—"1. First take the case of mercury, which must be in the mercuric state. The solution diluted with water to 100 or 150 c.c. is put in a beaker with about 10 c.c. of nitric acid and a little clear starch paste. Then a decinormal solution of potassium iodide (10.61 grammes of the pure salt per litre) is dropped in from a burette, stirring continually with a glass rod. Each drop produces at first a yellow precipitate, which quickly dissolves on stirring; then the precipitate turns gradually to red. At the moment when the mercury is entirely converted into the insoluble iodide the least excess of the reagent liberates iodine, which at once colours the starch. Before the end of the operation we perceive, at the place where the drops of the reagent fall, blue and afterwards brown spots, which disappear at first rapidly, then they form trains of a dark brown in the midst of the red liquid, and finally give it a general brownish tint. The exact moment must be seized when a permanent change of colour is observed. If this is ever so little overstepped, the liquid, when left to itself, remains of a blue colour after the subsidence of the red precipitate. When the quantity of mercury to be determined has been approximately found by a first operation, it is advantageous to add at once almost the total quantity of the reagent necessary, and to add the starch and the nitric acid afterwards. The remainder of the standard reagent is then added drop by drop until the reaction is completed. 2. Silver is determined in the same manner as mercury.

If the substance in question is of unknown composition, we make first an approximate determination. According to this first datum we calculate the approximate weight of the silver contained in the portion taken for analysis, we dissolve it in nitric acid, dilute it to 100 c.c., introduce the calculated quantity of the decinormal potassium iodide, and stir briskly, so as to collect the pale yellow precipitate of silver iodide in the form of dense clots. We decant the liquid along with a little washing water into a beaker, add some c.c. of starch paste, and about 10 c.c. of nitric acid slightly nitrous. If at this moment the liquid becomes blue, it is exactly decolourised by means of a centinormal solution of silver nitrate (1.7 gramme nitrate per litre). If it is not coloured blue we pour in at first potassium iodide until the permanent blue tint appears, which is then removed again by means of the centinormal silver solution. In this manner the author has obtained results accurate to 0.1 or 0.2 milligramme when operating upon known quantities of silver from 1 to 200 milligrammes."

In the House of Commons last week, on the report of supply on the British Museum Vote, some of the members appeared to be a little "mixed" with regard to the photography practised there. They seemed to think that some of the "Parnell letters" were copied by the official photographer, and with the apparatus belonging to the department. As a matter of fact, there is no official photographer at all attached to the Museum, neither does the Museum possess any photographic apparatus whatever. There is a photographic studio and dark rooms which are at the disposal of those desiring to make copies of the prints, manuscripts, &c., but they have to bring their own apparatus. When the authorities require any photographs taken for the Museum, they have to invoke extraneous aid. Of course, permission has to be obtained to photograph anything in the Museum, but this is readily accorded by the authorities, and, when it is obtained, every facility and assistance are afforded for securing the best possible result. A letter addressed to the Trustees meets with prompt attention.

At the National Gallery there is no such convenience. Permission is easily obtained to copy any of the pictures, but there is no studio to do the work in, and they must not be taken out of the building. An exception was made to this regulation a few years ago to Messrs. Braun, of Dornach. They were allowed to put up a studio outside the building, in which they worked for several months. If such exceptional privileges as these are ever again accorded, it is to be hoped that the Trustees will stipulate that copies of the different works will be supplied to art students at a cheaper rate than they are at present.

In the Civil Service estimates, some thirteen hundred pounds were voted for the National Portrait Gallery. Up to the present time this department has not recognised photography at all. In the projected new building which is to contain the pictures it is to be hoped that a certain portion will be set apart for photographs. There are many persons who have distinguished themselves in the different walks of life, and whose counterfeit presentments their country would like to possess, but no oil painting of them are in existence, though there may be excellent photographs of them. Photographs can be produced as permanent as oil paintings, and generally they are far better as portraits. In a national collection of portraits, works of art, one would imagine, should be a secondary consideration, and a truthful likeness of the individual the primary one. We hope that the many amateur photographers who now have seats in Parliament will look after this subject.

SOME discussion arose on the vote for the National Gallery last week. When the exorbitant sum was paid for a couple of pictures some little time back, it was stated that no more money was to be expended in this direction for several years. It was, however, explained that when the opportunity occurred for securing an important work at a moderate price it was embraced. This is wise. Our collection of pictures is by no means large, considering what is to be seen in the galleries of other countries.

FILMS IN THE CHANGING BOX.

WITH the introduction of films instead of glass for negative purposes, it might not have been unreasonable to expect a greater gain in the matter of portability and compactness in the apparatus for carrying them than seems at present possible. The roll holder, it is true, carries a large number of exposures in a tolerably compact form, but despite the undoubted ingenuity and almost perfection of mechanism of several of those in the market, there is in many directions a prejudice against them and in favour of employing the cut sizes.

The thickness of the glass plates being dispensed with, it is commonly said that the dark slides can be made much thinner and lighter, which is the case so far, at least, as the actual thickness of the glass is concerned, but no farther; and when we come to consider the size of a double slide so reduced to the utmost extent, we find that half an inch is the minimum measurement we can attain, as cameras are at present constructed, a thickness which seems out of all proportion in the camera for a couple of films that do not measure together one-fiftieth of an inch. The future of films seems, therefore, to be connected either with roll holders or some form of storage carrier in which a large number of cut sheets may be packed and exposed by means of a separate exposing slide, or otherwise, instead of carrying them separately.

But before the era arrives of special apparatus, there will be a large section of the users of films who will do their best to employ to the greatest advantage their existing apparatus, and for them have been already provided a large variety of film carriers for use in the ordinary slides, but as yet no provision has been made for utilising existing apparatus of the changing-box kind. And yet Hare's changing box may be adapted in an extremely simple manner, not only for use with single film carriers, in which case the advantage gained ends with the saving of the weight of the glass, but also with double carriers with a practical gain of double the number of exposures in the same space, and with only the additional weight of the extra films.

The plan I devised, partly for my own use, and which I have for some few weeks had in practical work, consists briefly of an adapter by means of which the dark slide may be applied to the changing box in the reverse way as well as in the ordinary manner, so that both sides of a double film holder may be exposed in succession. I have shown a rough, workable model of the appliance to Mr. Hare, who is prepared to adapt it to any instrument that may be sent to him.

It adds little to the weight to be carried, not more than three or four ounces for a $7\frac{1}{2} \times 5$ box, does not unfit the changing box for use with glass, and is quite inexpensive. It consists simply of a piece of wood, a quarter or three-eighths of an inch in thickness, an inch and a half wide, and the length of the shorter dimension of the dark slide. This is pierced with a slot through which the plate passes, and on one side is screwed a brass plate also carrying a similar slot, and which is a facsimile of the slot plate at the end of the dark slide. On the other side are fixed two strips or guides, identical with those on the lid of the changing box, but placed in the reverse position. When the slide is run home into these guides, the slot plate of the adapter is applied to the changing box in the ordinary manner, and opens the communication between the box and the slide, but with the latter in the opposite position to the ordinary one, that is to say, with the shutter or exposure side in the contrary direction.

I had intended giving a drawing of the parts, but really there is no necessity, since a simple glance at the brasswork on any existing instrument will explain everything. This has simply to be duplicated, and a thin piece of mahogany "sandwiched" in between and the thing is complete. Probably Mr. Hare will improve on my idea in its details, but that constitutes the broad principle.

Although the contrivance is so simple, it will require some little care in use in order to avoid accident, as I shall now point out. Those who are familiar with Hare's changing box will be aware that the act of sliding the dark slide on to the box opens the slot in the lid through which the plates pass, the brass plate which closes the opening remaining unmoved until the aperture is covered by the slide, the last half inch or so of the push home effecting the object. For this reason the adapter should remain permanently attached to the slide, if that were possible, because if pushed home into the jaws of the box, when unattached to the slide, the contents of the box would be

submitted to the free action of light. The adapter, however, cannot remain on the slide, as it would prevent the insertion of the latter in the camera, hence it must be removed before each exposure.

It may, however, remain attached to the box itself, at least during the time that the reverse sides of the carriers are being exposed, if proper precautions be observed, and here it is that the necessity for care arises. If inserted into the jaws of the box about two-thirds or three-quarters of the full distance, or so far as to still leave a portion of the opening in the woodwork visible, the brass slide remains closed, and in this state the plates are as "safe" as at any time. The slide may now be pushed on to the adapter from the opposite direction, and when in position the adapter itself is pushed home and opens communication. After taking out a plate before removing the slide, the adapter must be first pushed partly off so as to expose the aperture, when the box will be closed and the slide may then be detached. This must be imperatively borne in mind, and perhaps some arrangement is desirable to prevent the removal of the slide before this closing of the box has taken place.

In practice, therefore, it will be most convenient to expose, first of all, what I will call the front sides of the film carriers, that is to say, to make twelve exposures without using the adapter. Then, placing the adapter in position, proceed to make the twelve additional exposures of the reverse sides, carefully observing the precautions I have mentioned, when the trouble arising from the use of the adapter will be reduced to a minimum. No difficulty need be experienced in the identification of the different exposures, because the films always occupy the same position in the box, and the front film of No. 1 carrier will be No. 1 the reverse side, No. 13 exposure, and so on.

I mentioned in the early part of my description that the adaptation of the changing box to film purposes does not unfit it for use with glass, but clearly when using double carriers the fixed springs in the slide must be temporarily removed, or they would seriously damage the film, besides interfering, perhaps, with the entry of the light carriers. In removing the springs it is necessary to see that the screw holes do not let in light; if they do, the remedy is obvious.

The substitution of suitable springs to keep the thin carriers in position is the most awkward part of the business, owing to the construction of the slide in which the plate or carrier slides in a groove, and not simply a rebate, and consequently it is difficult to get at the edges of the carrier where alone the springs must bear. I have got over the difficulty by screwing on to each corner of the hinged pressure-back a short but comparatively stiff spring reaching into the groove, and so shaped that when the back is closed the springs bear forcibly on the corners of the carrier, but come clean away when the catch of the back is removed to open the slide. My arrangement works perfectly, but it is in these minor details most probably that Mr. Hare will be able to make improvements.

This arrangement, let it be understood, is simply a makeshift, but a thoroughly practical one to be used in connexion with existing apparatus. If the changing box were specially constructed for films, it is probable that at least three dozen exposures could be carried in the same space as one dozen plates, and the full box would then be lighter than with twelve glass exposures.

W. B. BOLTON.

ECHOES.

It is refreshing to have one's memory jogged by such articles as those on *Neglected Processes*—processes in which, at some period, you have had an interest of some sort, but which have long since been dropped and forgotten. The editorial on the chromotype process a week or two since recalled to my mind the perfect *furore* it caused in professional circles at the time of its introduction, and I shall not easily forget the deep impression it made on my mind to watch the easy manner in which M. Lambert produced results that put into the shade anything that had previously been obtained by the carbon process. I never, however, worked the process, except experimentally, though I still look with feelings of the greatest delight upon the few specimens I possess.

As to the reasons why the process, now that all restrictions are removed, is not more generally worked, I think those mentioned in

the leader referred to may be set on one side, with the exception of the final suggestion that it is "more troublesome" than silver. The patent rights no longer exist, the alleged fugitiveness was not a necessary characteristic, if I may judge from samples in my possession fourteen or fifteen years old, and the extra cost might with equal propriety be urged against platinotype; but that is worked. The fact is, the photographer of to-day does not like trouble, and so he will not work any form of the carbon process.

In addition to the fact that each individual print has to be submitted to the careful process of development—and, consequently, to treat practically singly a large number of prints is beyond the power of most amateurs—it is to be remembered that the mere exposure is much more of a "leap in the dark" than that of a negative; besides the fact that the progress of the image cannot be watched, even if it be accurately timed by an actinometer it must be developed within a stated time, otherwise the so-called "continuating action" steps in to upset everything. This and similar matters tend, in my opinion, more than anything else, to confine the practice of the process to large, well-disciplined establishments.

By the way, I do not think it is quite accurate to say that the late Jabez Hughes ever "entirely abolished" silver printing. I think I remember his telling me that he still used silver for certain purposes, though I forget what; and I certainly have a picture of his—a group consisting of Her Majesty and upwards of twenty of her children and grandchildren—taken, I suppose, about nine years ago, and given to me by him at the time, which, if not an albumenised silver print, is more like one than anything in the shape of carbon I ever saw.

Reverting to the remark I have just made with regard to the modern amateur's dislike of trouble, I cannot help feeling somewhat with the "amateur" whose opinion is quoted in a leaderette on the question of whether the introduction of gelatine plates has been an advantage to photography or not. At the same time I cannot shut my eyes to the editorial view of the question. It is no doubt galling to the "old hand" to find himself reduced to level terms with the tyro of a month, but it is, after all, a selfish feeling that makes him begrudge the novice his pleasure. He, the old hand, possesses the same advantages as the beginner *plus* the very important one of long experience; if his appetite for such pleasure has become a little dulled with age, let it not make him envious. The beginner of to-day is, perhaps, every whit as enthusiastic as he himself was a quarter of a century ago, and it is his good fortune rather than his fault that he has better means at his command.

I remember an old friend, an amateur of many years' standing, who had worked wet and dry processes with the greatest assiduity, but with very little artistic result until the gelatine process came in. It was his practice to try every new process, and of course he went in for Kennett's pellicle as soon as it was in the market, with the result that he turned out, as it was said at the time, his first pictures. He was one of the earliest enthusiasts in gelatine, and is still occasionally quoted as an authority in the earlier development of the process. So no doubt, with many others, the new process made all the difference between unsuccessful and successful plodding.

Apocryph of the liability of solutions of the caustic alkalies to lose their energy by absorption of carbonic acid, I may say that I recently had a very strong proof. Finding my development much more protracted than it had been earlier in the season, though using the same plates, I first suspected my stock solution of hydroquinone, so made up a fresh lot, with no better results. I then examined the alkali, and found what should have been "caustic" to consist very largely of carbonate. Since then I have adopted a plan which I think will prove useful to others.

First as regards a test, if a solution be suspected. Drop into a portion of it a small quantity of any strong acid—nitric, sulphuric, citric, acetic, or anything that may be handy, except sulphurous; if the mixture effervesces carbonate is present, and the quantity may be judged by the strength of the effervescence. Even when newly made a solution of sodium or potassium hydrate will contain some, possibly a good deal of carbonate, as the "sticks" themselves absorb carbonic acid. By adopting my plan the carbonic acid may be eliminated and the solution kept constantly in a state of free activity.

Procure some oxide of calcium or quicklime and "slake" it by pouring a little water on to it in a saucer; when all action has ceased,

break it down with a spatula and transfer it to the bottle containing the soda or potash solution and shake up well. The carbonic acid will leave the soda or potash and go to the lime, which thus restores the soluble alkali to its caustic condition, and constantly keeps it so. The lime should be freshly slaked as I have described, otherwise that will have been reduced in all probability to carbonate. In my practice I keep a "Winchester" of stock solution of alkali, into which the calcium hydrate is put; from this I fill up from time to time a smaller bottle, from which I use, and at the time of each such filling I shake up the "stock," bringing the lime and solution well into contact, and the sediment will have settled down by the time I want it again.

This was an old device of twenty odd years ago for "freshening up" the carbonate of ammonia solution then employed, or for giving it greater energy in cases of under exposure. This it did by neutralising the restraining effect of the carbonic acid and converting the solution into one of liquid or "caustic" ammonia.

Mr. J. R. Swain, in a paper extracted from the *St. Louis Photographer*, gives a, to me, new remedy for blisters on albumenised paper. This consists in immersing the prints, after toning, in a five per cent. solution of acetic acid, and it is stated to be an infallible preventive, acting by "toughening" the albumen. It may be, and probably is, effective, though I do not see the need of further toughening the albumen, which in blister cases is usually tough enough. But I am surprised no further stress is laid on the necessity for washing before fixing beyond that contained in the words "washed once or twice and fixed as usual." Surely a print containing free acetic acid is scarcely in proper condition to go into the fixing bath after the "washing once or twice" it is likely to get at the hands of the ordinary printer's assistant, unless his attention is strongly drawn to the fact that acetic acid, or any acid, precipitates sulphur from the hypo.

The *Scientific American* gives a remedy for the yellow stain in gelatine negatives caused by imperfect fixation, and I am glad to see that the editor only commits himself to saying he has "thought of, but not tried it." Perhaps when he has tried it he will tell us he has done so, but no longer *thinks* anything of it. The stain so produced is about the most permanent thing I know of in connexion with silver deposits, being, I suppose, honest sulphide of silver. But even if bichloride of mercury would touch it I don't quite see how matters would be improved—but rather the reverse—by converting it into a brown or black—scarcely bluish fog.

I note that attention was called at the London and Provincial Association to the fact that eikonogen and sulphite of soda will develop the image without any alkali. My first experiment with the new developer rather surprised me. Before making up my stock solution I was anxious to try the new agent, so dissolved six grains in water without any sulphite. This was applied to the plate, which had had a "normal" exposure, and the image began to appear so rapidly that, having read of the great energy of eikonogen, I flew to the bromide bottle, and after copious additions of a sixty-grain solution I managed to curb the "mad haste" of the solution, and, finally, completed a fairly good negative, only wanting a little in vigour. It was not until I had fixed it that I discovered I had used no alkali at all! Surely if eikonogen *plus* bromide will develop, eikonogen *plus* sulphite ought to do so handsomely.

Mr. Latimer, in exhibiting to the members of the Birkenhead Photographic Association a half-plate camera with an adapter for taking a whole plate, is reported to have said that he only uses his half-plate single lens for all purposes, and finds that by stopping it down it answers perfectly for whole-plate pictures. While I do not for one moment doubt the possibility of using a half-plate lens for the purpose mentioned, under certain conditions, I cannot help thinking there is something peculiar about Mr. Latimer's lens. If it has its stop properly placed to cover a half-plate, it is, I should think, scarcely in the right place to be reduced sufficiently to make the lens cover twice the area. Then, again, if the lens is of such a focus as to give good all-round results on a half-plate, it becomes a decidedly wide-angle lens for whole-plate purposes—a wide-angle lens, moreover, very ill-suited for wide-angle purposes generally, but for architecture and interiors especially. On the whole, such makeshifts are not to be applauded.

Poor "parent Society!" what new *lapses* have you committed that Dr. Edwards should propose to found a Royal Photographie Society, not only over your head, but without consulting you? JUNIUS.

THE CONVENTION.

SECOND NOTICE.

Wednesday, 21st.

TAKING the papers in order, the two following, respectively by Mr. Haddon and Mr. Dunmore, were read on Wednesday:—

DESENSITISING AND RESENSITISING ALBUMENISED PAPER.

By A. HADDON, M.P.S.L., *Demonstrator in Physics, Royal Naval College, Greenwich, S.E.*

I MUST at the very outset apologise for appearing before you with such a paper as I have in hand, but the fault is not mine; the responsibility rests rather with others than myself. On the 24th of July of this year I made a few remarks on this subject before the London and Provincial Photographic Association, the task having been kindly thrust on me by our worthy friend and past President, Mr. J. Traill Taylor, and on resuming my seat after the few words I was told by him that I should be expected to read a paper before you on this same subject this evening.

The object of the few experiments I have been making is to ascertain whether it is possible to thoroughly desensitise paper which has once been made sensitive to light, and again resensitise it so as to obtain passable prints from such paper. Had I made my experiments first I should not, most probably, have chosen the title that appears at the top, because as far as I have gone none of the ordinary reagents that I have employed deprive the paper entirely of its sensitiveness to light. The rate at which it prints is very much modified, and, as a rule, the slower the printing the less satisfactory the result.

The paper I employed, and which I will call normal paper, was prepared as follows:—Ordinary albumenised paper was floated for three minutes on a fifty-grain to the ounce solution of nitrate of silver. Four sheets were thus treated; after the last sheet had been floated the solution was returned to the bottle and the dish washed out, and then about three pints of distilled water were poured in; each sheet was floated on this for about three minutes; this water was then poured out and replaced by a fresh three pints, and the washing by floatation repeated. The paper was after each floating thrown over some blotting-paper on a line, albumenised surface upwards. This was done on Saturday morning; in the evening, when the paper was thoroughly air-dry, each sheet was folded into four quarters and placed in a 12×10 printing frame.

The printing was done on Monday and Tuesday, so that the paper was kept about seventy-eight hours between the sensitising and toning.

The first thing to ascertain was what kind of print could be obtained from this my normal paper. It printed but slowly, and the finished result is not very satisfactory.

In most cases I have printed from two negatives paper treated in identically the same manner. One of these negatives takes twice as long to print as the other.

My next experiment was to try the effect of fuming, *i.e.*, of subjecting the normal paper to the influence of ammonia gas either previous to or during the printing. Two pieces of paper were placed in a box containing ammonia in a saucer, and left there for about twenty minutes, and then printed; the results yielded in this case are far in advance of the normal paper. In order to fume the paper during the printing I took a whole sheet of blotting-paper and folded it so that it was of eight thicknesses, then, having unfolded it, placed it in the fuming box for about a quarter of an hour; at the end of that time it was again folded and at once placed in contact with the back of the normal paper which had already been adjusted on the negative. The result in this case is intermediate between the non-fumed and the fumed. In order to prevent the too rapid escape of the ammonia from the fumed blotting-paper or pad a piece of paraffined paper was placed between it and the back.

Finding that the simple washing of the paper had only partly desensitised it, I was curious to ascertain what would happen if the whole of the pure nitrate of silver were removed from the paper before printing. In order to effect this I washed the normal paper in three changes of water for about four or five minutes each, and then immersed the paper in a dilute solution of chlorate of sodium (common salt). It was again worked in a couple of changes of water, and then dried. The print obtained in this way was very poor indeed, in fact, the most unsatisfactory of all. I then fumed the other piece that

had been thus treated, and though it gave a better print the result is far from satisfactory.

Citrate of soda has frequently been recommended as a preservative when applied to the back of sensitive paper, but, as far as I am aware, no one has shown what its influence is on the quality of the resulting print, or on the time required to produce a sufficiently deep impression. I therefore treated some of my normal paper with a ten per cent. solution of neutral citrate of soda back and front; and in order to find out how such paper would print fumed and unfumed, instead of printing two separate pieces under each negative, I covered one half of the paper when placed on the negative with paraffined paper, and then I placed on the whole pads of blotting-paper, which had been fumed. The portion subjected to the action of the ammonia gave a slightly better image, but the difference was not so great as I expected. A better result would most probably have been obtained had the paper been actually fumed instead of the pads. It was in consequence of this result that I thought it would be better in future to fume the paper before printing, instead of doing it during the operation. The time required to produce a sufficiently dark print was much longer than with normal fumed paper.

At our last meeting in Birmingham a paper was read on behalf of Mr. Watmough Webster, on the preservation of sensitised paper by means of paper impregnated with dry carbonate of soda, and I thought it might be useful to ascertain the effect of this salt, when actually in the paper, before and during printing. The results I have obtained on paper treated to a ten per cent. solution of the salts are not very good; the prints are what one usually calls *mealy*, and I noticed that those pieces whose backs were floated on this salt became very absorbent, resembling very much certain brands of ready-sensitised paper which one comes across at times. Two pieces I fumed before printing, and the results obtained by this method are, I think, equal to the very best that I have obtained by any of the treatments to which I have subjected the paper. In several cases I floated the front of the paper only on the salt in solution, in others I treated the fronts of some and backs of others to the salt in order to see what the difference is, and in the case of the carbonate of soda-treated paper the result is decidedly in favour of the back being treated and fumed afterwards.

Rochelle salt (double tartrate of potassium and sodium) has frequently been recommended in different formulæ for printing-out papers, and Mr. J. Barker was, I think, among the first to work out a printing process in which gelatine was used as the vehicle and tartrate of silver one of the sensitive compounds, and I therefore thought some useful information might be obtained by treating paper with a ten per cent. solution of Rochelle salt, as undoubtedly the remaining free nitrate of silver would be converted partly into tartrate. The prints produced on the paper thus treated are poor and mealy, but when the paper has been fumed the results are very satisfactory.

The last set of experiments I made was to treat the paper with nitrite of potash, a salt which I think Captain Abney has at different times recommended in conjunction with others as a preservative. In all cases when trying the effects of salts as preservatives, the first consideration ought to be the effect it has on the image independent of its preserving action. In the case of nitrite of potash I find it to improve very considerably the quality of the resulting print when used by itself. I do not know whether this is due to the nitrite or to the fact that this is an alkaline salt, and the alkaline nature of the salt may have acted beneficially. When fumed with ammonia there is not such a marked difference as in the other cases. Nitrite of potash, therefore, seems to confer a quality on the paper not possessed by the paper when treated with any of the other salts I have employed.

At the meeting of the London and Provincial Photographic Association it was suggested that I should see what could be produced on paper prepared in the same manner as the other but unwashed, and I have therefore added to the series of prints one from each negative on plain freshly sensitised paper.

When time will allow I propose continuing these experiments so as to find out the effects of other salts on washed paper, and, if possible, to work out as regards their preserving action those which are the most promising.

A SUGGESTION FOR A METHOD OF ASCERTAINING THE COMPARATIVE RAPIDITY AND PRINTING VALUE OF GELATINO-BROMIDE PLATES.

By EDWARD DUNMORE.

A RELIABLE method of ascertaining the *practical* value of the sensitiveness of gelatine plates is, to use a stock expression, "a want long felt." Many ingenious devices have from time to time been suggested, Mr. Warnerke's sensitometer being, perhaps, the best—still this, as

manufactured, is far from being uniform and above suspicion as a guide. In the suggestion I am about to make, my idea is to have a reliable standard of comparison, so that a negative can be justly estimated as to its printing qualities, and the length of exposure required to produce it by any one skilled in photography or otherwise. Hitherto, the plan has been to ascertain how the strongest image can be made with the weakest light, under certain specified conditions, a film giving the most detail and strength when exposed for a definite time to somewhat weak artificial light being deemed most sensitive. Now, if the effect of weak artificial light was identical in its effect with strong daylight, no doubt the results would be more reliable, but this does not seem, to judge by ordinary practice, to be the case.

In the first instance, I propose to make a series of standard negatives of convenient size, say one inch square or thereabouts, as follows: Take any good, not too rapid plate, expose on an ordinary well-lighted landscape for the necessary time (this expression, although indefinite in itself, is easily understood as a period sufficient to impress an image on the sensitive film, so that it is in the best condition for development), this time might be determined by choosing a light that will produce a certain tint on a strip of sensitive paper, such as used for actinometers. A very close approximation to uniformity in the quality of the light would be thus obtained. Use a stop, say No. 128 U.S. We will assume it requires an exposure of three seconds to produce the best image. Several exposures, however, might be made to be certain of this. Secondly, make a series of exposures of the same subject in the same light for varying times, from one-tenth of a second to eight seconds, thus, one-tenth, one-fifth, one-fourth, one-half—1, 2, 3, 4, 5, 6, 7, 8. It stands to reason if No. 3, taking the numbers to represent seconds and fractions of seconds, is right, the others will be too much or too little exposed, as the development, which must be for a definite time, all the negatives being developed together, would show either under or over exposure. The developer itself should be one whose constituents are not likely to vary. By this means we obtain a series of negatives of varying qualities, which may be arranged in two rows of five each on one plate, and to each the time of exposure should be attached. These are now our gauge negatives, and can be reproduced in any quantities, identical in all respects, by means of a carbon transparency and copying. All we have to do, to ascertain the comparative rapidity of a plate, is to make a proper exposure on the plate to be tested and develop it by a similar developer and compare the results with the gauge plate; this will show the actual printing value of the negative, which is practically all we require. If the exposure is less than for the best exposure on the gauge, we at once see that it is a more rapid plate; if more, then it is a slower one. I am inclined to think that a direct comparison with a known high-quality image would be the most useful plan of estimating the printing quality of a negative the photographer could adopt, and a plan that especially recommends itself to those who only have the opportunity of practising occasionally.

As already stated last week Mr. Muybridge occupied the remainder of the evening with his illustrated lecture on "Animal Locomotion."

Thursday, the 22nd, was devoted during the day to excursions up the river, one being in a launch to Hampton Court from Richmond Bridge, provided by Mr. S. H. Fry, the other being to Kew Gardens and Observatory. Having formed one of this latter party, we are enabled to say that the leaders, Mr. F. P. Cembrano and Mr. R. L. Kidd, left nothing undone for the comfort of the party. After the lunch at the "Greyhound" Inn, an American gentleman of the party, Rev. Mr. Murell, of Florida, gave expression to the satisfaction he had derived from fraternising with them on that occasion, which led another gentleman present to say that America had so far been well represented at the Convention, there having been present residents of Florida in the south, Canada in the north, New York in the east, and California in the west, besides several others not situated at such extremes. At Kew Observatory the visitors were received by Mr. G. M. Whipple, B.Sc., F.R.A.S., who had not only granted permission, but had made a special journey from Deal to attend personally to the comfort of the visitors and conduct them over the building. We made a note of the various things there seen with the intention of apprising our readers of them at an early date.

"Mr. Whipple's kind forethought" (says the *Richmond and Twickenham Times*) "had suggested a pleasant addition to the programme, and the afternoon's inspection of scientific apparatus was followed by tea, to which he invited the members of the Convention. Mr. R. L. Kidd having expressed the thanks of the whole party to Mr. Whipple and his assistants, who so ably seconded him, was followed by Mr. Taylor in the same strain. Mr. Whipple having replied in a few re-

marks, the party retraced their way to the station after a permanent *souvenir* of the visit had been secured in the form of a group of the visitors and the Observatory staff, photographed by Mr. Scotton, of Derby." Having received from Mr. Scotton a proof of his group, we are enabled to pronounce it all that can be desired.

In the evening a report on Standards was read (see page 574), and remitted to the Committee.

Mr. Bothamley then read a paper on Orthochromatic Photography.

ORTHOCHROMATIC PHOTOGRAPHY WITH GELATIN PLATES.

By C. H. BOTHAMLEY, F.I.C., F.C.S.

To address the Convention again on orthochromatic photography presents some little difficulty, because on the one hand there are many in my audience who are well acquainted with the subject, whilst on the other hand there are some to whom it is not so familiar, and possibly even some to whom orthochromatic photography is only a name. I take it, however, that at this jubilee meeting of photographers it is desirable that the papers should, as far as possible, represent the present position of our knowledge, and I will therefore venture to recapitulate the main points that are already established.

Ordinary gelatin plates fail to represent coloured objects with their proper degrees of relative brightness, or, as artists say, with true "values," because the plates are most sensitive to blue and violet rays, much less sensitive to green, and very slightly sensitive to yellow, orange, and red; whilst the human eye is most sensitive to yellow, somewhat less sensitive to green and orange, still less sensitive to red, and least sensitive of all to blue and violet. The rays which produce the greatest effect on a photographic plate are those which produce the least effect on the eye, and *vice versa*. As a necessary consequence, blue and violet objects are, in a photograph, much too bright, whilst green, yellow, orange, and red objects are much too dark. It follows that all photographs on ordinary plates of flowers, fruit, paintings, and similar objects are unsatisfactory; in landscape work the foliage is much too dark, and has lost much of its roundness, water reflecting the light from the sky is much too bright, and a slight blue haze, almost imperceptible to the eye, is sufficient to blot out all the delicate details of the distance, on which the beauty of a view so often depends; in portraiture the flesh tints are much too heavy, and any freckles or similar defects become glaringly prominent.

To some extent these defects may be removed by interposing somewhere between the object and the plate a transparent yellow screen, which absorbs and cuts off the greater part of the blue and violet rays, and gives the green, yellow, and orange rays time to act without any accompanying reversal. True values, however, can never be obtained in this way, because ordinary plates are always more sensitive to green than to yellow, and, moreover, the total sensitiveness to green, yellow, and orange is so small, that under these conditions the exposure required is several hundred times the ordinary exposure. The negatives, too, are usually very deficient in vigour.

Vogel found, in 1873, that by treating plates with certain colouring matters, and especially with certain coal-tar dyes, they can be made sensitive to the green, yellow, orange, and red, or, as we may term them collectively, the less refrangible rays. The value of eosin for this purpose was first pointed out by Waterhouse in 1876, and Tailfer in 1882 was the first to obtain useful results with gelatin plates, and end which he achieved by the simultaneous application of eosin and an alkali.

Subsequent experiments, and especially those of Eder, have shown that the only dyes of practical value are cyanin and the dyes of the eosin group. These may either be added to the emulsion, or applied to ordinary plates in the form of a bath. In the first case the dye is either added to the materials before emulsifying, or to the melted emulsion before coating. According to Tailfer's specification it is necessary to add ammonia or some other alkali at the same time. In the second case the plates are immersed for a short time in a dilute aqueous or alcoholic solution of the dye, either with or without a certain quantity of ammonia. Sometimes the plate is immersed in a preliminary bath of very dilute ammonia, and sometimes it is washed after treatment with the dye solution, but neither of these courses is essential. A special modification of the bath method of sensitising has been described by Ives, and will be referred to again later on.

My previous communications have dealt mainly with the comparative values of the various dyes of the eosin group, which is a somewhat large group; the efficiency of these and of cyanin so far as regards obtaining true "values;" and the relative merits of sen-

sensitising in the emulsion or by means of a bath. I also exhibited the results of a number of experiments made with a view to ascertain the value of the methods from a practical photographic point of view. Stated as briefly as possible, the general conclusions arrived at were as follows:—For all classes of work orthochromatic methods have considerable, and often very great, advantages over the ordinary method. This, in fact, is generally recognised, and these methods are now widely and largely applied in the reproduction of paintings, in microphotography, and in all kinds of work in which coloured objects are dealt with. In landscape work their application is not so general, at any rate in this country, mainly, I believe, because the methods of working required to obtain satisfactory results are not yet generally known and diffused amongst photographers. Orthochromatic methods do certainly require more thought and skill than the ordinary method, and cannot be worked successfully in an unthinking and mechanical way. In the second place, I take it as established that although plates sensitised by means of a bath are somewhat, though not very much, inferior in keeping qualities to those sensitised in the emulsion, they have a much higher sensitiveness to the less refrangible rays. The testimony from many sources in favour of this conclusion is, in fact, overwhelming. Further, erythrosin, applied with ammonia, gives the highest sensitiveness at present obtainable, but the relative sensitiveness to green is too high, and the values obtained are not quite correct; erythrosin without ammonia gives less sensitiveness, but somewhat truer values; rose Bengal with ammonia gives better values than can be obtained with any other single sensitizer, though the degree of sensitiveness is lower than with ammoniacal erythrosin; cyanin is the only dye of practical value as a sensitizer for orange and red, and should be used in conjunction with erythrosin or, better, rose Bengal, for all objects in which orange and red are at all prominent or important. One of the most important results which I obtained early in my experiments was the fact that a very considerable degree of sensitiveness can be obtained with a bath of erythrosin or rose Bengal containing no alkali at all; with the first dye, in fact, applied simply in aqueous solution, the sensitiveness to the less refrangible rays is as great as that of the commercial isochromatic plates which are prepared according to Tailfer's specification by adding the dye and ammonia to the materials before emulsifying. I understand that Mr. Bedford obtained a similar result when sensitising in the emulsion. Another interesting result was that, contrary to the statements of some experimenters, I obtained the same sensitiveness with an ammoniacal solution of ordinary erythrosin as with a solution of silver erythrosin. This conclusion has been amply confirmed by the later and more extensive experiments of Professor Zettnow, published in *Phot. Correspondenz* in the early part of this year.

Lastly, with all methods of sensitising at present known, the relative sensitiveness to blue and violet remains much too great, and correct values can only be obtained by using a transparent yellow screen to absorb and cut off the greater part of the blue and violet rays.

The bath processes having proved to be the most efficient, it seemed desirable to investigate the various modifications which have been proposed, with a view to determine the best method of working. It was already known that the best degree of concentration of the bath depends on the nature of the dye to be used; that a bath too concentrated gives less sensitiveness; and that considerably greater sensitiveness can be obtained when an ammoniacal bath is used than with a simple aqueous solution. It was customary to treat the plates with a preliminary bath of plain ammonia of one or two per cent. It is stated in the Tailfer specification that it is better to add alcohol to the bath, and that the plates should be washed after treatment. The English exploiter of this patent has indeed repeatedly asserted that this last part of the process is quite indispensable. Three points then require quantitative investigation: viz., the necessity for or advantage of a preliminary bath; the influence of alcohol in the bath; the necessity for or advantage of washing after treatment with the dye.

The methods of measurement were the same as I described last year. The prepared plates were exposed for ten seconds to the light of the amyl acetate lamp at a distance of one metre, the plate being in contact with a Warnerke sensitometer screen immediately in front of which was a tank containing a one per cent. solution of picric acid two centimetres in thickness, which cut off all the rays more refrangible than the Fraunhofer line *b*. The plates were all developed together in the same dish, for three minutes, with a developer containing in each fluid ounce two grains of pyro, one grain of ammonium bromide, and four minims of liquor ammonia, '880. The details of the experiments are given in the following table. The plates used were Edwards's Instantaneous and Wratten & Wainwright's Ordinary.

The dye was erythrosin, and with Edwards's plates the bath contained one per cent. of ammonia, and with Wratten's plates two per cent. No preliminary bath was used, and the time of immersion was two minutes.

Dye.	Alcohol.	After-treatment.	Sensitometer.	
			Edwards.	Wratten.
1:10000	... None.	... Not washed.	... 22	15
1:10000	... 5 per cent.	... Not washed.	... 22	14
1:10000	... 5 per cent.	... Washed.	... 22	13
1:10000	... 10 per cent.	... Washed.	... 22	13
1:10000	... 25 per cent.	... Washed.	... 22	12
1: 5000	... 5 per cent.	... Not washed.	... 25	13
1: 5000	... 5 per cent.	... Washed.	... 25	13
1: 5000	... 10 per cent.	... Washed.	... 25	13
1: 5000	... 25 per cent.	... Washed.	... 23	12
1: 2000	... 5 per cent.	... Washed.	... 25	15
1: 2000	... 10 per cent.	... Washed.	... 25	14
1: 2000	... 25 per cent.	... Washed.	... 24	13

A second set of experiments, with special reference to the preliminary bath, was made with Edwards's plates and Paget Prize Plates XXX.

Dye.	Preliminary Bath.	After-treatment.	Sensitometer.	
			Edwards.	Paget.
1:10000	... None.	... Not washed.	... 25-22	15-15
1:10000	... 1 p. c. ammonia.	... Not washed.	... 23-22	15-15
1:10000	... None.	... Washed.	... 23	15
1:10000	... 1 p. c. ammonia.	... Washed.	... 22	15
1: 5000	... None.	... Not washed.	... 22-25	15
1: 5000	... 1 p. c. ammonia.	... Not washed.	... 25-24	15-15
1: 5000	... None.	... Washed.	... 25	15
1: 5000	... 1 p. c. ammonia.	... Washed.	... 22	15

Both sets of experiments were of course made in duplicate. The slight deviations are due to the difficulty of accurately measuring the exposures with the amyl acetate lamp in its original form. Where two numbers are given, the first was obtained with good commercial erythrosin, and the second with specially purified erythrosin.

The conclusions to be drawn from these results are:—(1), Alcohol up to ten per cent. has no influence whatever, and may be dispensed with in all cases where the dye is soluble in water: alcohol in larger proportion produces a distinct decrease in sensitiveness. (2), With a concentration of the dye up to 1:5000 the washing after immersion is quite unnecessary. (3), The preliminary bath may be omitted. It is further to be noticed that nothing is gained, at any rate with these three brands of plates, by increasing the concentration of the bath from 1 in 10000 to 1 in 5000. I believe, however, that with plates which have been prepared with hard gelatin or which have been treated with chrome alum, it is advisable to use the stronger bath, or to increase the time of immersion.

Ives's method consists in flooding the plate with an alcoholic solution of the dye (containing one grain in four ounces), allowing the alcohol to evaporate, and then washing with water. It was not easy to see why this method should give better results than simply immersing the plate in an aqueous solution of the dye. Photo-metric experiments confirm this supposition. They also confirm Ives's statement that if the plate is treated with the strong alcoholic solution and not washed no sensitiveness to the less refrangible rays is obtained, doubtless because the alcoholic solution does not really penetrate the film. I was unable to get satisfactory results with cyanin in this way. I observed also that some films showed a great tendency to leave the glass altogether, a result due to the contractile influence of the alcohol.

Abney's method of sensitising by means of a collodion or varnish film has completely failed in my hands.

It appears, then, that the best results are obtained in the simplest way. Dust the plate, immerse it for two or three minutes in a solution containing—

Dye solution (1:1000).....	1-2 parts.
Ammonia (ten per cent.)	1 part.*
Water	8 parts.

Allow the plate to drain for some time, place the lower edge on blotting-paper in order to take off the ridge of liquid which collects there, and dry in the dark in a pure atmosphere. Develop in ruby light with a developer containing about two grains of sodium or potassium meta-sulphite per ounce, in order to keep the liquid clear and thus enable the process to be more readily watched. As a rule,

* I believe I ought to point out that the use of an eosin dye with ammonia in this way is covered by Tailfer's patent. The ammonia may be left out if erythrosin or rose Bengal is used, but five or six times the exposure will be required.

density is obtained more easily than with ordinary plates, and it is not necessary, and often not desirable, to have more than one grain of pyro in each fluid ounce.

Turning now to the question of the use of orthochromatic methods for landscape work, I think I may say that the results exhibited at Birmingham last year were accepted as showing that these methods have considerable advantages over the ordinary method, the improvement being most noticeable in the rendering of foliage, water, and distance. (*Four sets of results obtained in spring, summer, and autumn, were exhibited in the form of lantern slides.*) I have since endeavoured to compare the various kinds of orthochromatic plates from this point of view, the comparison including:—(1), Ordinary plates. (2), Edwards's isochromatic plates, used without a screen. (3), Obernetter-Vogel silver erythrosin plates, used without a screen. (4), Plates treated with an ammoniacal bath of erythrosin, and used with a pale yellow screen.

It seems necessary to point out once more that the whole value of comparisons of this kind depends entirely upon whether the experiments have been made fairly and without bias. I do not hesitate to say that many of the so-called comparative results which are exhibited are not fair. In very many cases, for example, the results shown as having been obtained with ordinary plates are very much inferior to the results which might have been obtained if the plates had been properly managed. In all cases the quality of the values obtained depends very largely upon exposure and development, a fact which is by no means sufficiently recognised. Many of the bad, nay, wretched, results, so far as regards values, which are commonly exhibited, are due to insufficient exposure. If I have not been fair myself in the experiments which I bring before you, it is from want of ability and not from intention. I am an investigator and not an advocate. We have certainly not yet reached finality in orthochromatic processes, but a knowledge of the relative merits of the methods which we do already has considerable practical value.

In the first place, I have made a number of comparative exposures with Edwards's isochromatic plates and ordinary plates, both being used without any screen. The ordinary plates were Thomas's thickly coated landscape, Wratten & Wainwright's Ordinary. (*The subjects exhibited were Worcester Cathedral from across the river; Kirkstall Abbey; a view from Bolton Abbey, with distance and foliage; and a group with foliage.*) The differences are comparatively slight. As a rule, I do not think they are greater than might result from different exposure and development of the same plate. There is, at any rate, nothing approaching the striking differences observed when a yellow screen is used. In the case of the group, the isochromatic plate has a distinct advantage, but this was done rather late in the evening, when nature herself had provided a yellow screen in the shape of the water vapour and minute dust particles through which the rays of the setting sun have to pass. Many other experiments besides those shown lead to exactly the same result, and I believe my experience in this respect coincides with that of many other workers.

I have also made comparative experiments with ordinary plates (Paget Prize Plates XXX and Wratten's Ordinary) and the Obernetter-Vogel silver erythrosin plates. Here I have found a distinctly greater difference. (*Subjects shown: Knaresboro', foliage, water, and distance; Bolton Woods, ditto; Warwick, foliage and water.*) There is, as a rule, a distinct improvement over the ordinary plate in the rendering of foliage, water, and distance, and I consider the differences greater than could arise simply from differences in manipulation. I have exposed a very considerable number of these plates, independently of comparative experiments, and an examination of the results leads to the same conclusions. The plates, however, are not particularly easy to manipulate, and some experience is required to obtain the best results. They show a decided tendency to fog with an excess of ammonia, especially if the proportion of bromide of procedure is to put all the bromide which you intend to use into the developer at first, and then add the ammonia gradually as development proceeds. At the same time, the results obtained are not equal to those obtained with a yellow screen, although, as far as my experience goes, distinctly, but not very greatly, in advance of the Edwards's isochromatic.

Some comparative experiments were made with Obernetter-Vogel plates used without a screen, and plates prepared with ammoniacal erythrosin and used with a screen. These results (some of which are exhibited) confirm the conclusion already stated, namely, that so far as present methods are concerned, the best results are obtained with plates prepared with an ammoniacal bath of erythrosin and used with a yellow screen. If, however, the Edwards's isochromatic or Obernetter-Vogel plates are used with a yellow screen, which must be somewhat deeper in the first case than in the second, the results

obtained are not distinguishable from those obtained with bathed plates under the same conditions, but the exposures required are much longer.

This brings me to the question of the use and abuse of the yellow screen, a point which I believe to be, as a rule, very imperfectly understood. All gelatin orthochromatic plates prepared by methods at present known, remain relatively, with respect to the human eye, much too sensitive to blue and violet. The only method, therefore, of obtaining true values is to interpose between the object and the plate a transparent yellow screen, which absorbs and cuts off a certain proportion of the blue and violet rays, leaving the less refrangible rays with a relative degree of intensity and activity more nearly corresponding with their relative action on the eye. It is obvious that any variation in the tint or thickness of the screen will affect the proportion of blue and violet cut off, and hence will determine the relative activities of the various rays after they have passed through it. From an optical point of view it is desirable to keep the screen as thin as possible, but the depth of tint of the screen admits of very considerable variation. As the depth of tint of the screen increases, the amount of blue and violet cut off increases proportionally, and the relative action of the less refrangible rays on the plate, or, in other words, the relative brightness with which green, yellow, orange, and red objects are rendered increases at the same time. It is obvious, therefore, that it is easy to make a screen so intense that far too large a proportion of blue and violet is cut off; blue and violet objects will then be too dark, and green, yellow, and orange objects too light. In other words, the resulting photograph will be as incorrect in one direction as the ordinary photograph is in the other. In landscape work a screen too deep in tint causes loss of atmosphere, and with erythrosin plates under these conditions the grass and all other yellowish-green objects come out much too light. This effect is well seen in the examples exhibited. For landscapes the proper tint of screen is pale lemon-yellow; for paintings and similar subjects the depth of screen required is usually greater, and is determined by circumstances. Examples were shown illustrating the bad effects of a screen too deep in tint.

The great advantage of the screen in landscape work is that it prevents the failures, or, at any rate, want of complete success, which often results from the presence of a slight blue haze. The details in the distance, which so greatly increase the beauty of many landscapes, are rendered much more satisfactorily, and the more correct values obtained produce a roundness of the foliage, a transparency in the water, and a separation of the various planes of the picture which is rarely, if ever, attained in any other way. This kind of effect is easily seen by looking at any ordinary view with the naked eye and then through a piece of yellow glass; the increased roundness of the objects and the separation of the planes is very striking.

It has been claimed as an advantage for commercial orthochromatic plates that they can be used without a screen, which of course is true, but the results obtained are not such as to lead any one to be enthusiastic about them. It seems as if an attempt were to be made to set up as the ideal of orthochromatic photography a plate which requires no screen. Given that the plate corresponded in sensitiveness with the human eye, that ideal would be realised, but we are some distance from realisation, at present, so far as gelatin plates are concerned. Moreover, it seems to me that the use of a screen, with the possibility of varying it to suit the work in hand or the result which it is desired to obtain, places in the hands of the artistic photographer a power which he would be unwise to cast aside. With the so-called photographer, who expects his apparatus and plates to do all the thinking for him, I am not at all concerned.

Not very long ago Colonel Waterhouse communicated to the Photographic Society of Great Britain the results of photographing the spectrum on plates treated with *rhodamin*, a comparatively new colouring matter similar to eosin in constitution. I have been able to make a few experiments with a view to ascertain its value for photographic work. The magnitude of its sensitising effect was compared with that of erythrosin in the manner already described. Ordinary rhodamin prepared by the Badische Anilin und Soda Fabrik was used, and also some of the same rhodamin which had been purified. The results obtained are given in the form of a table. No preliminary bath was used, and the plates were not washed after treatment with the dye solution.

Sensitiser.	Ammonia.	Sensitometer.		
		Ilford Rapid.	Pall Mall Rapid.	Wratten's Ordinary.
Erythrosin 1:10000	1 per cent.	16	15	11
Rhodamin coml. 1:10000	1 per cent.	12	4	5
" " 1: 5000	1 per cent.	15	7	7
Rhodamin purif. 1:10000	1 per cent.	10	3	5
" " 1: 5000	1 per cent.	15	7	6

It will be seen that with one brand of plate the sensitiveness approaches that obtained with erythrosin, but with the other brands it is considerably lower.

The numbers show clearly the influence of the concentration of the dye; they show also the influence of the nature of the plate. They seem to show that the sensitiveness to the less refrangible rays obtained with rhodamin does not depend on the original sensitiveness of the plate, and that variations in the nature of the plate do not affect rhodamin in the same way as erythrosin. These and other points, however, require further investigation.

I also used plates sensitised with rhodamin to copy some paintings, and obtained results which promise well for the utility of this sensitiser. The experiments were not sufficiently numerous to justify me in bringing them before the Convention. In fact, the photometric experiments must only be taken as provisional, and are liable to correction by subsequent work. I thought, however, the Convention would be glad to have some idea as to the probable utility of this compound, and I hope to have become better acquainted with its peculiarities and capabilities before our next meeting.

On Friday there was an excursion by steamer to Gravesend, under the leadership of Mr. J. J. Briginshaw, after which the members of the Convention, to the number of between seventy and eighty, dined in the Café Royal, Regent-street, the President in the chair. To the toast of the Convention, Mr. J. J. Briginshaw, Hon. Secretary, responded; that of the photographic press being coupled with the names of Mr. J. Traill Taylor and Mr. Henry Sturmev, who responded. Mr. William Lang, of Glasgow, did like duty for kindred photographic societies. What with songs, recitations, conjuring tricks, and friendly chat, a very pleasant evening was passed.

On Saturday, the General Committee and Council for the next year were elected, and after the members had been photographed by Mr. Friese Greene in the quadrangle of Burlington House, there was a general separation.

Several papers other than those above given were presented to the Convention, but for want of time were taken as read. These will appear in our next issue.

The next meeting will be held in Chester, under the presidency of Mr. C. H. Bothamley, of Leeds.

The London daily and weekly press, with scarcely an exception, have given notices, some of them at considerable length, of the proceedings of the Convention, its nature, and scope.

There was a fair display of pictures in the galleries, and a very good display of apparatus in the body of the hall.

The showcase of Mr. J. H. Dallmeyer contained a large and choice collection of the lenses manufactured by this house, and one feature in it was unusually interesting, consisting as it did of lenses shown in the various stages of progress, from the rough-cast discs of optical glass, as received from the glass maker, up to the same after it had been subjected to the optician's skill, and was turned out ground, polished, and centred. An exhibition of this nature proves highly educational, and it seemed to be highly appreciated by those by whom it was always being examined.

Messrs. Newton & Co., whose exhibits at photographic gatherings of this nature have hitherto been "conspicuous by absence," made a magnificent show of highly-finished lanterns and scientific appliances, including a patent electric projecting microscope by Messrs. Wright & Newton. This is fitted with a new form of arc lamp of about 3000 candle-power, standing on Newton's traversing table, by means of which the light is kept in the axis. This instrument works with powers as high as one-twelfth and one-sixteenth immersion, and with lower objectives shows a blow-fly's tongue forty feet long. On one lantern was shown the microscopic attachment used by Mr. T. E. Freshwater in photographing the objects on the same table. Of these we have three before us while we write: they are in the form of lantern slides and comprise a male and female flea and a spider's foot. They are characterised by sharpness without hardness; indeed, we have seldom, if ever, seen a finer pair of fleas, which, although when projected on the screen, or for that matter when examined in the hand, cause a kind of shudder, yet do not fail to elicit a feeling of admiration at the wonderful structure of—

"Those little fleas,
Which do us tease."

A large triple lantern of very high finish was also shown, and by

its side the "Miniature" lantern—the smallest full-power lantern ever made, and which is now familiar to those in the metropolis who attend the meetings of photographic societies at which lantern demonstrations are given. This firm also exhibited a large number of slides in sets, coloured and uncoloured, these being mounted in juxtaposition. The colouring was admirably done, and by comparison with the plain ones showed photographers of how much their monochromatic productions were capable.

(To be continued.)

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM. LONDON MEETING, 1889.

REPORT OF COMMITTEE UPON LENS STANDARDS.

(To the President and Council.)

GENTLEMEN,—Your Committee, appointed at the Birmingham meeting of Convention to consider and report upon the best means of securing uniformity in diaphragms and flanges of photographic lenses and lens mounts, have now the honour of submitting the result of their investigations to the Council.

Having gone very carefully into the merits and demerits of the metric and other systems advocated by various scientific opticians and others, your Committee have no hesitation in generally recommending the adoption of such portions of the "standards" of the Photographic Society of Great Britain (with such modifications and additions) as are set forth below:—

"With regard to diaphragms, we recommend—

"1st. That the aperture of the standard-unit diaphragm should have a diameter equal to one-fourth the equivalent focus of the lens, and be marked '1,' the approximate equivalent focal length of the lens itself being engraved on the mount.

"2nd. That diaphragms with smaller openings should have apertures diminishing in area to the extent of one-half from the unit standard downwards, and be marked successively, 2—4—8—16—32—64, &c. These numbers would indicate to the practical photographer that if a given sensitive film requires with the unit stop an exposure of one second, the introduction of a smaller one would necessitate an exposure of as many seconds as the numbers marked on it; in other words, each step would require double the exposure of the preceding one.

"Should a lens not admit of a diaphragm with an aperture as large in diameter as one-fourth its focal length, nor exactly any one of the above-mentioned sizes, we still recommend that all the apertures be made in uniformity with the above scale, with the exception of the largest, which should be marked with the number its area requires in relation to the unit diaphragm. In the case of a lens having a working aperture exceeding in diameter one-fourth its focal length, the diaphragms should be marked in fractions (as $\frac{1}{5}$, $\frac{1}{25}$, &c.) in uniformity with the standard apertures, according to the sizes of their relative apertures.

"[We further advise that diaphragms required to be made with apertures intermediate to the standard sizes should invariably be marked with numbers corresponding to the ratio of their area to the aperture of the unit diaphragm.]"

Note.—The paragraph marked above cannot be endorsed by your Committee.

FLANGES.

"We advise the construction of flanges with internal and external screw threads of a standard series, for attachment to cameras having screw threads adapted for screws, $1\frac{1}{2}$ in., 2 in., $2\frac{1}{2}$ in., 3 in., in external diameter, and made with twenty-four threads to the inch.

" $3\frac{1}{2}$ -INCH.—The $3\frac{1}{2}$ -inch to have twenty-four threads to the inch on the inside, and twelve threads to the inch on the outside.

"If larger ones are required, we recommend that they increase in size one inch in diameter, from four inches upwards, with twelve threads to the inch, both internal and external. We also recommend the manufacture of a series of adapters, with inner screws made to carry any existing lenses, and with outer ones corresponding to the next or other larger size of the standard flanges above described. Hereafter, whenever practicable, the screws cut on the mounts of all newly manufactured lenses should be suited to one of the above-sized standard flanges."

These "standards" are at once intelligible and scientific, and from the fact of their already widespread use, both by the profession and amateurs, it may fairly be argued that they are generally popular and practical.

In addition to the recommendations of the Committee of the Photographic Society, as quoted above, your Committee would further suggest:

1. That besides the approximate equivalent focus being engraved upon the lens mount, the exact point from which that focus is measured be distinctly marked by a line or cross.

2. That the diaphragms be engraved with their proportionate areas to such equivalent focus thus: $f-4=1$, or $f-32=64$, and so forth.

3. That where iris diaphragms are used a *detent* be fitted to ensure accuracy in the apertures.

Your Committee would congratulate the Photographic Society of Great Britain upon the inception of a "Uniform System;" its adoption by

many of the leading photographic opticians both at home and on the Continent, and the insistence by most thoughtful workers to have their lenses constructed according to this system, being sufficient guarantees of its usefulness, and a strong proof of the necessity there has been for reform in this direction.

S. G. BECHANAN WOLLASTON.

Chairman of Committee on Lens Standards.

ON THE ACTION OF LIGHT ON ALLOTROPIC SILVER.

SINCE my last communication to this JOURNAL I have obtained the following results:—

1. It was mentioned in that paper that the red gold-coloured modification of silver was converted into a bright yellow-coloured form by the action of light. Continued exposure seems to produce little further change so long as the substance is dry. But if the paper on which the silver is extended is kept moist by a wet pad, with three or four days of good sunshine, the change goes on until the silver becomes perfectly white and is apparently changed to normal silver; water, alone, tends to darken this form of allotropic silver, accordingly the portion of the paper that was protected for comparison, darkened, showing that the whitening effect was due wholly to light.

It thus appears that light can convert yellow or red-yellow allotropic silver to white.

2. Some pieces of the very bright blue-green modification were exposed to light, and with about one day's bright sunshine they passed to a pure metallic gold colour.

It appears, therefore, that light can cause the blue-green modification to pass to the gold-yellow.

This change only occurs with a very brilliant form of the bluish-green substance, which is obtained with a quick, short washing. Specimens slowly and very thoroughly washed, which when brushed over paper gave a more mat colour, did not yield this result, but became brownish, as described in the July number of this JOURNAL. Nor can this result be obtained with the soluble form of allotropic silver described in the June number of this JOURNAL.

Light, therefore, can change the bluish-green to the yellow modification, and this last (with the aid of moisture) to white normal silver. The silver thus obtained is pure white, lustrous, and metallic, resembling silver leaf. Organic compounds of silver reduced by light give grey or black silver devoid of lustre.

M. CAREY LEA.

American Journal of Science for August.

THROUGH JAPAN WITH A CAMERA.

CHAPTER X.—NIKKO—JAPANESE TEMPLES—RELIGION IN JAPAN.

OUR work at Sendai was soon over, and we might have gone further on our travels, but we did not like the idea of travelling the ninety miles or so of the somewhat uninteresting road between Sendai and Koriyama (the nearest railway station) for the third time. There is a railway line between the two towns just mentioned, but it is not yet opened. The engineer in charge, however, kindly offered to let us travel on a ballast train, and we decided so to do, although it would keep us for several days longer in Sendai. I believe the truth was, we were in no great hurry to leave; we had so completely lost our hearts to the Bamboo and the Chrysanthemum, the charms of young ladies who, in addition to other attractions, could stand on their heads, having proved too much for us. However that may be, the ballast train somehow or other went without us; but we are all the slaves of time, so one evening saw us packing up our luggage, and at four o'clock next morning, long before it was light, the girls came romping and shouting into our room, pulling down the "mosquito houses" on the top of us to indicate that we must be marching. At the first streaks of dawn we were on the road, "Sayonara,"+ the sweet-sounding parting greeting of the Japanese, long called after us.

So we did this somewhat weary road from Sendai to Koriyama for the third time.

By this time the excessive heat was over, and the people were beginning to resume their clothes. During the very hot weather their raiment had been of the scantiest. The men wore merely the narrowest of loin bands; the women, for the most part, wore a single Japanese garment, (like a dressing-gown), but threw it off their bodies from the waist upwards. The children under eight or nine went scampering about stark naked.

Nagasaki and myself both took train at Koriyama, but the former went straight on to Tokio. Our business was over, but I had some ten or twelve days more of holiday, and had no desire to get back to the steaming atmosphere of the capital sooner than I had to. Besides, I wished to see the great town of Nikko. I therefore left the train at

* The pad used was of unbleached muslin, which was boiled several times with distilled water to remove everything soluble before use.

+ Pronounced like sigh-oh-nara. Literal meaning, "if it must be so."

Utsunomiya, from which town Nikko is about twenty-five miles distant. The road is one continuous avenue of stupendous pine trees.

Nikko is the Rome of Japan. It is a city of temples, or, more strictly speaking, it is a very small town surrounded with innumerable temples, which are, for the most part, amongst the trees which cover the sides of the mountains around the town.

The natural situation of Nikko is very beautiful. It is surrounded with mountains of very considerable height, all wooded to the very top with pine trees. There are deep valleys and gorges between these, with swift mountain torrents and cataracts flowing through them. The town itself is a single street, running parallel with one of these streams.

To give any idea of a Japanese temple is a most difficult thing, especially as there are temples of at least two distinctly different religions, namely, Buddhism and Shinto. One thing that is noticeable, and contrasts favourably with certain things at home, is that the priests of the different religions seem to carry on their offices side by side in the most perfect concord.

I have tried to discover whether the Japanese have any feeling of reverence whilst in these temples, or towards them, or anything that they represent, but it is very difficult to find a trace of any. I have seen crowds in a temple—smoking, laughing, and drinking tea. I have seen young fellows go up to the door of a temple and pull the cord attached to the bell, which, I believe, is supposed to call the attention of the Deity, laughing all the time as if it were a great joke. On the other hand, I have seen—occasionally—old men and women apparently deep in prayer.

The whole matter is very difficult to judge of, and in attempting to do so it is necessary to bear various things in mind, as, for example, that some of the temples are (I believe) not even professedly places of worship at all; and, again, that the Japanese appear to express by laughter many emotions different from those that we so express.

An anecdote may serve to illustrate the difference between the customs in Japanese temples and Christian churches. A friend of mine wished to photograph the interior of a temple. It was dark and the exposure required was long. He asked the priest how long it would be before there would be any service, and got a reply, which he understood to mean half an hour. As this would just allow him the time he required, he put up his camera; but after ten minutes had elapsed, the priest re-appeared followed by a crowd of people. "Had the honourable gentleman not finished his photograph?" "No; but, of course, if service was about to begin he would take down his camera." "Oh, by no means; the service would wait till the honourable gentleman had finished his exposure."

I forget now whether "the honourable gentleman" took advantage of the kind offer or not.

The temples vary in structure from a simple wooden canopy on four wooden posts to huge piles of the most elaborate wood-carving, filled in the inside with more carving, with gilding, painting, bronze work, lacquer work, and a general wealth of ornamentation perfectly bewildering.

These prints (which are of excellent quality—of cabinet size) were sold by a local photographer at a trifle under 2d. each. At the same shop an album containing thirty carte size silver prints could be bought for less than 1s.—and this where all the collodion-albumenised paper, &c., are to be imported from Europe.

W. K. BUNTON.

JACK AND I IN NORWAY.

No. XI.—VOSS AND EIDJE.

WE took a picture of the schoolhouse, Fleischer's temporary hotel at Voss, with Jack and me in our carriages at the door, and Fleischer himself seeing us away; we got one of the drivers to draw the shutter. I sent our landlord some pictures from this negative and he was highly pleased. He wrote me that they reached him on his birthday, and that he looked upon them as congratulation cards. This village of Voss holds a position of considerable importance, being the terminus of the railway line from Bergen, a run of sixty-five miles, passing through fifty-five tunnels on the way. The construction of this railway is considered a first-class piece of engineering. This line, when contemplated and made, was doubtless more as a means for the conveying of produce into saleable markets with more speed than they could hitherto, as the districts all round here are highly cultivated. Tourists, however, avail themselves of this line to a considerable extent in the summer-time, and certainly a more charming spot to spend a few days at so easy a travelling distance from Bergen could not be found.

There is an old stone church here (stone is unusual). It dates as far back as the thirteenth century, and is still in good preservation. We got a good picture of it in full sunlight, and the snow lying thick on the hills beyond.

The next resting-place on our way was Edje, on the Hardanger Fjord. The distance from Voss to Edje is twenty-four miles, with one resting-station between. On this journey we came upon one of those zigzag descents, as bad as that at Stalheim. It was so precipitous that we had to come out of the carriage and walk down a descent that never ceases till it reaches the valley below. On this descent there are two gigantic waterfalls, which we photographed in a mist of spray from the falls that filled the air. The bridge across the bottom of the falls was the only point we could get them from, and it is perpetually robed in this sheet of mist.

The mountains on the further side of this glen are very precipitous, with only little bits of green table-land to be seen here and there all up the front of them. In this glen we came upon one of the wire conductors used for conveying the grass when cut from the heights to the valley below. This wire is rather thicker than a telegraphic one, and it is stretched from the ground below right up to the top of the mountain. At any point on the way up the farmer has the wire line within reach. When he has cut, gathered, and bound his grass into bundles, these packets are hooked on to this wire and slide down to the end, where, by the action of a swivel movement fixed there, they drop off on to the ground, so that the collected gathering of the mountain is found in a mass at the bottom when he comes to take it away. Jack was talking to one of those hard-working fellows who seem to be wrestling continually with the hills for a living. Jack said, pointing to one of those insignificant bits of table-land that they cultivate with such care, "I can't see how it's worth your while to take all that trouble for the grass that you can take in a year off such a bit of rock."

"Bless you, sir, I will get as much pasture off that flat in a year as will be equal to the keep of one child." Then, thought I, it does not take much to keep a child in this country, or there is more grass to be taken off that rock in a year than I would give it the credit of being able to grow.

The day we travelled to Eide the road was thick with dust of a yellowish colour, fine as flour. There was a lot of carriages going our way, so that the air was filled with this dust, and the horses, conveyances, and passengers got so covered with it as to be almost past recognition. There was also considerable rivalry as to who would be first in the race, so as to get free from the swirling clouds of dust raised by the vehicle wheels in front.

The effect was very strange: hot weather, sweltering; dusty roads, blinding; and all around the tops of the hills snow-clad.

Eide, on the Hardanger Fjord, is one of the prettiest places on the tourist route. In going out to look for the best points from which to obtain views, we found that the only place we could get a good general view of Eide itself was from the water in a boat, as the hills on either side ran up from the water's edge almost perpendicularly, leaving no position from which we could photograph.

This is a beautifully green pastoral valley, a regular staying-place for the tourist, the surroundings commending themselves to the seeker after pleasant scenes, and Møland's Hotel for the seeker after pleasant times.

The garden in which the Møland house is situated is very inviting during the heat of the day, with its chairs, rustic lounges, and pleasant resting-places underneath the leafy, shady shelter from the sun. It makes us lazy; we roll, and smoke, and dream that there is no unpleasantness in this world of ours.

When here, Jack and I went away up amongst the mountains viewing a waterfall of some note, when we came on a lade of the roughest construction running on to a small paddle-wheel that kept in motion a grindstone. This was evidently erected here as a convenient place for the surrounding cottagers, wrights, and farmers to use in sharpening their tools and implements. Here a man could come and sharpen his tools without any assistance but the water, which was always there and always willing. Jack set to and sharpened his knife here just for the novelty of being able to say that it had been sharpened on a grindstone away in the midst of the mountains in Norway.

Many visitors were staying here—walking tourists, fishing tourists, newly-married tourists, and poor old tourists, who come here year after year, drawing in the fresh mountain breath to give a little more staying power to a waning life.

We met a young fellow here who had been doing a walking tour for several weeks in Norway, and from a description of his experiences it must have been very enjoyable. I thought with a light quarter-plate such an outing would be first-rate. And there is a Club in Norway (something like the Cycling Club that Jack talks about at home) that would help any one considerably who went on such a tour. The Norwegian Tourists' Club it is called, and the yearly subscription is only four shillings and eightpence. They not only give what information you require as to routes, but they make the roads easier for you by making pathways over mountains, and construct roads to waterfalls; where fording rivers are dangerous they build bridges; and in unfrequented parts of the country they erect huts for the use and comfort of the walking tourists. The members of this Society can have a badge for one shilling, which, when shown to the keepers of bridges, huts, and the like, would prove an open sesame to all the Club's possessions.

A considerable time could be profitably employed at Eide with the camera, making it a centre to work from, the surrounding scenery within easy distance being so well suited for photography. We intended to go on to Odde from here, but found that our time would not allow us.

We started from Eide for Bergen, a nine hours' sail. We had a very congenial company on board, all of the passengers being the visitors from Møland's Hotel, who were all more or less acquainted with each other, so that the intercourse was of a freer nature, and the interchange of ideas amidst the most interesting scenery made the passage very enjoyable indeed. We got some negatives of ships sailing and groups at the quays as we sailed along.

As we continue sailing in and out of the vandykes of the sea on this the last day of our ploughing Norwegian waters, we have leisure to draw

the threads of thought together and note the impressions of unfamiliar things that live with us.

It seemed to me that the land here belongs peculiarly to the people. With the exception of Mr. Gade, the American Consul's place—Fantoft—which is a country-seat near Bergen, we never in all our travels came upon what might be a gentleman's residence and grounds (they have no nobility). The country was all farms, farms, farms—and small at that. When on one of the fjords one day our boatman pointed up to the shelving rocks overhead covered green with grass, with a little house fixed against the rocks three-quarters up the mountain—"That's my brother's farm," he said; "isn't it a good one?"—well, we would not have taken it in a present. Still, it was about as good as most of the others we saw.

With regard to the general stock on these farms, and even on the valley ones, which show up better, it is meagre and scarce; you come across some goats, a cow or two, sheep very rarely. The only things in seeming plenty are horses, and they are very willing and good workers. I have seen one of these brutes, when out feeding on the roadside, jump the gates and follow our vehicle for miles; in fact, we could not get rid of him until he was caught and tied up in some station-house till we got away. Then they would free him, and he would trot quietly home again.

Birds are also very scarce here; I never heard any but one kind—and I cannot give it a name—chirping away in the woods all the time; we heard them, but seldom saw them. A gull or two might be seen flitting across our way in the fjords, but never in quantity as we have them at home in like situations. The very severe winter may have something to do with the paucity of the feathered tribe, although they are well cared for by their friend, the farmer, in the winter-time, who nails up boxes against his steading as homes for them in the winter, and hoists little bundles of corn on the top of long poles so that they might get food when their natural supply is lying deep under the snow.

We did not see many flowers, neither wild nor cultivated; on the tops of the mountains in some places we found heather in plenty, but the flower on it seemed the bloom of the previous year, for it all fell to pieces when pulled. The colour of the bloom was nearly white.

One thing that attracted and amused us very much while travelling here was the long distances the children of the little villages or hamlets would run to open the gates for the conveyance to pass through, in anticipation of the little *tip* they invariably expected and got. I have seen them scamper over a mile, by short cuts through the fields, to get up to the gate before the vehicle came up. And then there would be some doubt who should get the small coin, as rival parties usually started at the same time, and in breathless expectation each waited to see who was to be richer by the run.

MARK OUTE.

PORTRAITS BY PHOTOGRAPHY.

FIFTY years is not a long period of time in a historical retrospect, and yet it is sufficiently long to change the face of many things, long enough to remould the manners and customs of a race, long enough to mellow civilisation to deeper tints and a richer flavour. The story of the inventions and discoveries which have ministered to the convenience and comfort of civilised man during the last half century seem like fairy tales, yet a few years of familiarity and we forget that they were not coeval with the creation.

Fifty years ago, this leafy month of June, the tidings reached our shores that a Frenchman had discovered a method whereby the image given by a lens could be materialised. Since then a generation, substantially, have laid down in their graves, leaving behind them, *en masse*, the mirrored image of their faces—the only generation, so far as we know, since the morning stars first sang together. The faces of the dead and absent no longer flicker in the expiring recollection of the living, and *silhouettes* have ceased to grace the walls of the guest chamber. Year by year the little miniature—the first born of Daguerre's process—has given place to others of larger size and more pictorial value, until to-day camera portraits are too common to excite remark. It is of these larger products of the camera that I wish to say a word. Size has been attained, and now let us have something better than size. It must be admitted that an overwhelming majority of these pictures are crude to the rankest degree, and miss altogether the flavour that is of the most vital importance in portraiture. The vehement enthusiasm which is expended in maintaining that pictures by photography are works of art would be more wisely directed if applied to the study of artistic principles and effects. But, aside from this, we encounter far greater difficulties in portrait sizes than in making smaller work, for various reasons, prominent among which is the limitation of lenses. It seems to me that we have no lenses as yet suited to life sizes. Work of this sort usually bears upon its face the evidence that the instrument has been strained far beyond its powers. The definition may be all that could be desired, but the portrait is like a map—the pictorial effect, the atmosphere, wholly unattained. The great sensitiveness of gelatine plates permits the use of lenses of much longer focus than any we have for images approaching

life size. We all know how much better we can make small sizes—cabinets for instance—with a lens designed for larger work; the distortion of the head or figure is then no longer seen. Many sitters object to pictures showing their hands, for the reason that "they will look so large." They have been accustomed to seeing work with too small or too short-focussed lenses, and their objections are well founded. But small pictures are often seen now from the hands of skilful men, who are properly equipped with lenses, with the values perfectly kept. This may be attained in large as well as small pictures when we have lenses to meet the requirements of such work. The euryscope and others of kindred construction may very properly be used for groups and architectural work, but for portrait busts grant us an instrument of fourfold illumination and length of focus. Such lenses may reasonably be looked for in the future, I think; it is only just now that the great Lick telescope has taken up the work that astronomers have all along been trying to do with their spy-glasses. And when the coming photographer surveys the life-size image upon his plate—a size within the easy powers of the instrument used in its production—may the time have also come when the cramped and niggling work, now known as retouching, shall no longer be allowed to run riot over its fair proportions, but, instead, the work of the artist, supplementing its value by broad and skilful treatment. Then let the prints be made upon cartoon, or some other paper with a rough surface, which will not expand to the distortion of the image or repel artistic taste by its vulgar gloss.

Some maintain that enlargements by the solar process cover all this ground, but it seems to me that there is a value in direct work, when intelligently done, that is not successfully rivalled by other methods. This worthy style of portraiture appeals to the great middle class, who cannot well afford the work of competent portrait painters; and it is hazarding very little to predict that it will be largely known among the products of the second half century of photography.

By GUSTINE L. HURD.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 2.....	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 3.....	North London	Myddelton Hall, Upper-st., Islington
" 3.....	Holmfirth	Society's Rooms, Sutton, Surrey.
" 3.....	Sutton	Masonic Hall.
" 3.....	Rheinfeld Photo. Society	The Studio, Chancery-lane, Bolton.
" 3.....	Bolton Club	The Dispensary, Coventry.
" 4.....	Coventry and Midland	Anderson's Hotel, Fleet-street, E.C.
" 4.....	Photographic Club	The Balbs, Bridgman-street.
" 5.....	Bolton Photographic Society	Philosophical Hall, Leeds.
" 5.....	Leeds	Religious Institute, 177, Buchanan-st.
" 5.....	Glasgow Photo. Association	Masonic Hall Tavern, Bainghall-st.
" 5.....	London and Provincial	
" 6.....	Sheffield Camera Club	

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AUGUST 27.—Mr. John Spiller in the chair.

Mr. W. England handed round some negatives, one of them instantaneous, taken on celluloid films, developed with eikonogen. They were of neutral blackish colour, and were admired for their good qualities of cleanliness, clearness, and vigour.

Mr. A. COWAN remarked that negatives developed with eikonogen were of different colour according to whether sulphite was used, and when so used, according to the kind of sulphite employed. It was important also not to add nitric acid to the eikonogen solution with the view of enhancing its keeping properties. Such an addition was quite unnecessary, and even in small quantity had the effect of so filling the solution with precipitate that a spoon would stand up in it. Meta-bisulphite did not cause a precipitate but made the developer very slow.

Mr. ENGLAND then showed the lenses and shutter employed for taking the pictures (stereoscopic) that had been handed round. They were purchased in Paris during a visit to the Exhibition, and were very good as well as moderate in price. The lenses were of the rapid Steinheil type. The pictures shown had been produced with full aperture. The shutter was on the whole the most satisfactory that he had used. Mr. England also showed an appliance, previously described in our report of the London and Provincial Photographic Association, for fixing lenses to the camera front.

Mr. FRIESE GREENE said that cardboard fronts in place of ebonite had been shown at the late Congress.

Mr. CHAPMAN JONES showed a globe lens made by Harrison in 1862. It had been stated that these lenses covered a very wide angle, but this was not the case, as would be evident from the distance separating the lenses. There was, however, a remarkably flat field.

Mr. W. E. DEBENHAM inquired whether there was not a strong flare spot.

Mr. JONES replied that there was, and the CHAIRMAN said that one was formerly in use at Woolwich Arsenal, but the flare spot was very troublesome.

Mr. Jones next showed some lenses made by Swift for detective cameras working with an aperture of $f/4$.

Mr. DEBENHAM asked whether the field was fairly flat.

Mr. JONES replied, wonderfully flat. He also inquired Mr. Bolas's opinion as to whether it was desirable for a detective camera to have so large an aperture as $f/4$.

Mr. T. BOLAS replied that it was sometimes desirable to have the quickest lens obtainable.

Mr. McLAUGHLIN, from Ontario, Canada, being invited by the Chairman to address the meeting, said that in Canada they gained almost all their photographic information from the English journals. In the government photographic work, in which he was engaged, there was a great deal of printing by the blue process. He had been informed that in one department alone there was a saving effected by the employment of photography instead of draughtsmen of twenty thousand dollars a-year.

The CHAIRMAN inquired whether Mr. McLaughlin used any special means for clearing the lines in negatives for reproduction processes.

Mr. McLAUGHLIN replied that he developed his plates (wet collodion) with iron rather acid, and intensified with copper.

Mr. Greene showed a transparency on a 20×16 plate printed by contact from a negative taken last Saturday of the members of the Photographic Convention.

BATH PHOTOGRAPHIC SOCIETY.

ON Saturday last, the 24th instant, an excursion was made to Wick Rocks. The party of ladies and gentlemen left the city about noon by brake. The route lay along the Upper Bristol-road, through the villages of Kelston and Bitton. At the latter place a halt was made to photograph the rural church and its surroundings.

Arrived at Wick Rocks, and luncheon partaken of, subjects for the camera were quickly found and taken. At half-past five p.m. a start homewards was made, journeying by way of Cold Ashton and the Gloucester-road. The scenery along the route is of a picturesque and varied character, and the drive of some fifteen miles or more was greatly enjoyed.

Glastonbury has been selected for the next outing, on September 21, and the first ordinary meeting after the recess will be held at the Royal Literary and Scientific Institution on Wednesday evening, September 25.

Correspondence.

Correspondents should never write on both sides of the paper.

INTERNATIONAL CONGRESS ON PHOTOGRAPHY.

THE International Photographic Congress met at half-past two o'clock on Wednesday, the 7th instant, M. Marey, *membre de l'Institut*, in the chair. The work to be undertaken was again not taken in the order we find it in the preliminary report, but with the sixth question: "Uniformity in the size of photographic plates." Great discussion followed, and every effort was made by the Congress to endeavour to adopt a size in conformity with the foreign sizes in daily use. It was found regrettable that such a great number of different size cameras should be in the market, as a great benefit would accrue could an universal size be adopted for the future. The Congress adopted the size 18×24 as a standard, it being the most convenient. Cut into halves or quarters, or doubled, in every way the form or shape is adapted for landscapes, &c.

The fifth question was discussed on Thursday, the 8th instant, M. Davanne in the chair. M. de Villecholle was the reporter of the second Commission. Fifth question: "Find an uniform and easy method to adapt divers lenses on the different size cameras." The Commission proposed that a given number of flanges or rings, of a given size, screwing one into the other, should be adopted. M. Molteni proposed his "*adaptateur*," which I described in a former letter to THE BRITISH JOURNAL OF PHOTOGRAPHY. (This system I myself find very good, providing a safety screw be placed upon the apparatus, otherwise the risk is run that the lens may fall out and get broken.)

M. de Villecholle also proposed a modification of the above. He takes a piece of sheet-iron or zinc, of the exact size of the front board, and pierces a circular hole in its centre, through which the screw of the lens is passed; the ring or flange of the lens is then screwed on and nips the zinc front, and thus keeps the whole tight. The zinc front is then introduced into the camera. Naturally a zinc plate is necessary for every size lens. This system has the advantage of doing away with the necessity of screwing the flange of the lens upon a wood front-board.

The Congress then considered the advisability of a standard size and shape for said fronts of cameras.

The discussion then commenced upon "An uniform-sized screw for fixing cameras upon any kind of stand." After a long discussion it was decided that, as the Whitworth screw-thread had already been adopted by the Photographic Society of Great Britain, the Congress should accept it as well. This was decided on.

The Congress met again on Friday, the 9th instant. The discussion took place upon the ninth question: "Custom House formalities for the circulation of sensitive preparations."

As a dark room is about to be provided in almost every Custom House, the Congress thought wise to adopt a kind of international sign or label—a sign upon a red ground, and in the centre three letters, C. I. P. (*Congrès International de Photographie*). An inscription to be added in the language of the sender as well as the receiver—"To be opened only in the

presence of the owner." If by transit, the language of the country or countries through which the parcel passes can be added.

The discussion then began on the tenth question, M. Perrot de Chaumcux being the reporter. This gentleman, being a very experienced lawyer, gave the Congress the history of the French laws on artistic property for the last hundred years, and pointed out so clearly the advantages and disadvantages of accepting or not adopting the conclusions of his report that an unanimous vote was obtained.

The Congress met again on Saturday, the 10th instant, to discuss the second question, which had been proposed by the first Commission—"Uniformity in the Method of Measuring the Focal Length of Lenses"—Mons. A. Martin, reporter. Great diversity of opinion was here exhibited. The standard diaphragms of the Photographic Society of Great Britain were commented on, and a great desire to adopt them was manifested. Finally, the proposed method of the Commission was voted.

The Congress then chose Tuesday for their next meeting.

The General Secretary of the Congress then informed the members that on Thursday next, being a holiday, M. Marey, Directeur de la Station Physiologique du Collège de France, had invited the members of the Congress to visit his establishment.

M. l'Amiral Mouchez had likewise invited the Congress to visit l'Observatoire de Paris on Friday evening at nine o'clock.

M. Janssen desired the Congress to visit his Observatoire at Meudon on Sunday, the 18th instant, at three o'clock.

A few words on a personal matter. I cannot endorse the opinion expressed on the Congress by an editorial contributor in the last number of *The British Journal of Photography*, nor the words of the eminent Mr. Leon Warnerke, spoken before the Photographic Society of Great Britain on July 23 last.

The Photographic Society of France has been very liberal, kind, and generous to all foreign members of the Congress. They have not "had to pay a heavy subscription in the first place, and to look after themselves as best they can." Mr. J. Smith, accompanied by Mr. Braham, assisted at one of the *séances*. M. Pector, as they told me, refused to accept the ten francs, as he believed them to be delegates.

M. Leon Warnerke has also been received with the greatest honours. Last night he was invited to the banquet, and the post of honour given him. What these gentlemen would have received had they been delegates I know not. Your correspondent also received a free invitation, but was called to account by the President on arriving, on account of that article which was supposed to have been written by me. I was placed in such a position at table as not to be able to glean anything of the speeches made, which would, I am certain, have interested my readers.

On Tuesday, the 13th instant, the members of the Congress met again at 76, Rue des Petits Champs, Paris, under the presidency of M. Marey, *membre de l'Institut*.

An animated discussion began on the third question, "Uniformity in the indication of the photometric effect of diaphragms." The Congress decided on adopting, as the normal size corresponding to the unity of exposure, the diaphragm admitting light by an opening equal to the tenth of the focal distance of the lens. The Congress expressed the desire that all the other diaphragms should be so chosen as to be able to change the duration of the exposure, taking this unity as a basis, and that all diaphragms should have corresponding numbers engraved upon them, showing their *rapport* with the normal one.

On Wednesday, M. Davanne conducted the debates. The third and fourth questions were taken into consideration. The fourth question, "Uniformity in the method of measuring the duration of the admission of light regulated by obturators (shutters),"

The Congress, after a long discussion, decided that the duration of the total action of the opening and closing of the flanges of the instrument should be engraved on the obturator in seconds and fractions of a second, as well as the effective working expressed by the report to said duration. This to be calculated by comparison with an ideal instantaneous obturator. These items are to be given for the largest diaphragm which can be used with such obturator as well as for the principal degrees of tension which can be attained, or at least for the extreme rapidity.

The first question, "The introduction in photography of a fixed unit of light." The Congress adopted the luminosity produced by a surface of one square centimetre of incandescent platinum at the moment of solidification, which unit has already been adopted by *savants* under the name of "Unit of Light Vielle."

As a more practical unit or standard, the Congress adopted the flame of the Amyle Acetate Lamp, the intensity of which is to be calculated after that of the Unit Vielle. The flame of the Amyle Acetate Lamp to be employed in its most luminous part, the remainder to be cut off by means of a square sheet of metal, having a horizontal cut along its surface.

Subsidiary question A, "Uniformity in the estimation of luminous intensity in photographic operations." The Congress admitted that the luminous intensity of objects to be photographed could be determined by the employment of photometric apparatus, as proposed by M. Masent. A commission was appointed to study and experiment on the same.

Subsidiary question B, "Unity in the method of determining the sensitiveness of photographic preparations." The Congress adopted the method proposed by M. Janssen, that of obtaining a given tint by direct exposure to a standard light for a given time and developed under certain conditions. M. Janssen, in order to make this system more easy, ini-

tiated the Congress into the method to obtain a series of standard tints to facilitate said measures. For gelatino-bromide plates the standard light to be the flame of the Amyle Acetate Lamp (as modified by the Congress), placed at the distance of one metre from the sensitive surface; the exposures to be made at intervals of five seconds.

The Congress draws attention to the sensitometer Warnerke as able to render service, but in conjunction with the Amyle Acetate Lamp, and not with the phosphorescent plate.

Thursday being a national *fête* for France, the Congress did not meet, but accepted the invitation of M. Marey to pay a visit to his scientific establishment at Auteuil. At three o'clock we were all at the rendezvous. M. Marey exhibited and explained the different instruments he had invented to decompose motion by the aid of photography. The flight of birds, the motion of animals, as well as the different attitudes of the "superior beings," man, were all analysed and brought to a geometrical figure. His photographic gun was examined with interest, but what created most astonishment in most of the visitors was when they heard that the exposure of one ten-thousandth part of a second was not rapid enough to have the wing of a fly sharply delineated.

On Friday, the 16th, the Congress again met, M. Marey in the chair. The Congress proposed that another Congress should meet in 1890 at Brussels, in order to continue the work began. A permanent Commission was named, not only to prepare the work for the future Congress, but to enforce as far as possible the decisions of the present one. The Congress adopted a special mark to distinguish the apparatus made in conformity with the wishes of the Congress. The mark or stamp to be a rising sun with a monogram in the centre. All the standards which have been voted by the Congress are to be deposited in the photographic section "du Conservatoire des Arts et Métiers à Paris."

The same evening, at half-past nine, the Congress paid a visit to the "Observatoire de Paris." We were received by Messrs. Wolf and Henry, astronomers attached to the establishment, who kindly showed us all the instruments, and explained their scientific use. In order to go from one building to another the paths of the garden were studded with lamps, which vied with the constellations above, shining brighter than the starry firmament. A beautiful sight was obtained from the roof of the "Observatoire." Paris, illuminated with its thousands of gas jets; the Eiffel Tower, piercing the clouds in flames, as it were, by the Bengal fires burning between its mighty iron girders; the captive balloon lighted up by the reflected lights of the illuminated fountains of the Exhibition, resembled an extraordinary moon, or a fiery meteor about to bring destruction on the "modern Babylon;" the deep shadows cast by domes bearing the telescopes threw a gloom around; all appeared strange and unaccountable—a fairy land, a residence of spectres, or a scene of Dante. After two hours' visit to this sanctuary of learning we returned home, commenting upon the self-sacrifice of astronomers for their love of science, &c.

On Saturday the Congress met "au Trocadero," under the presidency of M. Janssen, for their *séance de clôture*. A recapitulation was gone through of the work accomplished. The foreign members were thanked, and cordially invited to the next Congress, to be held at Brussels. The President declared in the name of the *Ministre* that the "Congrès International de Photographie" of 1889 had terminated its work and was dissolved.

On Sunday, by special invitation, the members of the late Congress visited the Physical and Astronomical Observatory of M. Janssen, situated at Meudon, a short distance from Paris. The eminent astronomer awaited us at the entry gate of the establishment, and introduced us into the stables of the château (destroyed by the Prussians during the siege of Paris). These stables, about eighty yards long, were transformed into an immense laboratory. Apparatus of every description, size, and form—air pumps, gas reservoirs, meters, gas bags—encumbered the place. M. Janssen drew our attention to a series of three-inch iron pipes joined together so as to form a length of about sixty metres, each end being stopped by a thick glass. M. Janssen informed us that these long tubes were intended to contain different gases, under a pressure of 200 atmospheres; a ray of light was then sent through, and a spectroscopical examination then followed. Another apparatus for the spectroscopical examination of steam at different pressures was described. All these appliances have for their object the solving of the natural mysteries of the planetary bodies revolving through space. M. Stanciewitch, Professeur de Physique à l'Académie Royale de Guerre à Belgrade, assisted M. Janssen in his explanations.

The photographic department was then visited, and the apparatus in which such large negatives of the sun are obtained every morning (weather permitting) was carefully examined. The rapid obturator invented by M. Janssen, by which an exposure of one-hundred-thousandth part of a second can be obtained, the complicated mechanism and its working, was clearly and ably explained by the astronomer.

M. Pasteur, the clever operator, showed us a series of negatives of the orb of light. Its spot, their numerous changes, its atmosphere, and its revolutions were explained. A large print of the sun's surface, containing spots, was kindly offered by M. Janssen as a *souvenir* of the visit to his establishment. We then went across the park to see the new telescope, after which photographic negatives were taken by M. Fabre of groups of the late Congress. A lunch was then offered by the Directeur (M. Janssen), who was heartily thanked for the interesting and, above all, instructive demonstration, as well as for his hospitality.

On Monday evening, the 19th inst., the Photographic Society of France

invited all the foreign members and the delegates to a splendid banquet, organized in memory of the fifty years elapsed since the introduction of photography.

The celebrated Edison was one of the guests. Many speeches of great importance for the history of photography were made, of which I am sorry your correspondent cannot give a *resumé*, having been placed by error too far from the orators.

On Tuesday M. Janssen gave a lecture on the work and doings of the late Congress—in fact a *resumé* of all I have related in my letters to *THE BRITISH JOURNAL OF PHOTOGRAPHY*.

The Congress, in a short time, has done good work for the future of photography. It has laid a basis for future work, and has publicly shown that photography is an art well worthy of the solicitude of the State and the attention of *sarants*. A few years ago the latter would have thought it below their dignity to intermix with the adepts of the black art, or lose their valuable time in giving their attention to a problem in the interest of the Daguerrian art. PROF. E. STEBBING.

196, Rue Legendre.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—If I had not said all I have to say at present on naturalistic photography several times over, I should have been glad to discuss the subject with Mr. Graham Balfour—whose letter on your favourable notice of my book appears in your last—feeling sure that I should meet with fairness and good temper, for in this respect Mr. Balfour differs widely from his leader.

To my mind the subject has been thoroughly threshed out in words; it is now time for works. The Exhibition of the Photographic Society of Great Britain is now within measurable distance. Let Mr. Graham Balfour, Dr. Emerson, and other naturalists, show us examples of what they mean; let them justify the faith that is in them. It would be only fair, not only to myself, but to photographers generally, that after so much excited theory the naturalists should show us a little of the results when reduced to practice. I believe I shall be on the hanging committee, and I will take care that as far as my influence will go they shall have fair play, which, however, they would have had anyway.

I may be answered that in that case they would have to compete with the whole body of Philistine photographers, and the contest would not be equal. But there is "another way," as Mrs. Glass would say, in which they could bring all their out-of-focus batteries to bear on one man, one which the one man would gladly welcome. In October there will be an exhibition of my works at the Camera Club; I have no time to consult the authorities before writing this letter, but I have little doubt they would admit a collection of naturalistic productions for comparison. If it should be said that there will be no room, I would gladly give up some of mine.

I thus offer two opportunities of converting photographers to their peculiar doctrines, which the naturalists should not allow to slip.—I am, yours, &c.,

H. P. ROBINSON.

AMERICAN CONVENTION.

To the Editor.

SIR,—I herewith send you the following letter from my son Gavin, who is an amateur, residing in Boston, U.S.A. If you think his report of the Photographic Convention held there the early part of this month is worthy of publication, it is at your service.—I am, yours, &c.,

JAS. ALEX. FORREST.

Waverley, Alexandra-road, Birkenhead, August 26, 1889.

BOSTON, MASS., August 14, 1889.

"I am about to tell you what I saw at the Photographers' Convention held in Boston last week. The Eastman Company showed a new camera with celluloid film roller. This material is said to be a great improvement over the paper, both as to transparency and manipulation; the roller includes a hundred negatives and has an indicator attachment which tallies each plate as well as numbers those exposed. The prints I saw were very good, though I am not prepared to say they equal the best glass productions. Anthony's 'Climax' negative films are of a thicker kind, and if the sample negative I saw, as well as the prints were a fair exhibit, they are next to perfect; there was a picture of a young girl and no retouching, yet the print was as soft and finished as it is possible in best portrait work. I saw a swivel lens attachment, to avoid the nuisance of tilting the camera in taking high buildings or anything below a level focus; the lens could be moved the same as if on a ball socket, and in no way distorted the object of vision. There were exhibits of head rests made on the ball-socket principle, and so delicate in movement they could be made to act like the evolutions of a man's wrist.

"It may be rather late to introduce a new kind of head-rest in these days of instantaneous photography, yet even now the best artists use them in their best class of work. There were five exhibits, in three sets each, of illustrations taken from Longfellow's poem of *Evangeline*; they were all very fine, but the one selected for the prize surpassed anything I ever saw; it took right hold of

you like some masterpiece in oil, and had that mark of genius subtle as a gossamer. Saturday I went on excursion with the photographers some miles down the coast; we dined on board, and altogether were sailing some five hours. It was a most enjoyable trip. Coming home the cameras were in full force—'Kodaks,' 'Lilliputs,' detectives, &c.; and I have no doubt there were some nice yacht views captured. One artist, who took the silver medal for marine views, had a camera, the most ingenious get-up I have yet seen. The box was fixed on a gun-stock, the trigger so placed to work the lens shutter, while the operator sighted his object along the barrel, at the end of which there was fixed a finder; the moment he saw the picture in his finder away went the trigger, when the picture was taken!

"I overheard a conversation on formulae between Mr. Michael and Mr. Cramer. The former is considered the finest artist in the country, while Mr. Cramer is the largest plate maker, perhaps, in the world. Mr. Michael's formula was the quintessence of simplicity, and like the story of the young man who asked Sir Joshua Reynolds how he mixed his colours, 'With brains, Sir!' Mr. Cramer said there was really no fear of over developing, as the negative could always be reduced with red prussiate of potash and hypo, and in the case of local reduction the same remedy applied with a brush would always correct an over exposure. Mr. Michael said that was all very well, but no amount of doctoring would substitute bad workmanship, and to secure the best work you must have the best conditions.

"A few remarks occurred about the temperature and seasons, and how in summer you required far less alkali in your developer than in winter.

"Leeds ivory films' for positives—the samples of which I saw were splendid work, and I think more than likely to displace opal.

"Glass is fast losing its hold as a photographic film holder.

"GAVIN ALEX. FORREST."

DEVELOPOIDS.

To the Editor.

SIR,—On returning to town, my attention has been drawn to your notice of the compressed developer I have introduced under the name of "Developoids," and, if you will allow me, I should like to make a slight correction.

I believe I am right in stating the two-grain pellets made by Dr. George S. Sinclair contained pyrogallie acid alone; those I supply contain in addition a restrainer, viz., bromide of ammonium. All that is required, therefore, is to dissolve one of the pellets in one and a half ounces of water and then add from two to six drops of liquid ammonia, .880, when the developer is ready for use. For a quarter-plate one pellet is required, for a half, two pellets, and so on in proportion. These "developoids" work admirably with the Ilford and Britannia plates, and, indeed, with any other make requiring pyro and ammonia development.—I am, yours, &c.,

T. H. POWELL.

116, Denmark-hill, S.E., August 26, 1889.

[Dr. Sinclair's "pellets" certainly were composed of pure pyrogallie acid only, no restrainer being present.—Ed.]

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the Editor.

SIR,—With reference to the recent decision of this Society to form a museum of photography, the Council invites members and others to send for exhibition any photographic curiosities of historical interest in connexion with photography.

Such articles as are approved by the Council will be shown during the time that the Exhibition is open, without charge to the owners, and will be returned, carriage paid, at the close of the Exhibition.

Exhibitors will oblige by writing a short description of the articles sent, and by also stating whether they would be willing to give, bequeath, or sell them to the Society.

The exhibits should be sent c/o Mr. J. Bourlett, 17, Nassau-street, Middlesex Hospital, London, so as to arrive not later than Wednesday, September 18.—I am, yours, &c.,

A. M. MANTELL, R.E., Hon. Sec.

ANGULAR MEASUREMENT OF THE SUN.

To the Editor.

SIR,—I note a letter in your last issue by Mr. E. Dunmore, in which he states the sun in a 15 x 12 landscape would be represented one-sixteenth of an inch in size, but he does not state what focus lens would give that size. Now, taking a twenty-two-inch focus lens, you would have the sun about a quarter of an inch in diameter, and to get it the size he mentions, one-sixteenth of an inch, a lens less than ten-inch focus should be used.—I am, yours, &c.,

W. R. KENNAN.

7, Kenilworth-square, Ruthmines, Dublin, August 26, 1889.

ERRATUM.—Instead of the initials "C. R." attached to the article, *Round the Fleet with an Instantograph*, in last number, read "C. A."

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, September 4, 1889, will be *The Best Shutter for Detective Cameras*. Saturday outing at Strand-on-the-Green, Kew Bridge Station.

Exchange Column.

- Will exchange one interior and one exterior background for two others.—Address, J. GRIMSHAW, Photographer, Haslingden.
- I will exchange a geared hot and cold rolling press, fifteen-inch plated rollers, for modern photographic outfit, whole-plate or stereoscopic preferred.—Address, W. WALKER, 156, Noel-street, Nottingham.
- Will exchange Optimus 7x5 enryscope, new condition, for half-plate Ross' rapid symmetrical or larger enryscope. Difference, if any, adjusted.—Address, E. A. BASEBE, 6, Hartest-terrace, Mill-road, Cambridge.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

- A. Macdonald, Brodick.—Two photographs of a boulder. One photograph of cliff and boulder. One photograph from the summit of "Goatfell."

DEVIZES.—Such a stopper would certainly prove useful.

R. W. (Manchester).—Design unsuitable for registration as a trade mark.

J. J. A.—For permission to photograph in Kew Gardens, write to the director. It will be readily accorded.

L. J. W.—Evidently the plates have been made a long time. That will account for the iridescent appearance at the margins.

J. JONES.—Do not trouble about purifying the potassium iodide, but obtain, instead, a fresh sample from a respectable chemist.

GEO. F. BARTY.—To obtain permission for photographing ruins in Rome, apply at the Office for Preservation of Ancient Monuments there.

WAX.—Only oils and varnishes are employed for diluting the pigments employed in colouring lantern transparencies. Wax is not used.

F. DUNSTERVILLE.—The formula is as given by the author. Take the proportions of the salts as given and try with different quantities of water.

W. VERY.—The mere fact of a patent being sealed does not make it valid. If the apparatus was in public use before the application was made the patent is of no value whatever.

O. P. T.—The cheap views, such as you describe sold at watering places, are merely lithographs varnished. They are got up and printed in a colour to resemble photographs; indeed, they are sold as such at some of the bazaars.

J. WILLIAMS.—No one can prevent you from photographing the church, provided you do it from the public highway or where you are not trespassing on private property. No local photographer can have the sole right of photographing the village church.

R. STANLEY.—Your difficulty is only imaginary; collodion of all the recognised brands may still be obtained of the different makers or through any of the dealers in photographic materials. You see there is no necessity, in face of this, for the insertion of your somewhat caustic letter.

A. KIDD (Perth).—To take two different views of a face in one negative and by one exposure, all that is necessary is to place a mirror behind and to one side of the head. If this be at a very slight inclination, and the face of the sitter be directed towards the camera, a second and different view of the face will be seen in the mirror.

CLOUDY writes: "Will you be kind enough to inform me how to make a good cloud negative? I have tried, but cannot get any contrast. I tried a quick exposure with small stop, but did not succeed."—If there were good contrasts in the clouds and they were not obtained in the negative, over exposure was, no doubt, the cause. Try again with less exposure.

NEMO.—As you get the effect you desire on a dull day, all you have to do is to imitate the conditions on a bright one by the judicious use of blinds. It is impossible for us, not having seen the studio, to suggest the manner of procedure. Study the conditions well when the effect is as you require, and note them, then you ought to have no difficulty in repeating it in every-day work.

CHLORIDE.—If you wish to eliminate the hyposulphite of soda quickly and effectually from your prints, do it by washing. By decomposing the "hypo" you will get products which, if not removed, may prove as hurtful to the pictures as the hyposulphite of soda, and which are quite as, if not more, difficult to eliminate than the hypo. "Eliminators" should never be used until it is surmised that the fixing agent and its products are washed out—as a safeguard, in fact.

S. HARDY says that he has recently taken a house and shop on a lease, with permission to build a studio on the top of the house. Since he has commenced building it the superior landlord has served him with notice to pull it down, as being contrary to the covenants of the original lease. He asks whether he can be compelled to do so, seeing that his landlord has given him permission for the building.—This is a matter for a solicitor. But it is clear that if a man grants to another a right which he himself does not possess it is of no value. Our correspondent will, no doubt, be able to recover damages for the expense he has been put to from the one who granted him the lease, if the facts be as stated.

ZINC O. inquires: "Can you tell me where I can obtain, in small quantity, pure zinc plate for photo-etching, and its probable cost. I have tried several places without success. As I want it for experimental purposes only, I do not require a large quantity at a time."—Pure zinc plate is not an article of commerce. Pure zinc may be obtained of operative chemists, but not in the form of plates. Zinc plates suitable for photo-etching are supplied by all dealers in lithographic materials.

NOT IN FOCUS.—For large heads the single combination of the maker named will do all you can desire, but for groups we would give preference to the 10x8 rapid rectilinear.

X. Y. Z. writes: "Will you please inform me, through your 'Answers to Correspondents' column, what would be the best course to adopt? Some few weeks ago I sent three negatives for enlargement on porcelain; the enlargements arrived, but two out of the three were broken, owing to the careless packing, but they have not sent the negatives. I went to the Post Office about it, and they said I should have to claim from the sender. I have written repeatedly, and can neither get my negatives or a reply, and the people will not have the order, as it has been so long on hand. It is three weeks since I wrote first and have not heard yet."—If the pictures were imperfectly packed the Post Office is not liable for the injury, but the senders. Sue the enlargers in the County Court for the damage and also for the value of the negatives. You will have to prove in the case of the opals that it was through carelessness that the damage arose, as they will, no doubt, plead that, according to "custom of trade," they are not liable for injury in transit. This, of course, does not apply to the negatives which they still retain. If you issue a summons the firm will, doubtless, be glad to compromise the matter rather than allow it to go into Court, and thus gain publicity.

W. D. says: "Yesterday I wished to make a new nitrate of silver bath for some wet plate work (slides); I find it all wrong, however, and I want to know if you can tell me how to put it right? I dissolved one ounce of silver in two ounces of water, then I dissolved half a grain (possibly one grain) of iodide of potash in one ounce of water, and added this to the silver solution. The yellow precipitate disappeared all right, but on adding water to make up the bath to fourteen ounces a dense white precipitate formed, which afterwards turned black in the light. I filtered it twice, but could not get it clear. My old bath is perfectly bright and sparkling. I have had it in the sun to-day, but it does not clear. I have never had trouble with a silver bath before (at least at the very commencement of the life of the bath), and I have now made them on and off for seventeen or eighteen years. I cannot remember where I bought the silver; probably in a shop in our little country town. It was in a one-ounce bottle, just like you get elsewhere. The water I used was boiled rain water which had recently fallen, but collected after the house-top had been well washed. What had I better do? throw down the silver (if so, with what?) and make another bath, or is it possible to doctor this?"—In reply: In all probability the water was at fault. All appears to have gone well until the bulk was added; then a slight turbidity, not a dense deposit, should have been produced. The best plan now will be to add a little bicarbonate of soda until a permanent precipitate is produced, and then place the solution in the sun for a day or two; then filter and slightly acidify with nitric acid, when, no doubt, the bath will work all right. If this treatment fails the silver had better be precipitated as a chloride with common salt and added to the residues.

A. H. B. writes: "1. Is there any absolute way of deciding great under exposure and great over exposure of a gelatino-bromide negative? I have some lent me that are miserably thin, but not having seen their development, cannot form an idea. One or two were 'drop-shutter' exposures, but have almost the same appearance as some of my earliest attempts with a portrait lens, which I am certain were over exposed.—2. I am often annoyed by an iridescent stain on edges of negatives, not noticeable until fixed; can you form an idea of the cause, and its removal if possible?—3. What is the difference of the bromide of ammonium and the bromide of potassium in a developer, if any?—4. In enlarging from a half-plate negative with the lens that took it, is it necessary to stop it down to the same extent as when taking the negative? It is a 6x5 rapid symmetrical, and the illuminant when enlarging is best mineral oil. What I mean is, if the negative has detail microscopically defined by the use of a small stop, can this definition be reproduced with the full aperture or largest stop when enlarging, as when stopped down great loss of vigour ensues in the print, and enormously long exposure is necessary as well?—5. I am desirous of joining a good photographic club or society where I can mix with those who could help in such matters as the above. I live in Regent's-park, so one not too distant would be preferable. Any advice would be sincerely welcome."—In reply: 1. A thin negative full of detail usually implies over exposure.—2. We suggest deterioration of the plate in its incipient stage as the cause.—3. Either are used almost indiscriminately. The majority of workers prefer potassium.—4. Much depends upon the quality of the lens, but the matter can be decided by a trial conducted by the aid of a powerful magnifying glass.—5. The London and Provincial Photographic Association or the London Photographic Club.

* * We shall next week issue a group of the members of the Convention, taken by Mr. Friese Greene in front of the Royal Academy of Arts.

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No. 1531. VOL. XXXVI.—SEPTEMBER 6, 1889.

THE SIZES OF PHOTOGRAPHIC PLATES.

ONE of the questions set down for discussion at the recent Congress in Paris was the establishment of a series of standard sizes in photographic plates, a matter that presents considerably more difficulty than, perhaps, appears at first sight. We do not refer solely to the trouble arising from the difference in the national standards of measurement, nor to the existence of well-established and long-recognised sizes based upon the exigencies of those standards, but more especially to the questions of suitability to different purposes, and of taste in the matter of shape and proportion.

So far as the adoption of a universal or international series of sizes is concerned, it is from the outset unreasonable to expect that the Congress should depart from the use of the metrical system of measurement employed, not in only France, but almost universally in vogue in other Continental States; but it is equally hopeless to expect that English and American photographers will give up their *inches*, relinquish the well-known sizes of plates so long familiar to them, and commence to reckon their sensitive films in centimetres. From that point of view it is useless to attempt the establishment of any universal system until the metrical system is transplanted to British and American shores.

With regard, however, to the establishment of a more regular system in the shape or proportions of the plates in use, there is certainly room for reform, though it is far from easy to settle definitely upon any hard-and-fast standard of dimensions, or upon any particular *format* that will answer equally well for all purposes. Between the "quarter-plate," or even smaller size of the hand camera, and the 24×18 , and similar mammoth sizes still occasionally used for direct work, there is plenty of latitude for the exercise of taste as regards mere size, and perhaps the selection is better made from the heterogeneous list of existing sizes than from any carefully arranged series.

The argument has been put forward that such a system would greatly simplify matters for the makers both of cameras and of plates, but this is, we think, of comparatively little importance. Certain sizes are, and always will be, popular, and these sizes form the staple of the work, both of the apparatus manufacturer and the plate maker, while the "odd" sizes form but a small proportion of the whole. In this country, the quarter, half, and whole-plate sizes very far outnumber all others in use, while 5×4 , $7\frac{1}{2} \times 4\frac{1}{2}$, $7\frac{1}{2} \times 5$, and larger sizes are comparatively rare.

The question is an altogether different one from that of standard lens mounts, or camera screws, especially the former. English and French lenses are employed indiscriminately, regardless of the country of their origin, and it is in the highest

degree inconvenient when a large number of lenses are employed to have to provide a separate front and a separate flange for each. In the case of plates, if a camera be made to accommodate a recognised size of plate, such plates can always be readily obtained, at least in the country in which the camera was made, while even travellers in foreign countries have little trouble in filling their wants, since English plates are stocked by most of the Continental houses, and several of the English makers regularly manufacture the standard foreign sizes. It is, besides, much easier to cut down a larger size, or to have the plates specially made to the required dimensions, than to alter the national standards of measurement.

Some advantage might accrue, however, from the adoption of a systematic and systematically arranged series of sizes adapted to the standards of each country; but even here the question of taste comes into operation even more than that of convenience. Certain proportions in the dimensions of the picture are supposed to be more suitable for one class of subject than another, but it is doubtful whether any definite conclusion has ever been arrived at as to what is precisely the best shape of plate for landscapes and for portraiture respectively, or whether there is any necessity for any difference. Taking our English sizes, we have surely variety enough in shape, ranging as the dimensions do from such proportions as $7\frac{1}{2} \times 4\frac{1}{2}$ to 12×10 , and these have been indiscriminately employed from the earliest days for both portraits and landscapes.

Of late years the shapes known as "panel," "promenade," and such-like have been introduced as novelties, while occasionally we meet with pictures of a circular, square, or panoramic form. These last must, of course, be used only on subjects to which they are suited, while the more universally recognised proportions are of more general application.

This brings us to the question whether it is possible to fix upon a shape of plate which shall be, if not *the best* for all purposes, at least so proportioned that it is capable of general use. The precept has frequently been laid down, that the subject should, when at all possible, be arranged to suit the plate; but that when this is not feasible *the print* must be cut to suit the subject. On this principle, or rather on the supposition that no given shape of plate was suitable for all subjects, it was proposed some years ago to use square plates as being the form from which any shape of print could be most easily cut, but on the score of economy, no less than convenience, this practice is surely to be condemned.

Recognising the impossibility of fixing upon a shape that will prove applicable under all circumstances, we are reduced to the consideration of the question of the best for general purposes, leaving extraordinary subjects to be dealt with in

the best way possible. The almost universal opinion is that the form should be a rather narrow oblong, in preference to such proportions as 12×10 or 10×8 , which approach too closely to the square. No precise dimensions have ever been fixed, but if we may take practice as a guide, we would point to the sizes worked by such experienced landscapists as Valentine, of Dundee, and Wilson, of Aberdeen.

These firms have popularised two different sizes of pictures, namely $7\frac{1}{2} \times 5$ and 12×8 , the latter, it will be observed, being 12×10 "improved." In both these instances it will be noticed the proportions are as three to two, and certainly, from our own experience in landscape work, no less than from an inspection of the works of the two artists named, the proportions appear to be eminently suited for any kind of subject. For general portraiture, too, the form can scarcely be improved upon, whether for full-length, three-quarter, half, or merely bust. For groups also little difficulty need ever be experienced, with the aid of accessories, in satisfactorily filling the plates.

The recommendation of the French Congress is to adopt the proportions 24×18 as the normal, or $4 : 3$, also a good shape, a little broader than the one previously mentioned. But they go on to direct that other sizes be made by halving or doubling the normal. Here we think the size under the recommendation referred to is unsuitable, since it establishes two distinct and very different forms. We presume that the intention is to alter only one dimension at a time, so as to form a series 24×18 , 18×12 , 12×9 , &c., otherwise the difference between the successive sizes will be too great to be convenient. But if the series run as we have supposed, it will be seen that the proportions of each alternate size become $4 : 3$ and $3 : 2$ respectively, which, though it presents variety, is scarcely so desirable as uniformity.

But if the relative proportion be $17 : 12$, the dimensions may be altered singly and the *format* of the plates remain almost absolutely unchanged, the variation from strict accuracy being only one-third of one per cent. of the longer dimension. The next question to consider is how this will work practically without necessitating the resort to inconvenient fractions. Well, if we take a plate measuring 17 inches by 12, by halving each of the dimensions alternately, we arrive at a plate measuring $4\frac{1}{4} \times 3$, or a quarter of an inch narrower than our quarter-plate. This, though smaller, is to our mind a more pleasing shape, whether for landscape or portrait, even for that small size; and the form is, as we have said, absolutely adhered to throughout the series which runs $4\frac{1}{4} \times 3$, $6 \times 4\frac{1}{4}$, $8\frac{1}{2} \times 6$, $12 \times 8\frac{1}{2}$, 17×12 , 24×17 , &c.

Or if the narrowed quarter-plate be considered too small, we may take as our basis to work upon the half-plate increased in length by a quarter of an inch, or $6\frac{3}{4} \times 4\frac{3}{4}$. Commencing with the half of this we have the following series, which is almost as true to form as the previous one—viz., $4\frac{3}{4} \times 3\frac{3}{4}$, $6\frac{3}{4} \times 4\frac{3}{4}$, $9\frac{1}{2} \times 6\frac{3}{4}$, $13\frac{1}{2} \times 9\frac{1}{2}$, $19 \times 13\frac{1}{2}$, 27×19 , &c. Whichever series be adopted, it will be noticed that most of the existing popular sizes are closely approached, especially in the first series. If the $7\frac{1}{2} \times 5$ plate be taken as the basis, then a series of two shapes or proportions identical with the French proposal will result—viz., $5 \times 3\frac{3}{4}$, $7\frac{1}{2} \times 5$, $10 \times 7\frac{1}{2}$, 15×10 , 20×15 , and 30×20 , the proportions being alternately $4 : 3$ and $3 : 2$. This, as already stated, offers a variety, but, unfortunately, not of much use to the user of a camera of fixed size.

The establishment of a system such as this will very considerably simplify matters for the plate maker who may coat plates only of the largest size in general use, and by dividing produce

any size required. It is, perhaps, a long time before such a system will secure general adoption, but it no doubt has its advantages.

ECONOMY IN THE PRINTING ROOM.

MATERIALS AND THEIR USE.

NATURALLY, in considering economy of materials, the nitrate of silver bath occupies the foremost position, on account of the large amount of money invested in it in the course, say, of a year's work. The question of weak or strong baths will claim first place for notice in this regard. Now we will at once say that no question of economy can arise when quality of work may be interfered with: therefore, if strong baths give better results, they should be used without hesitation; if weak baths give equal results, we may discuss economy. When strong baths can also be used with the same sample of paper with equal advantage as regards quality of results, there is economy of material and economy of time and labour. Is the latter saving which is obtained when using a strong bath more than counterbalanced by any possible saving of material furthered by using a weak bath? This is all that need be considered. A sheet of paper will only decompose a certain amount of nitrate of silver, whether the paper be floated on a twenty or a hundred-grain bath; but as it will also take up about equal quantities of surplus fluid, *i.e.*, silver solution, in either case, the daily amount that will be thrown out of service in the form of print washings poured into the chloride tank must be directly proportional to the strength of the silver bath (we may disregard any consideration of the weakening of the adherent surface solution by the decomposition into chloride). Hence, if there were no waste or loss whatever of the theoretical yield of silver from the print washings, weak or strong baths would be on an equal footing as regards economy. But seeing that, as a matter of fact, there will almost always be waste, it is self-evident that the larger the quantity of silver in the print washings the greater the absolute annual waste. This may be a small fraction of the actual nitrate used, it may be a large one. *Ceteris paribus*, economy, then, is obtained by working so as to produce a minimum amount of residues.

On this principle, then, it is easy to predicate the best way of decolourising the floating bath. Kaolin has been long used for this purpose, but, seeing that it loses its properties after awhile, and a fresh supply has to be added from time to time, thus increasing the residues again, while the use of carbonate of soda is attended by little or no waste, for the carbonate of silver formed is, to a great extent, redissolved as the bath gets acid again, it follows that the carbonate plan is so much better both in this and in other respects that kaolin ought to be a thing of the past.

Regarding the albumenised paper itself, we may mention that we were recently consulted about the difficulty of cutting certain sizes out of a sheet, and when one was shown to us to illustrate the difficulty, it seemed almost insurmountable. Further consideration, however, induced us to take the actual measurements, and we found that this particular sample was more than half an inch shorter than another in our own possession, from which it is evident that paper of assumably ordinary dimensions is by no means of the same size as received from different makers. This is a very important consideration, and one that is, ordinarily, quite unknown to the majority of photographers. We have since seen sheets cut

largely to waste, because of the impossibility of gaining a particular size without loss? We are, of course, alluding to the ordinary size of paper, not the extra large, which needs a very considerable extra outlay in the shape of dishes, &c., and where economy is not necessarily obtained unless for special sizes.

Economy, too, is not necessarily consulted by cutting an unusually large number, for example, of *cartes de visite* from a single sheet, for, it must be remembered, that where there is a moderate amount of margin there is little probability of prints being wasted through slight damage to the edges during the handling necessary in the various processes a print is subjected to. On the other hand, when there is no spare margin, not only is there occasional waste from the paper being unevenly placed upon the negative, but a certain proportion of prints are rejected through frayed or torn edges. We do not, however, recommend a margin of too ample dimensions, as there would then be not only waste of paper, but waste of gold also, in that it would be unnecessarily expended upon useless margins. Economy is very largely influenced with prints with dark edges—especially the more important sizes—by cutting fairly closely to the required ultimate size.

We might, perhaps, be expected at this stage to enter into the question of the economy of the photographer making for himself the various salts, more especially those of the precious metals that he employs; but we propose devoting an article specially to this subject, and will, therefore, pass it by and conclude the present article with a reference to what is really the most important subject we have yet dealt with—the economy of the fixing bath. Our words of advice here may be very brief: "Use a maximum quantity of hypo for fixing the prints; it is the truest and best economy to use hypo with no niggard hand." This salt can now be purchased at such a low rate that there is no excuse for any photographer using a bath a second time over, or using too small a proportion to the number of prints he has to fix. Let it ever be remembered that the danger to the future stability of the prints through insufficiency in the amount or the strength of the hypo bath is entirely invisible when the prints are taken out of the bath. All the advice of experts here must be taken on credit; but no print is likely to "stand" that has been fixed in weak hypo or in too small a quantity of solution, and that a free hand with hypo is the truest and best form of economy.

NOTE.—In our last article on the subject, the printer has made us advise that a parcel over ten pounds in value should be "decreased" instead of "declared."

No sooner does an individual render him (or her) self popular or notorious, than a portrait is to be seen in most of the stationers' shop windows. It appears to matter not from whence the notoriety may proceed. It may range from philanthropy down to criminality, still "portraits" of some kind or another are forthcoming all the same. Frequently, when several portraits of the same individual are published, they are totally unlike each other. Notably is this the case with reference to the portraits of Mrs. Maybrick. Some of these from different sources now being exhibited in the windows bear no resemblance whatever to one another. What is more, the discrepancy between them cannot be charged to retouching, which is usually made the scapegoat in such instances. So much are some of the portraits at variance with each other, that one can arrive at no other conclusion than that there must be more than one "Mrs. Maybrick"—that is, if the portraits be authentic.

When, a few years ago, the Photographic Society of Great Britain after mature consideration, adopted what is known as the universal

system of diaphragms and flanges, it was imagined that this matter was definitely, and for ever, settled. The system met with approval both at home and abroad, and was generally adopted everywhere. Since then, however, different attempts have been made to alter it. The last two proposals are those emanating from the recent Photographic Congress in Paris and the Photographic Convention. If every country, society, or manufacturer were to adopt a system of their own, or any recognised system that is being continually altered, a "uniform system" may render confusion worse confounded than it was when makers simply numbered the stops of their lenses, arbitrarily, 1, 2, 3, &c., with any real reference to their ratios. Imagine, if the system of numbering the diaphragms and the uniformity of the screws were altered every few years, what would be the effect on some of the older lenses? Many of these have now been altered in conformity with the present recognised system. If this be changed, a fresh alteration or marking would be necessary, and again at the next change, so that, ultimately, the projecting metal of the diaphragm would not be large enough to contain the different figures. Neither would the brasswork of the mount be sufficiently thick to allow of the different screwthreads being, from time to time, cut upon it. Better by far to leave well alone, or, at least, till a substantial reason for an alteration is forthcoming.

PHOTOGRAPHERS who have a large stock of negatives will do well to take warning from the following case:—A very large number of negatives, the accumulation of many years in a somewhat extensive business, were stowed away in a spacious upstairs apartment. A short time back it was noticed that the floor of the room appeared to be subsiding. A builder was called in, and an examination showed that the whole of the flooring, together with the joists, from the great weight upon them, were giving way bodily. The negatives had to be at once removed to avoid accident. Then the floor had to be taken up and entirely new joists put in.

It is a very common thing for an upper room of a house to be selected and fitted up for the storage of negatives, and as they gradually accumulate more fittings are, from time to time, added. This is often done without due consideration as to whether the joists and flooring are sufficiently strong to carry the immense weight they are in the end called upon to bear. In some large establishments, of many years' standing, the weight of the accumulated negatives must be estimated by tons, and these are frequently located in the upper part of a not too substantial a building. Many photographers do well to bear the fact in mind, as, in the case of a sudden collapse, the consequences might be very serious.

PARLIAMENT is once more in vacation. Nothing was done during the past session with reference to the long-promised new Act on artistic and photographic copyright. Nor, so far as we are aware, was any allusion made to it in the House. That a new law as regards photographs is highly desirable cannot be gainsaid. In Parliament there are a goodly number of members who take a lively interest in photography, and they have already, in a very practical way, used their influence to the general advantage—as witness the provision of dark rooms at the different Custom Houses. Possibly, if these gentlemen were approached with reference to a new Copyright Bill, they might be induced to take the subject in hand next session. Why does not the Photographic Society of Great Britain, which is largely composed of professional photographers, move in the matter? This would be quite legitimate business for it to undertake.

WHAT is a permanent process in photography? Usually any process in which the image is composed of colouring matter in the form of a pigment is recognised as such. Carbon prints are generally considered as being permanent, but some of them will not bear a few weeks' exposure to a strong light without exhibiting a marked change in tint. Collotype, and other mechanical processes in which the image is in printing ink, might well be considered as permanent. We have, however, seen some collotype prints which, but a few weeks ago, were of

a rich photographic tint, but now, by the action of light, they have become changed to a totally different colour. In fact, the change, in the time, has been greater than would have been the case with ordinary silver prints. It must not be supposed that because a picture is in printers' ink that it is necessarily permanent, because many of the pigments employed in its composition may be extremely fugitive. Notably is this the case with some of the bright reds used for printing posters, as is manifest on most hoardings. Some of these fugitive reds are often employed in the inks for mechanical processes, in order to obtain the brown or purple photographic tints. Consequently, if the prints are exposed to a strong light the red becomes quickly discharged. Furthermore, it leaves the print of a far less pleasing colour than it would have been had the red not been used in the first instance. The red is not simply discharged, but usually becomes converted into a pale, dirty brown. On former occasions we have directed attention to this subject; but the tendency to use fugitive pigments in "permanent" processes appears to be increasing rather than otherwise. However, it may be mentioned that it is only exposure to light that effects the colour. It does not change spontaneously, unless exposed to its influence, as in the case of a silver print.

ON THINGS IN GENERAL.

THE Photographic Convention having become an assured success, thanks in no small degree to the unflagging, unselfish energy and industry of its Secretary (elected by acclamation, of a very hearty nature, to the same post for the forthcoming year), we may hope every meeting for increasing usefulness from its deliberations. When the first American Convention was instituted, I remember seeing extracted from its proceedings in the columns of this JOURNAL a series of useful apophthegmatical utterances, under, if I recollect aright, the name of *Convention Cameos*; but as I was reading the other day some of the papers read at the last meeting of that body I saw a great contrast, and I must express surprise that some of the matter then published was ever allowed either to be read or published. When a man can write, as did one contributor to the Convention, respecting the floating of albumenised paper on the silver bath—that there is "no danger of over-silvering. In experimenting, the writer silvered six sheets respectively—four, six, eight, ten, twelve, and fourteen minutes, in a fifty-grain bath. No difference could be noticed in the finished bath," &c.—one wonders what the Convention is for, and to whom the papers were submitted before being read, the truth being that it would be base flattery to call the man who could write such absurdities merely ignorant. I am happy to think, too, that the tone of the British Convention is too high to permit the utterance of such sentiments as we found in another paper read in America at the same time. The writer coolly advises the "average photographer," whatever that may mean, not to try experiments for himself, but to let others do that kind of thing, and then to suck their brains. Lest I should be accused of exaggeration, I give the *ipsissima verba* of Mr. Ersley. "Let experts work out the processes, and when they have made a success of them it is time enough for the average photographer to take them up!"

I am rather wandering afar from my subject proper, which is just now the Convention here, whose meeting has just closed. If the "average photographer" would take to heart the retiring President's words, and act upon their spirit, our science would be greatly the gainer. "Mr. W. E. Debenham has stated, and Mr. C. H. Bothamley has corroborated the statement, and my wish is to emphasise it, that there is in our ranks a sad want, an almost total absence of scientific methods of research and logical report of our investigations. . . . We jump at conclusions without safe ground to jump from . . . papers such as we read and write would never be accepted or attended to by societies cultivating any other science, as far as I know." How true! Without arrogating to myself any superiority, indeed, I would rather liken myself to the Publican, and ask for mercy for my own sins, I shall not be alone in saying, I blush for some of the papers I see in print in some of the photographic journals. Conspicuously apart from such were some of our Convention papers. May I instance Mr. Bothamley's own? Without entering into any polemical remarks, I cannot help being struck with

the real usefulness of such a paper, and with the amount of real, honest, carefully conceived work it bears witness to.

There were capital papers upon lenses, too. It would be interesting to know if any one can explain why some malign fate generally seizes upon whoever starts writing upon the peculiarities of the human eye. Mr. Dallmeyer knows something about optics, and yet we find him stating that "the eyes cannot take in without movement more than from a quarter to a third of the 180°." The fact is, the eyes take in an angle very closely approximating 180°, and a single eye no greatly inferior range. *En passant*, it may be said that his theoretically perfect instrument—a pinhole camera with the section of a mathematical line for an aperture—is a hard nut to crack; for a line is a two-dimensional imagination, and if one dimension-length is removed, it is difficult to conceive the remaining one breadth "without breadth," and possessing no magnitude to produce diffractions. Then, again, still keeping to the eye question, we have our old and respected mentor, Mr. H. P. Robinson, writing, "It has been said that the eye only sees about five per cent. of what is before it; this is true in a double sense, but physically the eye only sees an angle of five degrees at one time," &c. Now, I have already stated above that the eye embraces an angle of not very far from 180°, and the experience of any one will tell him that if the space embraced by five degrees be excluded from the field of view there is left behind neither a black, white, or grey space devoid of outlines, as would be the case under Mr. Robinson's contention, so far as to the literal meaning of the words. If, however, they are to be improved upon by inserting the phrase "with distinctness" before the word "sees," there is equal error, for five degrees is greatly in excess of what can be seen at one moment by an immobile eye.

There was in Mr. Bothamley's paper one sad omission, he said not a word upon their power of weather prophecy! If any one will turn to page 541 of this JOURNAL he will find an account of the discoveries of Dr. Zerger, of Prague, who finds that photographs of the sun, taken on orthochromatic plates, furnish a means of predicting by more than twenty-four hours the approach of tempests, hurricanes, earthquakes, &c. It may be confidently anticipated after this that their next performances will be the predicting the future of individuals of the human race. It was very interesting to read about the instantaneous photograph of a dog climbing a tree. Does a dog when it climbs a tree always need a quick exposure? We learn that in Australia the rabbits have taken to tree climbing. An interesting pendant to the dog picture would be a rabbit similarly employed.

FREE LANCE.

CONVENTION NOTES.

Birmingham has held aloof from the London Convention. This is to be regretted, for *some* of the Council, at any rate, entertain a lively sense of the trouble and expense the Birmingham brethren put themselves to in order to make it the success it undoubtedly was last year. Into the financial troubles to which this coolness is mainly attributable we do not here care to enter, but we desire to record our conviction that they then did what, in their estimation, was best for the furtherance of the interests of the Convention.

When London was announced as the *locale* of the Convention, it was enthusiastically believed that the Queen would *certainly* open it. Failing this, some other member of the Royal Family would be only too pleased to do so. But when it "came to the scratch," Royalty was inaccessible. The Lord Mayor was appealed to, but he declined, and of all the phalanx of great men, embracing dukes, archbishops, presidents of learned and other societies, and men of scientific and artistic renown who were paraded as "Patrons," not one could be got! These all held aloof, even to the extent of gracing a single meeting with their presence. The moral of this is: let future Conventions stand on their own dignity, and not play the part of toad-eaters or sycophants to those who happen to have great names, and who estimate at its proper worth such servility and obsequiousness. Photography is quite able to stand its own ground upon its own merits. Derby, Glasgow, and Birmingham did the thing right royally without fawning; why should London have been so abjectly parasitical?

Several new departures were made this year. One, which demands first attention, is the confining of the members of Council to residents in, or in the vicinity of, London. This is probably the right and proper thing to do, but what then becomes of the organization of the concern as being of the United Kingdom? Would it not have been at least decent that some few, at any rate, of those who reside in other parts of the United Kingdom than London should have been placed upon the Council? And from the way that these London members were read out from the chair and carried, may it not give rise to the suspicion that the Council is self-nominated and self-elected? We know quite well all that can be advanced relative to electing a Council who, residing in one place, are able to attend all its meetings. But what then of some four or five members not yet elected, and who are to be residents of the next place of meeting, or its vicinity? are they supposed to be able to run up from Chester every now and then to attend the meetings of Council in London? If the organization is to be truly national, common policy demands that those on the Council shall consist of members selected from localities other than London, even although it may be difficult for them to attend every or any meeting.

The members proposed and passed as Councillors are—we give them in alphabetic order—Messrs. W. Bedford, Bridge, C. Beck, Cembrano, Cowan, Clifton, Dallmeyer, Dresser, Davison, S. H. Fry, Friese Greene, Haddon, Haes, H. M. Hastings, Levy, Mackie, Pringle, Samuels, Taylor, Wellington, and Webster. Four more to be added from Chester. Of these we know that one at least has given orders that his name be erased. A separate Treasurership has been abolished, and this office is, for this year at any rate, to devolve upon the Hon. Secretary, Mr. Briginshaw, who most certainly can never be said to have allowed private interests to interfere in the way of the public good.

The attitude of the leading London 'professional' photographers towards the Convention is difficult to understand. Making full allowance for the merely trade, in contradistinction to the technical, interest so many of them are credited with taking in their profession, one might have expected that from motives of policy alone they would have taken at least a seeming interest in it. But in these dull times the five-shilling fee for membership may be a consideration, especially when one could have access to any specially desirable meeting on payment of one shilling.

More anomalous still is the attitude of some who allowed their names to be placed upon the Local Committee, yet who never attended a single meeting, or even, if we are correctly informed, became members of the Convention at all.

The begging of papers from friends to be read at the Convention is largely a farce, seeing that the majority of such papers cannot by any possibility be read, but must be "taken as read." Much better confine this department to at most two good lectures, and devote the remainder of the week of meeting to that for which it is much better adapted, viz., pleasant outings and recreation. It is a small compliment to those who prepare long and, doubtless, interesting papers to relegate them to the limbo of what is so well termed a "massacre of the innocents." Who that has been subjected to this fate will risk its repetition?

With what a wondrous display of zeal, although not according to knowledge, did Mr. Andrew Pringle, the late President of the Convention, try to trip us up in *re* the publication of certain two papers! But that we know that cowardice is no part of a Scotchman's character we should have attributed to this feeling the fact of his sending his letter to the other journals, in which he was certain of holding his ground for a week at least, while carefully abstaining from sending it to us, in the moral certainty of his being stampeded down. Connected as an editorial writer with another journal, he loyally did his level best, whether under compulsion by his chief or not it matters not to us, to try to make it appear that we alone were the sinners in regard to publishing two papers in addition to his own (relative to which no offence was taken). But, alas! for his imperfect acquaintance with

photographic serial journalism, he closed his eyes to the fact that the offending papers also appeared in the *Photographic News*, the editor of which journal says he published them under official instructions, or to quote his own words in reply to Mr. Pringle's letter:—"The papers were published in these pages because on the Tuesday evening the *Honorary Secretary to the Convention handed us the proofs in the hall, and said that the arrangement with the photographic press had been rescinded, consequently we might publish them without delay.*" It is a pity, for the sake of Mr. Pringle's reputation, that he had no Mentor at his elbow to check him when in his eager zeal, presumably to obey the injunction of his journalistic chief, he made a rush at the ink bottle and had a dash at THE BRITISH JOURNAL OF PHOTOGRAPHY. We said the resolution had been rescinded, hence our publication. We gave no names, preferring to take the blame, if blame there was. Our contemporary is more outspoken; but what is the sum as regards the estimating of the action of the late President?

What a splendid display did the Eastman Company make at the Convention Exhibition! They had everything, as regards size, from the small Kodak to truly magnificent enlargements, and they also had a most excellent display of apparatus of all kinds. Messrs. B. J. Edwards & Co. had also a fine display of their specialities. We are favoured by Mr. Hindley, of the firm of Mr. Jonathan Fallowfield, with an admirable collection of groups taken by the excellent Fallowfield Facile Detective, which shows its perfect adaptability for pictures of this class. But of the general collection of apparatus or pictures, historical and artistic, exhibited by Messrs. Werge; Watson & Sons; R. W. Thomas & Co.; Houghton & Son; Gotz; Taylor, Taylor, & Hobson; R. & J. Beck; S. Fry & Co.; Noakes & Son; and Swift & Son, it is almost needless to speak. Each firm showed its latest and best work, of which it would be impossible here to speak at such length as to do them justice.

THE CONVENTION.

[THE following papers were contributed to the Convention, but, for want of time, were not read.]

FOX TALBOT—HIS EARLY EXPERIMENTS.

By FRIESE GREENE.

MR. TALBOT was the only child of the marriage of William Davenport Talbot, of Lacock Abbey, in the county of Wiltshire, with Lady Elizabeth Theresa Fox-Strangways, eldest daughter of the second Earl of Ilchester. He was born at Melbury, in Dorsetshire, the seat of the Earl, on the 11th of February, 1800. His father, William Davenport Talbot, died July, 1800, when his son was only five months old. His mother married, secondly, in 1804, Captain, afterwards Rear-Admiral, Charles Fielding, by whom she had two daughters—Caroline, Countess Dowager of Mount Edgcumbe, and Horatia, late wife of Thomas Gaisford, Esq. Mr. Talbot was educated at Harrow, where he displayed marked abilities at a very early age, for in a letter written by Dr. Butler to Lord Winchelsea in December, 1812, occurs the following paragraph:—"Little Talbot goes on capitally; he has just finished his trial for the fifth form, and has done himself credit; I am really distressed at removing him at so early an age into the fifth form, but if his acquirements are beyond his years, how can I help it?" His acquirements were beyond his years, and the ordinary school work soon became insufficient to satisfy his intellectual powers. He took up chemistry, and one of his experiments resulted in an explosion, which alarmed Dr. Butler for the safety of his house, and made him declare that he could only allow the theory of chemistry to be studied at Harrow. Dr. Butler himself was fond of chemistry, and very kindly offered to lend his pupil any of his books on the subject. The prohibition was, of course, respected, but the ardent student arranged to carry on his future experiments in the shop of a neighbouring blacksmith, and thus continue, by his own manipulation, to illustrate and test the statement contained in his textbooks.

On leaving Harrow, he read with a private tutor, and then entered Trinity College, Cambridge, where, in 1820, he gained the Porson prize for Greek verse. He graduated in honours in 1821, being twelfth wrangler and second chancellor's medalist. About 1821 he left England, travelling, not as an idle loungeur, but with the aims of a scholar and man of science; his education and bias of mind qualified

him for observation and study. His love of plants and flowers remained with him until the last, and was exhibited in his green-houses at Lacock Abbey. He appears to have always been in pursuit of knowledge, in pure mathematics, in physics, and in chemistry; for the range and character of his researches, reference may be made to many papers in scientific journals from 1836 to 1847. The attention of the leading men of science was naturally attracted to the successful researches of Mr. Talbot, and he was elected a Fellow of the Royal Society on the 17th of March, 1831. The Royal medal of the Society was awarded to him in 1838 for his papers, published in the *Philosophical Transactions* for the year 1836 and 1837; in 1842 the Rumford medal was awarded to him for his "Discoveries and Improvements in Photography." His other researches in science are less popularly known than his brilliant discovery of a method of fixing the image of an object in the camera obscura, in the completion of which the art of photography consists. This invention was not a mere chance result of a chemical experiment; on the contrary, it was a calculated series of results. It was a profound application of optical and chemical knowledge to the solution of definite problems, the solution of each being one step towards the grand result. You can see this by what Fox Talbot says of the invention of the art of photography in the first volume of *Pencil of Nature*, published by Longmans, Brown, Green, & Longmans, 1844. I have the original copy here, so any member who wishes to look at it can do so, and he will find it very interesting, especially the pictures, which are very good, considering they were finished so many years ago. I have read it over and over again, and always find some new idea started, when you compare photography as it was at that time and photography as it is at the present time. Well, this is what he says on the third sheet:—

"One of the first days of the month of October, 1833, I was amusing myself on the lovely lake of Como, in Italy, taking sketches with Wollaston's camera lucida, or rather, I should say, attempting to take them, but with the smallest possible amount of success, for when the eye was removed from the prism, in which all looked beautiful, I found that the faithless pencil had only left traces on the paper melancholy to behold; after various attempts, I laid aside the instrument and came to the conclusion that its use required a previous knowledge of drawing, which unfortunately I did not possess. I then thought of trying again a method which I had tried many years ago; this method was to take a camera obscura and to throw the image of the objects on a piece of tracing paper laid on a plain piece of glass in the focus of the instrument, on this paper the objects are distinctly seen, and can be traced out with a pencil with some degree of accuracy, though not without much time and trouble. I had tried this simple method during former visits to Italy, in 1823 and 1824, but found it in practice difficult to manage, because the pressure of the hand and pencil upon the paper tends to shake and displace the instrument (insecurely fixed, in all probability, while taking a hasty sketch of a roadside, or the view from an inn window), and if the instrument is once moved it is almost an impossibility to get it back again so as to point truly in its former direction; besides which, there is another objection, viz., that it baffles the skill and patience of the amateur to trace all the minute details visible on the paper, so that, in fact, he carries away with him little beyond a mere *souvenir* of the scene, which, however, certainly has its value when looked back to in long after years; such then was the method which I proposed to try again, and to endeavour, as before, to trace with my pencil the outlines of the scenery depicted on the paper; and this led me to reflect on the inimitable beauty of the pictures of nature's painting which the glass lens of the camera throws upon the paper in its focus—fairly pictures, creations of the moment, and destined as rapidly to fade away. It was during those thoughts that the idea occurred to me—how charming it would be if it were possible to cause these natural images to imprint themselves durably and remain fixed upon the paper. And why should it not be possible? I asked myself."

Now here, you see, is the genius of Fox Talbot, the question why and the determination to know at the particular moment; and he says, if you read on, "I made a careful note with such experiments as I thought would be most likely to realise it if it were possible;" so the knowledge of chemistry which Talbot must have had was the main link which brought floating philosophic visions to reality. So in January, 1834, Fox Talbot procured some nitrate of silver (strange to say we have not found a substance yet to better nitrate of silver for our principal processes, but I am under the impression it won't be long before nitrate of silver will be put aside and something cheaper will take its place); he made a solution, and with a brush spread some on a sheet of paper, he put it in the sunshine and was disappointed to find that the effect was very slow in comparison to what he anticipated. What would he say now if he were alive? In one thousandth part of a second you can get a picture full of detail, which at that time would take a man a lifetime to draw, and then not so full of minute detail and so true to nature. Then his next experiment

was to wash the sheet of paper with a strong solution of salt, and when this was dry it was washed again with nitrate of silver. Of course, chloride of silver was then formed in the paper; but he found this was not much quicker, but he noticed where there was not much salt it darkened much quicker, so he tried a weaker solution of salt, and it immediately manifested a far greater degree of sensitiveness. Here he established beyond doubt the important fact that a less quantity of salt produced a greater effect, and no doubt many of us here, in experimenting, are as near important discoveries as he was with the first solution of salt, but not the fortune to have a weak spot to notice, and if we have, we have, perhaps, not the power of perception to notice it. Fox Talbot not only found out the quickness through the spot, but we find his first fixing solution was a strong solution of salt to stop the further action of light upon sensitive paper. Now Mr. C. H. Talbot, his son (who I have the honour of knowing), has some of these pictures in good preservation which were done by his father in 1835, signed and dated. He very kindly brought a series of these before the Bath Photographic Society, and I had the pleasure and good fortune to have a good look at them, and I can assure you I was immensely surprised to find these early results in such good condition, especially taking into consideration the camera and lens and the difficulty of obtaining chemicals at that time for working photography.

Now it took an hour or two to procure a picture at that time, so he tried no end of experiments to make the paper more sensitive; and here he says, during his experiments, how necessary it was to trust to nothing but actual experiment. He tried repeated alternate washes of salts and silver, and, using it in a moist state, so he reduced the exposure from an hour to ten minutes. These being Fox Talbot's important discoveries in 1835, I wonder he never brought them before some society until Daguerre made known to the world his important discovery; but then at that time there was not in England an Arago who kept on extolling Daguerre's discovery to the Assembly of Science, which surprised the whole scientific world; besides, Fox Talbot was of a modest nature, and his results were achieved only by steady work continued year after year. Strange to say, all the principal processes used now, such as transparent paper, films, &c., are the outcome of Fox Talbot's experiments. Here are some of his first paper negatives, which his son kindly gave to the Bath Photographic Society; and here are some more which Mrs. Calvert Jones kindly lent me, taken by her husband and Fox Talbot in the early days. Mr. Calvert Jones was the first to whom Fox Talbot taught his process, and he was a personal friend as well. The unique box of Daguerreotypes was also taken by them. Now I want you to look at these negatives carefully, and as they are passed round give your honest opinion upon them, and see if you do not come to this conclusion, that though we have advanced so much it seems so little. There is also a complete set of *Pencil of Nature*, which is very rare and valuable. Look how well some of the pictures have kept—and nearly fifty years old!

In spite of high birth and good means, Fox Talbot was one of the few men who devote themselves to scientific research during the greater part of their lives. Fox Talbot's genius was very versatile, for he did good work in spectrum analysis, and, with Rawlinson and Hincks, was one of the first to decipher the cuneiform inscriptions brought from Nineveh. We also owe to Talbot the use of albumen employed for printing photographs; and on September 20, 1840, he discovered the latent image (which, by-the-by, none of us understand yet), and the mode of its development, which altered the whole system of his work. During the British Association's visit to Bath last year I had the pleasure of seeing the place where Fox Talbot's first experiments were tried, and recognised the places in the pictures which are here; and during the time I was admiring the noble mansion a profound sense of feeling and respect for Fox Talbot, the English father of photography, came over me.

He died at Lacock Abbey on the 17th of September, 1877, full of years and honour. It is greatly to be regretted that no public memorial has yet been raised to his memory; why, at the French Society, when I was at Paris a fortnight ago, they had three busts of Daguerre in the room. By Fox Talbot's discovery we are getting to love the beautiful symmetry of nature's secrets; even in the invisible portion (to the eye) of the insects we now by the aid of enlarged photographs trace the beauty and form—a love and appreciation which was repulsive to us before: it seems as if we have a new world to investigate, many great truths are half known and half enjoyed for centuries; the means and the wish to know the other half is the essence and the substance of all great discoveries. Now photography is launched upon the restless ocean of the human mind we can safely calculate for advancement which will calm down mysteries and bring things home to us as they really are. Photographers should always be in a good humour, for people always put on their best look

to be photographed, and the reflection from these charming faces we see should be sufficient in itself to make us always happy. Besides—

"Photography is like magician's charm—
We nurse the absent, in affection warm
Present the distant, and retain the dead
Shadows remaining, but the substance fled;
For faces vanish like the dreams of night,
But live in portraits drawn by beams of light.
Exquisite Nature caught in changing dress;
Motion in photography appears at rest."

PAST AND PRESENT.

By W. M. ASHMAN.

WHEN the gigantic strides which photography has made amongst the arts, and the enormous advantages it confers on mankind at large, are considered, it is really a matter of surprise that until recently such a comparatively small proportion of literary work should have served for the dissemination of its marvellous capabilities. But this apparent state of quiescence as regards the development and spread of photographic knowledge is fast melting away before the fierce heat of popular enthusiasm now to be met with on all sides, and in every civilised community societies formed for the express object of advancing photography are making great headway: the number, which increases at an astonishing rate, can now safely be estimated at a hundred in this country alone, there being hardly a centre of importance where a band of the brotherhood does not exist. It would be difficult to comprehend the amount of energy displayed by active members of these many societies, or appraise the value of this work, only a tithe of which gets recorded in the respective societies' archives, to slumber indefinitely within the recesses of the Secretary's minute-book of proceedings. The process of referring to such an *omnium gatherum* being at all times tedious, and owing to its limited scope in a great many instances proving of but dubious efficacy, outside publication of the sayings and doings of individual members has grown to be a necessity to photographic society existence, and one which it would not be difficult to show has sprung up in a ratio with the growth of photographic society discussions rather than to the popularity of any particular quantity or quality of photographs, such as are produced on a strictly commercial basis.

Looking back through the pages of our brief history, to the incipient stage, if we may so phrase it—to the period when Fox Talbot, Herschel, Brewster, Hunt, Reid, Ponton, and many others in this country, contrived in a brief space of time to introduce to the scientific world a constant series of discoveries of more or less immediate importance—we find that in many instances a very meagre record appears to have been kept. It may be that little was then thought to be necessary which did not bear directly upon the process occupying the experimentalist's immediate attention; but who can judge of what recorded experiments may or may not at some future date be of intrinsic value, and perhaps be the means of stemming the progress of an over-ardent patent seeker? Indeed, owing to the scarcity of reliable information on several matters it has, in so short a period as a trifle over half a century, become no easy task for the historian to assign to our English experimentalists their due share of honour for the discoveries they made. A writer of history is dependent upon former works for much of his narrative, therefore, should the material he has to deal with be incomplete, and there are doubts concerning the accuracy of the earlier publications, future students are almost certain to be led into error. In the pre-journalistic days of photography we learn that the record of progress was restricted to stray paragraphs, which from time to time appeared in the public press, or the printing of certain papers on photography in *Philosophical Transactions*, the authors having read them before the Royal Society. These, together with a few works written by well-known experimenters of the time, whose names have since become household words, were the available sources of information, and based upon this material the English portion of the early history of photography has been built up. There yet remains to be brought to light investigations recorded only in note-books, some of which are known to be carefully preserved, awaiting a fitting and convenient opportunity to be placed in history. It is fortunate that as time passed on one or two societies sprang into existence whose business was the advancement of photography as a separate and distinct branch of science, and the result of their work was published by themselves. The information, so meagre at that period, and so much in request, led to the founding of journals devoted exclusively to the interests of photography from a scientific as well as a commercial point of view, and henceforward the advancement of photographic knowledge and

the elucidation of all that pertains to the fundamental principles underlying processes has been steady and quite unmistakable.

At this period, however, the general interest exhibited in the study and progress of the art, as distinguished from the novelty created, may very well be gauged by the number of societies existing for the mutual interchange of ideas and for the general advancement of photography. The possibility of producing a pictorial representation by the aid of light and the alteration of some chemical compound was known early in the *thirties*, and abroad at a still earlier date. Yet it was not until about twenty years afterwards, in 1852, that the first photographic society was formed, followed in 1853 by the present Photographic Society of Great Britain, then known as the London Photographic Society. Manchester came next in 1855, and ranks second in point of venerable activity at the present time. The South London Photographic Society, founded in 1859, did most excellent service, but upon the death of the President, the Rev. F. F. Statham, in 1884, fell into almost complete lethargy, and, as a consequence, after some twenty-five years' work, succumbed from inanition.

Running down the list as published at the time, we find between 1860 and '70 that seven more were formed: the Amateur Photographic Association, also societies at Sheffield, Edinburgh, Glasgow, Liverpool, Cheltenham, and Oldham. In the following ten years seven others were added: Bristol and West of England, 1871; Photographers' Benevolent Association, 1873; Sheffield, 1876; Photographic Club, Dundee and East of Scotland, Photographic Society of Ireland, 1879. Now the influence of rapid dry plate photography becomes apparent, four societies within our own border having been formed in the one year, 1879. Since the advent of 1880 to the present time the number of societies started in this country, and busily engaged, may be estimated at no less than eighty, about a dozen and a half of which were established last year. The majority of these many centres of enlightenment are very active ones, ranging in membership force from twenty-five as a minimum to considerably over four hundred as a maximum. The present strength of the membership roll of the Convention of the United Kingdom I do not exactly know, but judging from the large and representative committee elected to carry on the work this jubilee year of English photography, one is naturally led to the conclusion that the Society is as numerous as it is important, and, further, that the great energy displayed by those gentlemen who have undertaken to guide the ship will call forth the hearty response which such unselfish labour deserves. The objects of the Convention—at least, such as I imagine them to be—are so distinct from those of the general run of photographic societies that I am led on the present occasion to leave out of this short paper matters of a purely technical nature, such as may be regarded as the legitimate business of any one of our hundred or more societies, and to crave your patience while I state a case which many are agreed ought to be dealt with at once.

I have already mentioned certain familiar names in connexion with the beginning, so to speak, of that photography we are so proud to be now associated with, but to relate anything like a chain of circumstances, or to dilate upon those original researches which contribute so much towards the present position held by photography, would not be fitting here, where so much work is contemplated in a very brief period. Every one will readily admit that we owe a deep debt of gratitude to our English fathers of photography, a debt that mere words introduced into papers and manuals by way of preface does not adequately recognise, since such expressions are those only of the individual authors, though, let us hope, they record the general sentiments of us all. We who are situated in the provinces or abroad are looking forward with interest to the result of this meeting of the Convention in 1889 at St. James's Hall, London, where the jubilee of the discovery of English photography is to be celebrated. Several celebrations termed "jubilee" have already taken place in connexion with our art, but have any steps been taken to establish a permanent testimony to our great benefactors? Monuments have been talked of in honour of William Henry Fox Talbot as a set-off against those erected in France to honour the illustrious Frenchmen, M. Daguerre and M. Nicéphore Niepce, but the wisdom of building monuments of such a kind is doubted by many who would gladly help in some other scheme to perpetuate the esteem we of the present generation have for those veterans who have gone before. It would be presumptuous for me to come to the Convention with a cut-and-dried scheme and ask you to give me your support in carrying it out, but I will ask you in the interests of photographers to consider whether this Convention week is not an opportune time to appoint a committee with power to bring forward a definite plan, and submit the same for general approval as early as possible. In my own opinion Fox Talbot stands first in the importance of his successful researches. Some of his photographs, produced as far back as 1835, are, I believe, preserved at Lacock Abbey, Wilts, by his son, but these historical

treasures have been publicly exhibited at a photographic society's meeting, held in the early part of the present year at Bath. An album of calotypes produced by the inventor has also been placed on view in the hall by permission of the society referred to, and I am sure those who have an opportunity of examining these valuable prints will be struck both with the excellence of selection and the degree of permanence they exhibit.

Mr. Friese Greene, who has been entrusted with the album, will doubtless in his capacity of delegate deal with this matter more fully than it is my purpose to do, for other names also await their share of recognition. Mungo Ponton is thought by many to be as deserving of monumental adoration in Scotland as the great Frenchmen in their own land, or Talbot in this country. Sir John Herschel's researches were by no means meagre; whilst to Robert Hunt, Claudet, Goddard, Sutton, and others, due prominence ought in justice to be given. To erect a statue in honour of every scientist who has discovered a photographic process is out of the question, but to found an institute for the advancement of photography may seem practicable to commemorate this period of our history. There is ample work to do, and if properly managed such an institution might prove useful in many ways. Within its walls the future photographer might find the portraits of the fathers of photography, a record of their experiments, and examples of their work. Starting with such material, later inventions, improvements, or discoveries, would doubtless follow in proper sequence, and something like a national institution would be the result. Whatever is done to commemorate the early work in photography could not have a better start than at this Convention gathering of photographers, representative of all the different photographic societies of the United Kingdom, and the numerous industries which the birth of this art has given rise to: at least, such is the opinion held by yours fraternally,

W. M. ASHMAN.

THE PHOTO-MECHANICAL PRINTING METHODS AS EMPLOYED IN THE JUBILEE YEAR OF PHOTOGRAPHY.

By THOMAS BOLAS.

LITTLE did the first makers of sun-pictures imagine that, within the short time of fifty years from the time of their work, what one may term solid metal photographs would be running to and fro on the "coffins" of our largest and quickest printing machines, and from them impressions, just in all gradations of tint, would be turned off at the rate of something like fifteen hundred an hour. Such is, however, the case at the present time, and probably there is scarcely a typographic printer in London who has not worked from the phototypic blocks now so common.

Though phototype blocks represent in the aggregate the form in which photo-mechanical printing surfaces are most commonly met with and used, it is desirable to take a brief survey of the most important printing methods which come under the category of photo-mechanical methods, and we may begin with—

PHOTO-LITHOGRAPHY.

In the method which is most common, a sheet of paper coated with gum, albumen, or gelatine, containing bichromate of potash or ammonia, is exposed to light under a clearly defined and intense line negative, and after exposure the sensitive surface is thinly and uniformly coated with printers' ink, or a special ink of analogous composition, but made up with less pigment than is contained in the usual ink. The inked paper being now immersed in water and the surface very gently rubbed with a soft and long-haired camel's-hair brush, the ink becomes removed from the parts where the bichromated colloid has been protected from the light by the opaque parts of the negative. The bichromated colloid where acted on by light loses its power of softening in water and retains the ink; where not acted on by light it softens in the water and the ink loses its hold. The image with printers' ink thus prepared is called a photo-lithographic transfer.

The following details are sufficient to enable any photographer to make a transfer in fatty ink ready for the lithographer to "put down" on the stone, and print by the ordinary lithographic method, which method need not be described here, as it is in no way photographic, and no special treatment is required in dealing with a transfer made by photography.

A sheet of plain paper is floated on a warm solution of gelatine (containing six per cent. of gelatine), and it is then hung up to dry. When dry it is insensitive to light, and it may be kept any length of time without injury. To make it sensitive to light it is soaked for a few minutes in a solution of potassium bichromate, which contains about three and a half per cent. of the salt, and it is hung up to dry,

but this time in a dark room, or in a room illuminated by yellow light. When dry, it is ready for exposure under the negative.

For a short time it is left soaking in water, and gently brushed on the inked surface with a wet camel's-hair brush. The ink gradually comes off, but in order to save time it is often desirable to employ a little warm water, and, at the same time, continue to use the brush. Now, the end of the matter is, that the printers' ink becomes removed from all those parts of the paper which were not exposed to the action of light, and an image in fatty ink is thus obtained on the gelatinised paper. From this the excess of water is now removed by means of blotting paper, and the print, inked face downwards, is laid on a clean and slightly warm lithographic stone. The stone and paper being now passed through the press, the paper adheres firmly to it, but on moistening the paper with a sponge it becomes easily removable. When stripped off, the fatty ink is fixed on the surface of the stone, leaving a perfect but reversed image thereon. All is now ready for the lithographic printer, who gums and etches the stone, as a preliminary to the ordinary printing process.

Instead of putting the photo-lithographic transfer down on a lithographic stone, it may be put down on a zinc plate, and the plate can be printed from, if treated exactly as the stone was treated.

In its usual form, photo-lithography is only adapted for the reproduction of line subjects, or subjects in extreme black and white, and various attempts have been made to render it available for the reproduction of the gradations of a negative taken from nature. By a modification of Asser's starch process it is easy to get results which are excellent renderings of half-tone as a grain or stipple. A sheet of blotting paper is covered with ordinary flour paste, containing eight per cent. of flour. The paper having been coated, it is next smoothed with a soft badger brush, and when dry the paper is soaked in a three and a half per cent. solution of potassium bichromate, to make it sensitive to light. This piece of sensitive paper being placed under a negative, and exposed to the light of burning magnesium for a few minutes, or to daylight for a longer time, soon becomes tinted with a brown colour where acted on by light, as you see. The light brown print is next soaked in cold water, in order to remove the unaltered portion of the potassium bichromate, after which it is dried and ironed with a warm flat-iron. This last operation is to harden the coating. We now put the ironed print into water, take it out, lay it on blotting paper, and dab on printers' ink with a stiff brush. The ink adheres to those parts where the bichromated paste has been made insoluble by the action of light, and it refuses to adhere to those parts where the paste remains soluble. In this way a fatty transfer is obtained, which shows all gradations of a negative taken from nature, not, however, as a true half-tone, but as a grain or stipple well adapted for transferring to stone or zinc. As a fine image of this kind is liable to get clogged up when printed from stone, it is better to transfer it to a plate of zinc, and to make a typographic block from this by the etching method.

PHOTOTYPIC BLOCKS.

A fatty ink transfer, similar to that which is commonly put down on a lithographic stone, can be transferred to a smooth and clean zinc plate, and the ink firmly adheres to the zinc, just as it would to the stone. A treatment with gum now protects the clear parts of the zinc plate against the adhesion of printing ink, and the application of the ink roller adds more ink to the fatty image already on the surface of the zinc plate. So far the process resembles the photo-lithographic process; but, instead of printing from the zinc plate, powdered resin is dusted over it, in order to give firmness to the fatty image. The zinc etcher next very slightly warms the plate to make the resin and ink partially blend, and then puts it into dilute nitric acid, containing one part of acid to about forty parts of water. Here it remains for about three minutes, during which time the acid dissolves away those parts of the metal which are not covered by the waterproof coating. The covered parts now stand slightly in relief, but only very little, and if we were to continue the etching without further preparation, the acid would gradually undermine the lines, and the image would be lost. Now, the undermining action of the acid can easily be prevented by washing the plate, drying it, and then heating it sufficiently to just melt the resin. Under these circumstances, the melted resin blends with the printers' ink, and runs down over the sides of the little ridges left by the etching, and protects these sides from the further action of the acid. Having done this, it is well to gum the plate once more, ink again, dry, and dust with resin before proceeding to another etching. This second etching may be done with stronger acid than the first, say one of nitric acid to thirty parts of water, and it may be continued longer, say for six or seven minutes, and when this second etching is finished, the series of operations must be repeated until sufficient depth is obtained, care being taken that the melting of the resin is only carried far enough to allow it to flow just over the

sides of the relief left by the previous etching. In ordinary cases, ten etchings are enough to give the necessary depth, but in the case of important work it may be necessary to give twenty or thirty very slight etchings in order to obtain the same depth, without endangering very fine lines or details.

The process of zinc etching has been largely employed for the production of typographic blocks from fatty transfers, either drawn by hand or printed, and this phase of the process bids fair to compete successfully with the art of wood-engraving.

There are other methods of producing phototypic blocks, among which may be specially mentioned the method which is founded on the swelling of gelatine.

By the following modification of the swelled gelatine process I have succeeded in overcoming many of the difficulties of the methods already published.

We start with some clear sheet gelatine about one-thirtieth of an inch in thickness. This can be prepared by drying a layer of gelatine solution on a sheet of waxed glass, or it can be purchased from Mr. Cornelissen, of Great Queen-street. To make this gelatine sensitive to light it is soaked in three and a half per cent. solution of potassium bichromate until it becomes flaccid; it is then laid on a piece of clean glass, and the excess of solution is removed by an application of the squeegee. The plate bearing the wet gelatine is then placed in a warm and photographically dark place to dry, and when dry it can be easily separated from the glass by raising one corner with a penknife. We obtain in this way a flat sheet of sensitive gelatine, having a smooth surface and all ready for exposure under the negative, and this exposure may last from ten to twenty minutes in sunshine, or a correspondingly longer time in the shade.

We now take the exposed film and put it into water to soak, and those parts which were protected from the light begin to swell immediately, while the exposed parts refuse to swell in the water. The soaking should last several hours, especially when the temperature is low, and when the gelatine has soaked the necessary time we make a cast from that. For this purpose we lay the wet gelatine film on a piece of glass, exposed side upwards, and squeegee it down as before—you see that it adheres to the glass quite easily—and after having made it surface-dry by dabbing with a soft cloth, a little oil is applied, and distributed over the surface. Now that the excess of oil has been removed by a soft cloth, we pour on plaster of Paris to a thickness of about an inch, taking care to remove any air bubbles by the application of a camel's-hair brush through the liquid plaster.

This plaster will take about ten minutes to become solid, and if we violently tear the plaster and the gelatine apart, the fine details of the cast are almost sure to be damaged. But, instead of doing this, a good plan is to hold the glass plate in one hand and gently push the plaster cast with the other. Now the gelatine slowly slides over the glass, and finally it will slide quite off, the gelatine still being adherent to the plaster. It is now merely necessary to turn up one corner of the gelatine film and slowly fold it back, so as to draw it off the plaster gently and without fear of damage, either to the gelatine relief or the plaster, just as a lithographer draws a thin paper proof from the stone. The next step is to make a cast in stearine from the plaster, and for this purpose the plaster should be soaked in rather warm water, about 60° Centigrade, and on this soaked and warm plaster a layer of stearine about an inch thick should be cast. The stearine cast is now dusted over with blacklead or bronze powder, and is then put into the electrotyping bath, and when a sufficient quantity of copper has been deposited it is merely necessary to back up with type-metal and mount on a wood block, the work being then ready for the typographic press. If the process I have described is gone through with an ordinary half-tone negative, an exceedingly beautiful electrotpe is obtained, in which the gradations of light and shade are represented by varying degrees of relief. These, or even plaster casts, ought, I think, to have a very good sale, if photographers would only take the matter up. The ease with which they can be made is surprising.

I may mention that, instead of taking a cast from the plaster in stearine, guttapercha may be used, a press being employed to force the plaster cast—which should be in an iron chase—into the soft guttapercha.

The depth of the relief obtainable by the swelled gelatine process is about equal to that of an ordinary visiting card, and where large surfaces of white occur, it is necessary to deepen the plate in these parts. This may be done either by cutting out the metal from the finished plate, or in most cases more conveniently by raising the surface of the mould, let it be wax, stearine, or guttapercha, on which the electrotypic copper is to be deposited. This is best done by holding a stick of stearine or wax in the left hand, and a warm pencil of metal in the other hand, and so holding the wax or stearine as to let a thin melted stream flow down the warm

pencil. This stream is allowed to flow on those parts of the mould which require raising.

ENGRAVING ON METAL PLATES.

We now go back to the first photographic process discovered—that is to say, the first process which gave photographic representations which could be exposed to light without destruction—the bitumen process of the hard-working and patient Niepce. This investigator noticed that the residue left on the drying of certain varnishes became insoluble by exposure to light. About the year 1814 he covered metal plates with a bituminous varnish, exposed them in the camera obscura, and after exposure he subjected them to the action of similar solvents to those originally employed in making the varnish. Under these circumstances those parts of the film which had been exposed to strong light refused to dissolve, while the unexposed parts dissolved, a negative image being thus formed on the metal plate. To convert this negative image into a positive, those parts of the metal which were uncovered by bituminous matter were darkened by the vapour of iodine, and the bitumen was then removed by the use of a more powerful solvent. By the application of a suitable acid to the bitumen pictures on metal, the bare parts were dissolved away, and engraved plates were obtained. Bitumen or asphalt dissolves readily in benzole, and the solution runs freely through a paper filter. The solution should not be quite as thick as collodion. A carefully cleaned copper plate, such as the engravers use, is clamped down on to a turntable. The next step is to flood the plate with bitumen solution, and then to make the table revolve quickly. When it has revolved a few seconds the film will be dry. I know of no other method by which such a uniform and compact film of bitumen can be obtained. After coating, it is well to put the plate aside for twelve hours, in order that the film may become harder. It is then necessary to dust it over with French chalk, to remove stickiness; and after this it is placed behind a transparency and exposed to light. The time of the exposure may vary from twenty minutes to two days.

When a plate has had the requisite exposure, the next matter is to dissolve away that portion of the bitumen which has not been made insoluble by the action of light. Now, benzole is generally too energetic a solvent for my purpose, and oil of turpentine is often not sufficiently active; but by mixing these together you can get any degree of solvent power which you may require. The workman commences by flooding the plate with oil of turpentine, and if this has not sufficient action he pours it off and adds a little benzole; this begins to produce an effect, and enables him to judge as to the amount of benzole which he may safely add to the oil of turpentine. When he has added this quantity, and has washed away all the soluble bitumen from the plate, it is next thoroughly rinsed with water to remove the oil of turpentine. The plate is next placed in nitric acid, so as to etch the lines where the metal is bare.

So much for the line-engraving process of Niepce; but it is worth mention that very perfect half-tone transparency pictures may be produced by means of bitumen. Let us take some pieces of sheet gelatine, or some pieces of talc, which have been varnished on one side with bituminous varnish.

Supposing that the varnished side of the talc or gelatine is placed in contact with the negative, and the light is allowed to shine through it, those parts of the bitumen film which are under the perfectly transparent parts of the negative become insoluble, let us say, all through. Now, those parts of the film which are under less transparent parts of the negative do not become insoluble all through, but a skin of insoluble bitumen is formed on the surface of the bitumen film, this skin varying in thickness according to the amount of light which has given rise to it. Put a varnished and exposed gelatine sheet of this kind into the solvents and note the effect. When the film is made insoluble all through, it resists the action and remains on the talc; but where only a skin of insoluble bitumen exists on the surface of the film the solvents loosen and dissolve the bitumen from underneath this skin, and away it floats. Now you can understand why the bitumen process, in its ordinary form, is only adapted for the reproduction of subjects in extreme black and white, such as line engravings or letter-press. If we wish to preserve the half-tone picture intact we must expose through the transparent medium (talc or gelatine), so as to ensure every part of the insoluble image, whatever its thickness, being in contact with the transparent support.

A picture of this kind is solid, the gradations of light and shade being due to a greater or less thickness of bitumen, and the essential points in producing them are to varnish a thin, transparent medium with bitumen, to expose to light through this medium, and then to dissolve away that portion of the bitumen which has not been acted on by light. The ordinary black varnish sold for backing glass

positives will answer very well, and so will some samples of Brunswick black.

By the method just indicated very fine lantern slides may be produced, as there is an entire absence of texture or granularity.

Plates from which much printing is to be done are ordinarily covered with a thin film of iron, by the electrolytic method, and as the film of iron is extremely thin, it does not in any way interfere with the printing qualities of the plates. When the surface of a plate begins to wear a little, and the impressions show signs of deterioration, the film of iron is dissolved off by means of dilute sulphuric acid, leaving the copper plate as good as ever. The film of iron, although so thin as not to injure the printing qualities of the plate, is nevertheless sufficiently thick to protect the copper from injury in printing. The plate having been freed from the first worn-out film of iron, is once more coated with a layer of iron, and is again ready for use. When the second film of iron is nearly worn away, and the printer approaches near to the true surface of the copper plate, the iron is again dissolved away, and a new coating of iron is put on. According to this system, one really prints rather from a cast of the plate than from the original plate, and new casts are made as required.

I may call your attention to a very simple and expeditious way of making engraved plates from line subjects. Take a photo-lithographic transfer made from a positive, instead of from a negative, as is usually the case. The ground is black and the lines are white; in fact, by far the greater part of its surface is black. It is now laid on a zinc plate and passed through the press. Now, what will be the result? So much of the paper being covered with printing ink, and so little being white, moist, and gelatinous, the transfer will slide over the zinc plate, and we shall merely get a smear. To prevent this, take another transfer similar to the last, excepting that white patches are introduced on it wherever they can be introduced without falling foul of the picture. This is done by painting on the transparency with Brunswick black. On putting this transfer down on a zinc plate it adheres properly, and we have a perfect image on the metal. As the white patches are now done with, we varnish them over, and the zinc is covered everywhere except where the lines of the engraving are bare. The covering on the zinc is now made denser by inking and dusting with resin, as explained, and the plate is then etched by dilute nitric acid. We now clean off the ink, and you see the lines are engraved on the zinc plate. The plate may now be printed from in the copper-plate press, or, as zinc is not a convenient metal for deep plate-printing, it may be reproduced by the electrotype process.

An extremely simple and expeditious method of engraving line subjects upon copper plates is the bichromated albumen process, practised with much success by Gobert and others. A plate is covered with a film of bichromated albumen, and exposed under a transparency, until the whole of the ground—that is, the part not covered by the lines of the transparency—is rendered insoluble. The plate is next washed with cold water, so as to remove the albumen from the lines, after which the etching is effected by an alcoholic solution of ferric chloride.

The following details will be sufficient to enable the method to be carried into practice. One hundred cubic centimetres of albumen are mixed with a solution of two and a half grammes of bichromate of ammonia in fifty cubic centimetres of water, and, after having been well beaten, the mixture is filtered. A carefully cleaned plate of copper is now coated with the mixture, and after the excess has been well drained off, the plate is dried at a very gentle heat, it being retained in a horizontal position meanwhile. The exposure required is by no means a long one, half a minute in moderate sunshine being sufficient in ordinary cases; but this must, of course, be learned by experience. Instead of developing (washing away the unaltered albumen) in plain water, it is better to use a weak solution of aniline red or magenta dye, as under these circumstances the ground becomes tinted, and the progress of the development can be watched. When the plate has been dried, nothing now remains but to varnish the back and edges with an ordinary black varnish, such as the so-called Brunswick black, and to etch. The etching bath is made by dissolving one part of perchloride of iron in five of alcohol, and ten minutes is generally a sufficient time for etching to the required depth.

The method which Major De la Nöe calls *typogravure* is in reality an intaglio process, but the printing is conducted as in the case of ordinary zincography. The details are as follows:—A prepared zinc plate is coated with a film of sensitive bitumen by well-known means, and exposure is made under a transparency or a tracing, so that when development is carried on with turpentine or benzole in the usual way, the lines alone are bare. The plate is now etched with dilute nitric acid (1 to 40) until a depth of about a 250th of an inch is reached, after which the plate is dried, and once more coated with bitumen. The ground is now polished off with a stick of charcoal,

leaving the bitumen in the lines; after which, the plate is gummed and printed from by the usual zincographic method. This process is admirable for map work, although it is obviously inapplicable for the reproduction of subjects with widely extended blacks; and it has the advantage that the lines show no tendency to spread.

Before going any further we may, with advantage, look back at some of the older examples of photo-engraving in half-tone. Excellent work was done by Talbot's etching process over twenty-five years ago. Some examples of work done by Pretsch about twenty years ago are quite sufficient to prove that good work is not altogether a thing of to-day. Among the newer methods, that of Klic deserves special mention. Klic's process is an etching method, the result being a "carbon" print. A copper plate is dusted with powdered asphalt, and the plate is heated, so that the asphalt becomes nearly melted. A negative carbon print is now transferred on to the copper plate, and the plate, now covered with the negative in carbon, is etched—at first by a strong solution of perchloride of iron, which penetrates only the thinnest parts of the picture; then, by a weaker solution of the same salt, the solution etching through the thicker parts. By employing more and more diluted solutions, it is possible to etch through thicker and thicker layers of gelatine, so that only the high lights remain unetched.

Major Waterhouse has been remarkably successful during the past few years in making intaglio plates, and he has published the details of his method. The process is a modification of one introduced some time previously by Geymet, and it is based on the mechanical reticulation or breaking up of the Woodbury relief.

A Woodbury relief is developed upon a plate of silvered copper (but the relief need not be nearly so high as that required for the Woodbury process; in fact, an ordinary carbon print will answer), and when the relief is taken out of the developing water, it is dipped into a solution of potassium bichromate, drained, and dusted over with fine sand—this sand having been previously waxed by being heated in an iron pot, and stirred up with a small proportion of wax. The layer of waxed sand is allowed to remain on the film until it is quite dry, when it is brushed off, leaving the gelatine granulated or pitted all over; the pits being deepest in the thick parts. The plate is now blackened, and a cast is made in the electrotype bath, this cast being the printing plate.

Numerous specimens show what excellent work can be done with this method, and you must remember that Major Waterhouse has not only published full working details, but he has demonstrated the process before several gentlemen interested in the matter; moreover, he has not patented the method.

Some fine examples of the application of photo-engraving to pottery decoration are due to the skill of Mr. F. J. Emery, of Burslem—and one photographic method which this gentleman adopts for the reproduction of pottery designs is of special interest. He coats a plate with sensitive bitumen, puts down upon this surface a transfer from the plate to be reproduced, and exposes to light until the ground is insoluble. Development is now effected with the usual solvents—say, a mixture of turpentine and benzole; only those parts of the ground which were protected by the transfer dissolving. The etching is effected by perchloride of iron.

In connexion with intaglio plate work, special mention must be made of the method of etching copper by means of a solid image of chloride of silver, due to Obernetter, and called by him *Licht Kupferdruck*. A gelatino-bromide image in film form and made from an emulsion rich in silver, is converted in chloride of silver by immersion in a chlorinating solution—a weak solution of bichromate of potash acidified with hydrochloric acid answers well—and this chloride of silver film is laid on a smooth copper plate. The chloride of silver becomes decomposed, the chlorine uniting with the copper and etching it, so that every detail is reproduced as an intaglio. Unless the action is assisted by a weak electric current it is very slow; but when the copper plate is connected with the positive wire of a battery, and the negative wire is connected with a carbon plate placed behind the film picture, the etching of the plate proceeds quickly. The film picture should be moistened with weak salt and water.

(To be continued.)

JACK AND I IN NORWAY.

XII.—EIDE—BERGEN—HOME AGAIN.

WE had been haunted by the stories of no place to sleep and nothing to eat that we were likely to take, and general starvation painted as a likely thing to be met with in many places on the way. I am glad to hear testimony to the fact that this was not so; of course, as was to be expected, in many places the lodging was very plain, but always scrupulously clean,

and the food, if plain, was good, and always nicely served. In all these stations in the country places the prices for board and lodging was very cheap—on an average one could live well on five shillings a day; whenever the place, however, had the importance of a town (a hundred houses would make a town here), and the house of entertainment assumed the importance of an hotel, the prices go up considerably, but in no case would it be called dear. I fancy the increase of travellers is teaching them how to charge.

The continuous run of lake, river, fjord, mountain, and fall excites the traveller so, that a craving for a little rest takes possession of him. You must have felt this sensation in a picture gallery, even when filled with the choicest examples. After a bit you want to sit down and rest and think over what you have seen before you go on again. In such a mood one of our fellow-passengers exclaimed, "I would to heaven this scenery would just stop for half an hour!" And I must confess that such a feeling possessed me more than once on the journey, a feeling as if you had got more than you could take, and that you really needed a little rest to digest it before going on.

Over that part of Norway where we journeyed, photography is in a very backward state, in fact, all the pictures that are to be seen seem to come from Bergen. The trade has not yet attained sufficient importance for any native to venture the starting of a studio in any of the smaller places.

Looking at it from a commercial point of view, the best pictures we saw were landscapes, and the best landscapes were by Beyer, of Bergen. This photographer seems to hold here very much the same position as George Wilson does in Scotland, his pictures being found all over the country, even in the most secluded places where a stray traveller might chance to go. On every station-house all over the mountains, and in the glens, will be found Beyer's advertising boards, blue-painted, with white lettering. He has not got the length of the enamel tablet yet that resists all kinds of weather, for the rain and the storm have obliterated many of the inscriptions on these, and nothing is left but the blue board with a white patch here and there. But after travelling two or three days, you get so familiar with it, it being the only advertisement that is there to attract attention on the way, that you say to yourself "Beyer's board," whether you are able to decipher what is on it or not. Taking his pictures as a whole they are good, and a great many of them must be sold.

We came across some books of views lying at some of the hotels on sale, taken by a photographer from England, but from what we saw of these, Beyer's pictures were very much better: we did not see any good work in portraits even in Bergen. In the shop windows there was exposed any quantity of photographs illustrative of the country and its people, such as portraits with costumes of the different districts, groups of Laps and the like; but all this class of picture was produced in very poor photography.

I think, however, in and about Christiania (which we did not visit) the portrait artist must be more successful, for at some exhibitions here at home I have seen some good portrait work exhibited that had been sent from Norway.

On our return to Bergen, Jack looked up a friend of his of former times, who showed us considerable attention and kindness during our stay. He took us to where we could get the best panoramic views away up by the park, but, alas! our roll gave out on the second view, and we had to be content with the two, for it was a considerable climb, and we did not venture to go again.

We wanted to arrange to go out to Mr. Gade's place and see the Stone Kirke, but when trying to arrange for a conveyance we found that in this town, at any rate, they had got up to the way of charging. I think that they have learned so well, that their charges for hiring is a little in excess of those at home.

Mr. Scarborough (Jack's friend) managed to get us a turn-out on more reasonable terms, and we drove out to Fantoft. There was a fair amount of foliage and wild flowers on the way, and we made a couple of negatives of the kirke, which they say was originally built about the twelfth century—the approximate date is decided by the style of architecture and ornamentation. Being considered of special interest, it is visited by many strangers, and Mr. Gade makes all visitors welcome. We also went out to Neston, a village a few miles out from Bergen, where we went to visit a spinning mill, introduced there as a new industry by Mr. Scarborough. He is of opinion, with plenty of water as the moving power, and labour cheap—as it is here—the speculation should be successful. This mill was a very interesting sight, but the fall at the present point where the mill is placed is supposed not to be a steady one, owing to the snow sources giving out sometimes, so he had just bought a *new steady waterfall* at an outlay of two hundred pounds. A strange fancy buying a waterfall! It put me in mind of Mark Twain going round the country collecting echoes to start an exhibition with.

Mr. Scarborough is a very enterprising gentleman and has various kinds of businesses running successfully. His forefathers came from England, and they have evidently conveyed to him a fair share of the English element of "push." He was of opinion that the Norseman could not advance far, nor fast; he said that they could work well and cheaply, but they failed in management, or the directing of others; besides, the country he thought was not well-suited for commercial enterprise, they were certainly growing in knowledge, but very slowly; but they are poor, and lacked capital to help them on. The countries that were fortunate

enough to possess capital with equal knowledge got before them easily in the race, and he was convinced that the Norsemen stood ten years behind as competitors in the world's trade for the want of money alone.

When here Jack came across a young fellow who had sold him some furs up at Molde the previous year. He turned out to be an actor at the Bergen Theatre, and the fur selling had been done by him when out for a summer holiday. We struck up an acquaintance with him, and he proved one of the most enjoyable of companions. He had a lot of time on his hands, during our stay we used it up for him pretty considerably.

He told me that acting as a profession was a very poor business in Norway, and that the highest salaries paid were very meagre, the principals at their theatre not making more than four pounds a-week. The situations, however, as a rule, are permanent, as the theatre is supported by the State, and it keeps open and salaries are paid regularly whether the receipts of the house itself pay expenses or not.

We had not the opportunity of seeing our young friend performing, but he was certainly a genius at "making up," judging from a series of photographs that he showed us, representations of himself in the various parts he played. The transformation in face and figure were the most perfect things of the kind I had ever seen.

He walked us round many places of interest. Amongst them we visited the German Quay, where were scattered about the largest quantity of dried fish I ever saw in my life, they lay split up and dried hard as mahogany. An axe would be needed to cut them, and even then you could only break them in splinters.

Shiphoads of these fish are continually going out to foreign parts, or to what other countries it would be hard to tell, but it is certainly one of the largest trades of the place, for they lay about in such profusion all along the quay; there must have been hundreds of tons of them. We made a picture of the busy scene, embracing the Hanseatic Museum, an old tumble-down-looking house over the shops forming the corner of the quay. We paid a visit to this museum; in it are stored quantities of antiquities and relics illustrative of the olden time when the Germans inhabited this locality, and lived so exclusively to themselves. In this place they show you a method whereby the beds were all made from the outer passages; this was done so that the domestics need not enter the rooms, the merchants having decided objections to their clerks and other *employés* holding any intercourse with the Norwegian girls. The various rooms and primitive style of living are illustrated—quaint furniture, and curious washing utensils, weapons of war, samples of crude painting, which were considered fine arts then, old books in parchment, and many other curious things which makes it well worthy of a visit. Should it still exist, for it was in a sadly dilapidated condition when we were there, and if they do not look to its renovation, the museum itself, I fear, will soon be a thing of the past.

We visited a cod liver oil factory close by, where we saw the oil being decanted in large quantities green as grass. We were told that the men who worked in the place drank lots of this vile-looking stuff, and took a pleasure in drinking it.

In the same lane as this oil factory we were taken into an old tottering tenement which was used by the fishermen and sailors when they came in worn and weary from the storms at sea. Fire and food, cooking utensils, and other rough comforts were arranged in this place, and it had been used as a house of refuge since the days of the Vikings. From our standpoint of what we consider comfort, the place did not look much, but to the half-drowned sailor sitting before that comforting fire, his eyes still half blinded by the drifting brine from the trough of the sea, this haven then would seem to him a heaven.

We went next to the forts; they were undergoing repairs, but we got a beautiful view of Bergen lying across the water from the battlement on which we stood. Our friend then asked us if we would like to see the spirit shops, as they were considered things of special interest in the town. This traffic it seems is regulated by a kind of local option. By the vote of the authorities only one company is allowed to sell spirituous liquors, and the company is only allowed to take five per cent. of profit, the surplus to be given away in charities. The company have twelve shops in all in this town of fifty thousand inhabitants. The shops are void of any decoration and look as uninviting as possible, fitted with a common deal counter with a row of glasses and a bottle or two on it, and not a chair or seat of any kind to sit down on. You are supplied with one glass of spirits only in one place, and if you want more you must travel on to the next shop. These shops shut up every day during the men's dinner-hour, and at five o'clock on Saturdays.

Restriction exists all over Norway with this effect, that in this country, where drunkenness was one of the prevailing sins, steady industry and sobriety now reign.

In sketching this month's outing I could but give the briefest outlines at the best, the places unnoted that we saw and passed, for number and variety, are of such extent as will fill up the picture for you when you go.

Our journey has been through what is considered the most interesting part of Norway, but only a part. I believe that Christiania and its surroundings can boast more peaceful scenes and fertile plains, or, if more rugged roads are desired, they say that you will find them if you journey on to the North Cape, where from the middle of May till the end of July there is continuous light.

Still, you follow in our track and you cannot help enjoying yourselves, and leave these other parts, as we have done, for future exploration.

We met our American friends here for the last time, and saw them on board their steamer which was bound for Hull, we leaving the same night by *Norge* for Newcastle. We went on board rather early to arrange everything comfortably for ourselves, but when we got on board and looked up the bay from the deck the scene looked charming, with light, colour, and life, and we both exclaimed, "Oh, we must have that!" It was between seven and eight o'clock in the evening, and still the light for such a subject was perfect, but our traps had not come along, so we had either to wait and perhaps lose it, or go back to the hotel and have them brought. So we hurried away and got the party to bring our things at once, and thus managed to get a very good negative before starting.

I could not but heave a sigh of regret as we steamed out of the bay, and I stood upon the deck and watched quaint Bergen receding in the distance, for we had had a very happy time, and one wet day only in the month, and now we were sailing away from that quaint, interesting, wonderful country.

When we got out to sea we found it very calm, for which I was very thankful, for I like the sea best when it's not making much row and noise. but, alas! we sailed right into a bank of fog. We had to slow right on for hours, and perform upon that horn every minute that produces more noise than music.

We had a very pleasant company on board. Our tricycle friends were with us on their return journey also.

We had on board Mr. Howie, who had been photographing Norway with a quarter-plate camera, and a very complete little set he had—everything constructed to take up no space at all; you know the style of things. Some two hundred plates he had exposed; that was what he told me as far as I can remember.

The fog was with us pretty well all the way till we reached the Tyne, when it cleared up. Then Mr. Howie took a picture of the passengers on deck. I don't know how it turned out.

I have sent on a few of the pictures taken from my negatives to the *JOURNAL* office, which may be seen by any interested. They show the class of scenery to be met with in the route we travelled.

Amongst them will be found the pictures taken at Red at midnight, with six minutes' exposure, on a whole plate; lens, Ross 10 x 8 rapid rectilinear; *f*-16 stop. The distance in this picture will be found wonderfully clear considering the time at which it was taken.

And now our journey's over we must part.

"Give me your hand first; fare you well."

MARK OUTE.

Our Editorial Table.

HALF A CENTURY IN MANUFACTURING PHOTOGRAPHIC APPARATUS.

It is always pleasing to have a peep into the interior of a well-established and reputable business, and such a peep is afforded us into the large establishment of the Messrs. E. & H. T. Anthony & Co., of New York, through the mediumship of a little work by Dr. Elliott, one of the editors of the *Photographic Bulletin* issued by this firm.

It is embellished with admirable likenesses of the late Edward Anthony, the founder, and Henry T. Anthony, an original partner in the firm; William H. Badeau, a retired partner, long favourably known in London, where he mostly resided as European buyer for the firm; and of Colonel Wilcox, Richard A. Anthony, and Frederick A. Anthony, its present heads. Much interesting information relative to early photography is given, together with several engravings showing the interior of the workshops in past and present times. "All those now connected with the house," says the author, "are men tried and earnest in their work, men who feel the responsibility of holding untarnished the fair name of the house founded by Edward Anthony."

ONE HUNDRED PHOTOGRAPHIC DODGES; Collected and Arranged by W. INGLIS ROGERS.

THIS tractate contains the above number of "dodges," presumably compiled mainly from hints and formulæ given in the *ALMANACS*, and are in most instances useful. Published by Piper & Carter, price 6d.

WHEELER'S MODERN PHOTOGRAPHIC LABELS.

A COLLECTION of printed labels, gummed and perforated as these are, is always useful, and can never fail of being appreciated by every photographer into whose hands they may be placed. It contains almost everything likely to be used by the modern photographer, printed in bold type, together with some blank labels. Another useful feature is a variety of figure labels for pasting on the corner of lantern slides. Sold by J. T. Chapman, Manchester. Price 6d.

CELLULOID FILMS.

FROM S. Guiterman & Co. we have received a number of celluloid films cut to sizes suitable for coating. Some are "ground" on one side, others being left quite transparent. They are perfectly uniform in translucency, and are admirable specimens of a new preparation of celluloid for photographic purposes.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,523.—"Improvements in or relating to Mixtures or Solutions for Developing or Fixing the Latent Images on Photographic Plates or Sheets." Communicated by C. Spiro. W. P. THOMPSON.—*Dated August 27, 1889.*

No. 13,676.—"Improvements in Photographic Camera Shutters." W. J. LANCASTER.—*Dated August 30, 1889.*

No. 13,699.—"Improvements in or relating to Photographic Cameras." W. H. R. KERRY.—*Dated August 30, 1889.*

No. 13,712.—"Improved Process for the Production of Oxygen Gas." R. D. BOWMAN.—*Dated August 30, 1889.*

No. 13,739.—"Improvements in Photographs and Apparatus for Effecting the same." W. H. PHILLIPS.—*Dated August 31, 1889.*

No. 13,748.—"Improvements in Coin-freed Apparatus for the Automatic Delivery of Photographs, Cards, and other Articles." J. G. CUMMING.—*Dated August 31, 1889.*

PATENT COMPLETED.

IMPROVEMENTS IN TELESCOPIIC FRONTS FOR OPTICAL LANTERNS.

No. 7658.—ALFRED WRENCH, 50, Gray's Inn-road, London.—*July 13, 1889.*

My invention relates to telescopic fronts, of the kind described in the specification of former Letters Patent granted to me, dated A.D. 1887, October 31, No. 14,809, for enabling optical lanterns to be used with lenses or objectives of varying focus.

The chief object of my present invention is to provide a telescopic front which is both simpler in construction and cheaper than that described in the specification before referred to, and to this end it comprises the improvements hereinafter described.

In carrying out my invention, I provide a series of two or more tubes adapted to slide one within the other, the inner end of the outer tube being constructed to fit into, or be secured to, the body of the lantern, and the outer end of the inner tube to carry a lens or objective, all in a well-known manner.

The said tubes, instead of being provided with racks and pinions for adjusting them, as described in the specification before mentioned, are adapted to be approximately adjusted by hand, the fine adjustment being effected by means of the lens rack.

To prevent any accidental displacement of the tubes and to ensure their axial alignment when extended, I provide for clamping the end portion of each tube upon the tube sliding within it. For this purpose the outermost end of each tube (with the exception of the inner tube carrying the lens) is screw-threaded externally and made slightly tapering, and upon it is placed an internally screw-threaded collar, or a nut which is correspondingly tapered. The result of this arrangement is that when the collar or nut is tightened upon its thread, it will tend to contract the tube, and so reduce its diameter at the end portion. A number of saw-cuts, or slots, are formed in the said screwed end portion, to enable it to be readily contracted and clamped upon the tube within it.

In order to prevent the tubes from being inadvertently separated, a set screw is advantageously placed in the larger tube, its end extending into slots formed in the tube within it.

I wish it understood that I do not confine myself to the means hereinbefore described for contracting the ends of the tubes, as it is obvious that the same can be considerably modified; for instance, the screw threads on the ends of the tubes and within the collars can be dispensed with, the said collars being fixed by means of bayonet joint, or by means of pins attached to the tubes and working in inclined slots or grooves in the collars, or *vice versa*, that is to say, the pins being attached to the collars and entering slots formed in the tubes.

The claims are:—1. A telescopic front for optical lanterns, the tubes of which are designed to be adjusted without the intervention of racks and pinions, or other mechanism, and which are fixed relatively to each other by clamping the outer end of each tube upon that sliding within it, substantially as described. 2. In a telescopic front for optical lanterns, the employment of an internally tapered collar adapted to be screwed, or otherwise tightened, upon the correspondingly tapered end of such external tube for clamping the same upon the tube sliding within it, substantially as described. 3. The manufacture and use of the improved telescopic front hereinbefore described and illustrated in the accompanying drawing.

THE *employés* of the firm of Messrs. England Bros. had their annual dinner and outing at Virginia Water on Saturday last. Mr. Louis England presided at dinner, and the usual toasts having been proposed, and programme of songs rendered, the company dispersed to enjoy the beautiful scenery in the neighbourhood, meeting again in the evening to return to town in brakes. Altogether a most enjoyable day was spent, especially as the weather proved so fine.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 9	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 10	Derby	Society's Rooms, 3, Derwent-street.
" 10	Manchester Amateur	Manchester Athenæum.
" 10	Bolton Club	The Studio, Chancery-lane, Bolton.
" 11	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 12	Birkenhead	Free Public Library, Hamilton-st.
" 12	Manchester Photo. Society	36, George-street.
" 12	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 29.—Mr. J. B. B. Wellington in the chair.

The meeting of this Association was, as had been announced, of a social character, and nothing of a technical nature was brought forward. Views, however, taken by the Chairman during a recent visit to Norway, and by Mr. Medland, taken during a river excursion with the members of the Conference, were passed round, and excited considerable interest. Amongst the Chairman's series, which were all printed in platinum, was a sea scene, including the mid-night sun, taken at the North Cape, and several photographs illustrating the domestic life of the natives of the country.

In reply to some questions, the CHAIRMAN said that the air was generally very clear in Norway, and that mountains could then be seen that were from fifty to one hundred miles away. In consequence of this clearness of the air the eye was deceived as to distances; mountains which appeared to be about two miles away might actually be twenty miles off. In order to secure the white margin to the prints and the proper fitting of cloud negatives when these were used, he temporarily stuck the margin of the print on to the mask with rubber cement.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

AUGUST 26.—Mr. Goodhew in the chair.

The CHAIRMAN called upon Mr. E. T. Hiscock to read the following paper on *The Platinotype Process* :—

Although I promised to work the sepia branch of this process, I intend using the black as well as the fabrics. Of the origin and history of platinotype I shall not speak, as we are dealing with the present and the future more than the past; let us then deal with the printing. The paper for use in this process is coated or sensitised with salts of iron and platinum, and is exposed under negatives, exactly as in silver printing, but instead of seeing all detail plainly brought out only a faint image is visible. The sensitised surface before exposure to light is of a lemon-yellow colour. During exposure the parts affected by light become of a pale greyish-brown colour, and, finally, if the negative be quite vigorous, of a dull orange tint under those parts of the negative which present clear glass or nearly so. When the last change has occurred it indicates that the iron salt has been almost completely reduced, and then further action of the light produces no more visible effect on such parts. When printing from a negative having moderately strong contrasts it is frequently found that the deepest shadows of the print are of this orange tint, and are different and lighter in colour than the parts rather less exposed to light. Parts in which this change has taken place are said to be "solarised." Soft-printing negatives, not permitting sufficient action of light in the shadows, do not produce this effect, unless the proofs are over printed. Prints from "hard" negatives are liable to show, when deeply printed, a poorer or more granular black at these parts when developed. Such cases demand a hot and prolonged development. The most suitable kind of negative, when brilliancy is desired, is one intense and full of gradation. Generally a little "solarisation" is desirable in the deepest shadows of the print. The correct exposure (about one-third of that required with silver printing) is ascertained by inspection of the paper in a rather weak white light in the usual manner. A little experience will enable the exposure to be determined very accurately. When examining the prints in the printing frames care should be taken not to expose them unduly to light. The slight action of light not being visible until after development, it follows that the most delicate tones of the finished print are equally visible before development. As to the amount of detail visible, all depends upon the nature of the negative and the eye of the observer. As soon as the exposure of each print is complete it should be placed in a calcium tube or other suitable receptacle containing the dry preparation of chloride of calcium, to preserve it from moisture until it is developed, care being taken to avoid all possibility of contact between the paper and the chloride, which latter would produce white or yellowish-white spots on the print. Having now our prints ready for development, we can start at once. The developer is made by dissolving one hundred and thirty grains of potassic oxalate to each ounce of hot water, so it is left to the operator to make up what quantity he needs. A good plan is to place the prints after removal from the printing frames in a calcium tube with their printed surfaces outwards, and, therefore, convex. In a short time the prints will receive and retain this curvature sufficiently for the developing operation. To develop, take the print in the right hand (its printed surface being downwards), lay the left-hand edge on the developer, and then slowly and continuously lower the right hand until the whole print is floating. The great point is to well preserve and, if possible, increase the curvature of the paper as it nears the liquid. A temperature varying between 150° and 170° Fahr. may be considered the standard temperature for the developer, though higher and lower temperatures may be used on occasion. To test the temperature a chemical thermometer must be used. The print must not be raised for examination during development, nor be taken off the bath too soon, otherwise brilliant and juicy prints will not be produced. The bottom of the developing dish should be covered with the developing solution to the depth of at least one-half of an inch. To clear the developed prints,

these must be washed in three baths of a weak solution of hydrochloric acid. This solution is made by mixing one part of hydrochloric acid with sixty parts of water (for textile fabrics, one part acid and forty-five parts water). The specific gravity of the acid should be not less than 1.16; if lower, more acid should be used. The acid should be colourless. Or citric acid, in the proportion of one ounce to twenty ounces of water may be used. The object of this washing in dilute acid is to remove all traces of iron salts from the paper before it is passed into the plain water. It is obvious that if there be the slightest trace of colour observable in a large bulk of the last acid bath there will be a very appreciable quantity of iron salts present, and, if so, that there must be a proportionate quantity also contained in the body of the print; this plain water will not remove. The use of the washing in plain water is to remove the acid. The prints must not be placed in plain water on leaving the developer because insoluble salts are precipitated thereby on the print. After the prints have passed through the acid baths they should be well washed in two or three changes of water during about a quarter of an hour. They are then finished. Up till the present I have treated only with the black process; with a few exceptions, the sepia is nearly the same. The sepia paper is more easily affected by faint rays of light, and, therefore, increased care must be taken when printing. It does not remain in its best condition for so long a period as the black varieties; there is also a tendency in paper which has been kept to lose some of its warmth of colour. To develop, add to each ounce of the solution of potassic oxalate (one hundred and thirty grains in each ounce) one to two drachms of the special solution supplied for this purpose. The object of the special solution is to give purity to the whites. As regards temperature, over exposure cannot be corrected by a cooler bath, as in the case of black prints. The developing bath, after use, must be kept in the dark. This bath must not be used for black prints. The prints are cleared in a bath of hydrochloric acid (specific gravity, 1.16), one part to sixty parts of water. Porcelain baths or dishes carefully heated are, perhaps, the best to use for a sepia developer. A dish which has been once used in developing sepia prints should on no account be afterwards used in developing black tone prints. In conclusion, I am glad to see the Platinotype Company have dropped the objectionable five-shilling license, that which has deterred many from joining the ranks of platinotype workers; not that the amount was much, but because one's idea was against it. Had it never been charged I believe that bromide papers would not have obtained the same amount of patronage. It is quite palpable to all that platinotype is growing, and is more generally liked both by photographers and the public. One has only to look around the walls of an exhibition to see this fact strongly demonstrated.

The CHAIRMAN then declared the meeting open for discussion or remark. The PRESIDENT (Mr. J. Humphries): If the paper has been kept a considerable time before development it will generally be found that better results may be obtained by using carbonate of soda for developing. Mr. PITHEU remarked that, in his opinion, the sepia was far preferable, as he remarked that prints done by this process strongly resembled a mezzotint. Mr. F. Jones, a member connected with the Platinotype Company, kindly brought four large prints for inspection.

Correspondence.

Correspondents should never write on both sides of the paper.

SIDEREAL PHOTOGRAPHY.

To the Editor.

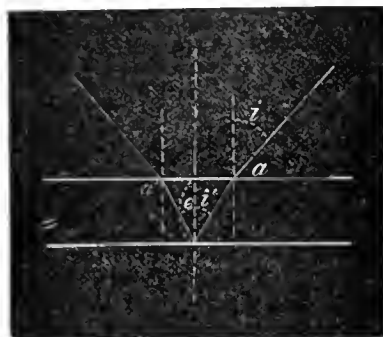
SIR,—The great distance which separates us from one another entails, as a consequence, that when any article of more than ordinary interest appears in your valuable journal any reply which I might presume to make necessarily arrives so late as to have lost nearly all its interest. Notwithstanding this, however, I venture to request you once more to allow me space in your columns for a few remarks.

In your issue of June 14 last you were good enough to publish some observations of mine upon an hypothesis brought forward by Mr. Traill Taylor in the course of a discussion, the object of which was to account for the formation of discs in sidereal photography.

From the articles of that able astronomer Mr. Piazzzi Smyth, and your contributor Mr. Davis, I gather that the conception, or, at any rate, the adoption, of the hypothesis in question is ascribed to myself. Nothing is further from the truth, for on reverting to my letter—in its excellent translation—I find that I distinctly expressed myself thus: "If Mr. Traill Taylor's hypothesis be correct certain results would follow," &c. I have no wish to claim it as mine; in fact, further on I will give my own opinion about the formation of discs in stellar photographs; but since the supposition that these discs are due to reflection from the second surface of the plate was put forward in the presence of such an astronomical authority as Mr. Common—who to me appeared to concur—I considered the matter worth investigating. What I said was, that if this assumption were admitted as correct it would be necessary to make corrections from the negatives in order to give the true position of each star. This I will proceed to prove.

I have in my possession a number of positives by the Brothers Henry, measuring 24 × 18 centimetres. Their instrument had a focal length of 3.4 metres, and consequently each side of the square, reckoning it only at 18 centimetres, would subtend an angle of 3°. The angular dis-

tance of the edge of the plate, therefore, from the centre of the field would be $1^{\circ} 30'$, and that of the corners nearly 2° . The glass plates upon which the photographs are taken vary in thickness from 2 to 3 millimetres, and their mean index of refraction is 1.5. The image of a luminous point is formed upon the plate by the apex of the cone of rays whose base is the objective itself. Taking only the axis of this cone, forming with the normal an angle of $1^{\circ} 30'$, and admitting the foregoing data as correct, a very simple calculation will show that the distance between the point of incidence of the ray of light and the point of emergence after reflection from the second surface of the plate is 0.1 millimetre.



$$\frac{\sin i}{\sin r} = \text{ind. ref.} = 1.5 = r$$

$$\frac{1}{2} a' = e \tan i'; e = 3^{\text{mm}}; 1 = 1^{\circ} 30'$$

$$\log \sin i' 8.41792 \log t' i' 8.24192$$

$$-\log r 0.17609 \log c 0.47712$$

$$\log \sin i' 8.24183 \log \frac{1}{2} a' 8.71904$$

$$i' 1^{\circ} 0' \frac{1}{2} a a' = 0^{\text{mm}}.05236$$

$$a a = 0^{\text{mm}}.10472$$

Now, according to the scale adopted by the International Congress, 1° is represented by 60 millimetres, consequently 1 millimetre is equal to $1'$ and 0.1 millimetre to $6''$, which amounts to a considerable source of error, seeing that Messrs. Henry and M. Thiele profess to attain a precision of $0.2''$. I am, therefore, right in that *if the hypothesis prove correct it will have to be taken into account in reducing plates*, even though the angles adopted be very small. The reasons which, in my opinion, do not admit of the hypothesis in question being recognised as quite conclusive are, in the first place, the thickness and density of the films at present in use—they are much more opaque than those made with collodion; and also the fact pointed out by Mr. R. N. Lucas, namely, that the diameter of the image of the star produced ought to be the same whatever the magnitude of the star may be. Be this as it may, as soon as the photographic apparatus constructed at Paris in accordance with the Congress regulations is sent here by Professor Cruik, Director of our Observatory, I shall certainly try to ascertain what rôle is played by reflection in the formation of the discs. I am myself inclined to believe that several causes simultaneously concur in producing the effect alluded to, and, according to the extent to which each of these causes asserts itself, widely different results are obtained. Thus all observers do not get discs of the same shape. Messrs. Henry Brothers and Herr von Gothard, for example, have shown perfectly circular and sharply defined ones, while Dr. Lohse, operating with the great Potsdam refractor, obtained discs gradually decreasing in blackness from the centre outwards, so that it was scarcely possible to determine their diameter. The late Warren de la Rue (see Rayet *Notes sur l'Histoire de la Photographie Astronomique*, p. 35) obtained no discs at all, so that he was obliged to place the plate a little out of focus in order to obtain more visible images.

One of the principal causes is, I think, to be found in the movements that variations in (atmospheric) refraction cause the image of a star to perform round its mean position. That such movements do actually take place has been directly demonstrated by the able head of the Cape Observatory with the assistance of his heliometer. "The resulting photographic image," says this authority, "is the integral sum of all the impressions successively produced during the period of exposure." * Another equally important cause—which, however, is well-known already—is the reflection from the "grain" of the sensitive film. This film may be considered as consisting of minute, white, opaque particles immersed in a transparent medium, viz., gelatine. Under these circumstances no more or less hypothetical vibratory action is needed to account for the irradiation; for the ray of light falling on the plate is diffused through the film round the point of incidence, being reflected over and over again by the particles of bromide till it gradually disappears through absorption; and this would readily explain the increase of diameter of the discs according to the position and the magnitude of the star. But the chief reason, as far I can see—and on this point I fully endorse Professor Piazzzi Smyth's opinion—lies in the various errors inherent in the construction of achromatic objectives. In fact, I think it even more difficult to remedy these defects than Professor Piazzzi Smyth stated. For the object

of achromatic photography is to focus on one plane the yellow rays and those next to the line G, which are assumed to be alone capable of photographic action. This may be correct in the case of the collodion processes, which can scarcely be affected by any rays but those of short wave length—called "actinic" in consequence; while it remains almost inert under the action of rays of less refrangibility than the greenish-yellow. Collodion plates, again, can easily be developed by rather intense yellow light. But matters are totally different with regard to gelatino-bromide plates, which, under similar conditions, would certainly get clouded; they are consequently sensitive to the action of rays of low refrangibility, and this sensitiveness becomes still greater when the gelatine bromide is treated with various aniline or other colours in order to obtain what is termed isochromatism or orthochromatism. It is easy to satisfy oneself of this by taking photographs of the solar spectrum upon plates impregnated with colouring matters. The experiments made in this connexion by Professor H. W. Vogel and J. M. Eder are perfectly conclusive. The addition of cyanine, for instance, renders the plate particularly sensitive to the action of the yellow rays, and extends the photographability of the spectrum, even into the red rays, at the expense of the blue and violet; a great many other substances, such as aldehyde-green, picrate of methylo-saline, azaline, chlorophyll, &c., produce similar results.

Now in the orthochromatic arrangements employed in ordinary photography, the only rays brought to a focus on the same plane are those comprised between D and G, and a few more; that is to say, the orange, red, and ultra-violet rays are neglected. In the case of collodion plates this is of small moment, as they are only affected by the rays before mentioned. But in the case of modern plates, especially those that are isochromatic, the rays thus neglected are sure to interfere and produce confused images. The real desideratum, therefore, appears to be an achromatism adjustable according to the maximum sensibility of the plates employed, comprising at least rays of all degrees of refrangibility below B. The requirements of celestial chart-making render the use of isochromatic plates imperative unless all orange, yellow, and red stars are to be systematically left out, and it is much to be desired that the plates which are now being tried by Professor Eder may turn out successful; for with them one may hope to obtain from silver bromide a sensibility uniform for the whole spectrum,* without maxima or minima. With such plates approximate achromatism, such as is now used, will not be sufficient, and they will no doubt compel astronomers to resort to perfectly achromatic reflectors, notwithstanding their defects—defects which Professor Piazzzi Smyth has already pointed out.—I am, yours, &c.,

HENRY MORIZE.

Imperial Observatory, Rio Janeiro, July 26, 1889.

THE PHOTOGRAPHIC CONVENTION.

To the Editor.

SIR,—A letter from Mr. J. F. Peasgood, published in a contemporary of the 30th ult., raises, in my opinion, questions of vital importance respecting the Convention which it would be well to have freely discussed.

I do not propose to say anything on the subject Mr. Peasgood describes as purely a personal matter, except that I cannot see how his Fact No. 2 can be taken to prove the assumption contained in the last line of Fact No. 1.

With reference, however, to the state of the Convention, Mr. Peasgood appears to me to hint that he knows something of the inner working of the Society more than is known to the general body of members, and if this is so I venture to ask him to let his fellow-members have the benefit of his knowledge for the good of the Society; and I would especially ask him—whether the Secretary accepts the challenge or not—"to assign a reason for the present unsatisfactory position," &c. I was one of those members who, at the annual meeting, Mr. Peasgood says "plaintively begged to be told how it is that the Photographic Convention is not a success," and though I do not endorse his description I certainly should have been glad to have had a fuller explanation than was given. As an humble individual member of Convention of very recent date, I should not have thought it seemly to have troubled your readers with any remarks on this subject, but as the representative (at the Convention meeting) of one of the largest societies in the North of England, which Society, I trust, may take an active part in promoting the success of the next annual meeting, I have ventured to address you, in the hope that discussion may arise on the points Mr. Peasgood raises; for if it be true that the Society goes about the country manufacturing enemies, surely it is time that the cause of such a deplorable state of things should be fully set forth in order that suitable remedies may be sought for, and the future position and prosperity of the Photographic Convention established on an enduring foundation.—I am, yours, &c.,

L. E. MORGAN.

Manchester, September 3, 1889.

* See *Notes relatives à différents mémoires contenus dans le premier fascicule des bulletins du comité*, by M. D. Gill. *Bulletin du comité International Photographique*, 2nd part, p. 129.

* See *Photographie des Objets Colorés*, by Professor Vogel, p. 128. Gauthier-Villars, Paris, 1887.

A CONVENTION FIASCO.

To the Editor.

"I am Sir Oracle," &c.—SHAKESPEARE.

SIR,—The *cacothes scribendi* has once more victimised Mr. Andrew Pringle, and once more after a very short interval has he put his foot into it by writing about a matter concerning which his knowledge was evidently as sadly at fault as in his late silly attempt to depreciate stereoscopic photography.

Smarting apparently under your having shown up a most uncourteous and inexcusable omission in his attempt at summing up the history of photography during the past fifty years, poor, dear "Andrew Pringle, Esq.," has, in some of the other journals, although not in your columns, given a denial to your foot-note statement concerning the rescinding of some decision or other at which the Council had arrived, and by which the Press was to be debarred from publishing any papers until after the Convention was past and had taken its place in history; and this notwithstanding their publication to the world at large by the free distribution of them in printed slip form. Why such a decision had ever been arrived at passes my comprehension, but it would appear that at the eleventh hour—and horrible dictu! in absence of Mr. Pringle—some fragmentary portion of the Council were wise enough to rescind this stupid decision, and, in consequence, two papers in addition to that of the President were published in the pages of your JOURNAL and in those of the *Photographic News*, and this could be got into the one with which he is associated. *Hinc illa lachryme.*

You, Sir, rather quixotically, if you will permit plain speaking, took upon yourself the sole blame of being misled by some section of the Council, declining apparently to put the saddle on the right horse. But it now appears that the publication was authorised by the Secretary of the Convention, and it therefore becomes an official act. Seemingly the President was so much engaged in permitting himself to be interviewed by the *Pall Mall Gazette*, and other papers for what I know, as not to have time to devote to the more important interests of the Convention.

But I started with the intention of saying, and I now say it in a few words, that this attempt to muzzle the Press will, if again made, only serve the purpose of bringing the Convention into disrepute, and, if its heads are well advised, they will never make the attempt again. It is altogether contrary to the spirit of the age.—I am, yours, &c.,

COTTONOPOLIS.

[It certainly would have been better had Mr. Pringle put some restraint on his desire to rush into print until at least he had made himself sure of the ground on which he stood; but there is no accounting for the eccentricities of genius.—ED.]

PHOTOGRAPHERS AT THE BRITISH ASSOCIATION.

To the Editor.

SIR,—Kindly allow me to intimate to any of your readers who may be visiting Newcastle during the coming meeting of the British Association that a large and commodious dark room is at their disposal at the premises named below, and that any information with respect to places of interest in the neighbourhood will be willingly given by—Yours, &c.,

1, New Bridge-street, Newcastle-on-Tyne.

J. ROBERTS.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—I fully agree with Mr. H. P. Robinson that no advantage is likely to be gained at present by any verbal argument on Naturalistic Photography. But when it was assumed that all who differed from him had been swallowed up, a word of protest became necessary.

But Mr. Robinson's challenge still remains. He wants to see some photographs executed in accordance with naturalistic principles. Sir, in this *blasé*, withered age such ingenuous inexperience is pleasant to contemplate. Is it Rip van Winkle who speaks, fresh from a ten years' slumber, or is it the voice of the wily controversialist skilled in every move? I will offer him a dilemma in answer: Either Mr. Robinson is asking to see Dr. Emerson's pictures, which he has seen himself any time for the last six years at the *Pall Mall Exhibitions* and in illustrated volumes, or he has been criticising and condemning the work of a photographer without taking the trouble to qualify himself for his self-imposed task by examining the work in question. Dr. Emerson has, as I think, hidden his light away too much in *éditions de luxe*, but nobody is in a position to condemn his theories without having seen his later productions, especially the *East Anglia*.

But granted an open competition between Mr. Robinson and Dr. Emerson, as head of the naturalistic school (though Mr. Davison might run the self-elected champion of the old school hard), Mr. Robinson has left out the essential and vexed point of all exhibitions—the judges. The Naturalisticists do not for a moment look for recognition from any one but artists, and those, as we all know, have long been displaced from the *Pall Mall* juries. To whom does Mr. Robinson so confidently look for suffrages in his favour? Is every visitor to the show qualified, by payment of a shilling at the doors, to have a vote, as for the "Rejected" at Olympia? Photographers have nearly all taken one side or the other by now, and one could tell beforehand which way they would vote. They are perfectly

honest, but they have made up their minds. Even given the pick of eminent artists, are they to be Messrs. Cooper & Herbert, Messrs. Henry Moore & Gow, Messrs. Stanhope Forbes & Adrian Stokes? For my part, I should await with confidence the verdict of the three last-elected A.R.A.'s, though I do not now remember who they are, nor have I here any means of discovering.

But, after all, I shrewdly suspect that Mr. Robinson wants to argue with Dr. Emerson and to exhibit against me. I should not have been worthy to write to you, Sir, if I had not been as fully aware as Mr. Robinson himself that his pictures possess artistic qualities of which mine, as yet, at any rate, have given little sign. But the issue cannot be decided on one narrow vote. Permanence of success, and adoption by the best artists among photographers, can alone settle differences. Is it to be equal focus, dressed-up models, combination printing, and silver printing reluctantly abandoned, or long, patient study out in the country, subordinate detail kept under by every means, study of tone and photogravure, that will win the day?

I have known both the rivals the same number of months, both have been uniformly kind to me. I only hope, in conclusion, that I have said nothing to disturb them in this point of unanimity.—I am, yours, &c.,
Paris, September 1, 1889.

GRAHAM BALFOUR.

PHOTOGRAPHY AT THE DEAL PIER.

To the Editor.

SIR,—Wishing to test the question of extra payment for using a camera on Deal Pier, I took my camera with me one morning last week. I was stopped at once by the man at the gate; he was certainly on the look out for me, as I had a few days before spoken to him on the subject, and had given my intention of trying the question.

The charge made is 10s. 6d. the first day, and 3s. 6d. per day after. On asking why this charge, I was told it was to protect the local photographer. I can hardly see where the protection comes in. I may take Deal when and where I like, in Deal, Deal from under the pier, even the pier itself from Deal, but I may not take a photograph from the pier without a charge of 10s. 6d., in order to protect the interest of the local photographer. I pointed out that no one paid this charge, and that it would rather be to the interest of Deal to invite people there, and to the interest of the pier if a small dark room were placed at the end, and a small charge made to change plates there.

I was told that if I exposed any plates without paying, my double backs would be all opened to daylight. Can they do this?

But perhaps the local photographers there may be able to say something on this matter. Should this meet their eye will they answer?—I am, yours, &c.,

J. W. ZAEHNSDORF.

ON PACKING PLATES.

To the Editor.

SIR,—The last word does not seem to be said on this (for the Lancashire photographer) all-important question.

For those who work in the gallery at home, the ordinary plan of folded paper to prevent the surfaces touching is, in my estimation, all that is needed, that we can hardly expect the manufacturer to consider the landscapeist and to have plates specially packed for him. I have tried many plans for packing plates to be exposed in the field, and my conviction and experience is, that all plans in which the surfaces touch each other, or with intervening paper of any kind touching the surface, result in some failures caused by pressure or friction.

The plan I have settled down to is exceedingly simple and within the reach of all. It consists in attaching to each plate a piece of thick paper on the margin which is covered by the dark slide.

I carry strips of paper of suitable strength, and as I take the plates out of the original box, I set the strips on both sides and press upon the sensitive surface, to which it will adhere firmly. Upon taking out of the slide, the plates require nothing but wrapping in paper, and returning to the original box to be developed at home; this method of attaching paper is easily done by lamplight in any hotel bedroom at night.

I carry these plates in a stock box that will carry from twelve to twenty plates; they lie close together in the smallest possible space, and are easily transposed to a dark slide (single) by feeling in a bag.—I am, yours, &c.,

A. PUMPHREY.

A DAY'S OUTING.

To the Editor.

SIR,—Your correspondent, who so modestly assumes the pseudonym of "Junius," asks what purpose can be served by my communication to your columns of an account of *A Day's Outing with a Camera in Kent*? He also complains that no information is given by me likely "to attract an amateur in search of fresh fields to go over the ground." The elegance of this sentence indicates the literary attainments of the writer; and, I may add, that the idea which possesses him, that my effusion was directed to instruct amateur photographers, exhibits an utter destitution on his part of ordinary perspicacity. The sordid compositional motive attributed to me I put aside with a contemptuous smile, as my only object in recounting a delightful journey with Mr. Clement Vernon, of Maidstone, a master of his glorious art, was to demonstrate that the cultivation of a

poetic love of nature, and a fondness for the music of its engaging symphonies, were not incommensurable but in unison with the exercise of the artistic work of the professional photographer. I can only express the hope that the tympanum of "Junius" may ere long vibrate with these melodies, and that the cultivation of a spirit of Christian charity may lead him to award his fellow-man credit for the same honest motives he may claim for himself.—I am, yours, &c.,
R. W. H.

Exchange Column.

* * No charge is made for inserting *Exchanges of Apparatus in this column*; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Exchange quarter-plate cold press (14×14), camera and lens by Phillistr (landscape, 10×12), for enlarging lantern (in good condition) for quarter-plates.—Address, A. L. SMITH, 233, Uxbridge-road, Shepherd's Bush.

Will exchange fine old mahogany stereoscopic camera, rack-and-pinion movement, two dark slides with carriers, also fitted with mahogany hood and flap shutter, all in splendid condition, for Lancaster's quarter-plate Instantograph set, with extra dark slides (of recent date).—Address, R. S. Coldershaw-road, Ealing Dene.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PLATINA.—See article by Mr. Lyonel Clark which appeared a few weeks back. The article, *Portraits by Photography*, by G. L. Hurd, in our last, should have been credited to the *St. Louis Photographer*.

BELGAM.—1. Most certainly the preparation with which the paper was coated was not uranic but uranic nitrate.—2. Mono-carbonates are meant.

MESSRS. TEAN & SON send us a rose-coloured sample, consisting of eight 5×4 sheets, of their ready-sensitised paper. We have no doubt it will do all they claim for it.

A.—If you can manage to wait till the next ALMANAC is issued it is probable you will see something that will meet your case. Experiments are now being made to meet this crying evil.

JOHN PRICE.—Sulpho-pyrogallol is supplied by the Platinotype Company ready prepared, and with full instructions for use. The Company do not publish the formula by which it is compounded.

S. R. B.—The lens will certainly be too slow for instantaneous work. If you wish to work with a single lens you had better obtain one of the modern type with the specially large aperture. Some have an aperture as large as *f*-8.

W. BOUGHTON.—The print demonstrates the possibility of taking portraits by the incandescent lamp. But the arc lamp is most generally employed for such portraits, precautions being taken that none of the glare or direct light falls upon the sitter.

X. Y. Z.—We think the patent is still in force, or at least it was a few months back. This you can ascertain at the Patent Office. The present holders of the patent, if it be in existence, will give you all particulars as to royalty, and also supply all the necessary apparatus and materials.

W. C.—The less any of the photographic chemicals are brought in contact with the skin the better. In developing so small a number of negatives as you have to deal with, we should expect no ill effect if ordinary care be taken in the manipulation. There is no reason why the solution should touch the flesh at all.

VERAX says: "I have a very valuable negative, and I tried to print off it on Pizzighelli platina paper, damped it as per instruction, and it stuck to the negative and caused a yellow stain. Can you say what will get it out, as I am anxious to save it?"—Perhaps some reader who has met with a similar mishap will give the benefit of his experience.

W. SIMS wishes to know how to print in silver on ivory, as the carbon process is too troublesome for him.—There is no successful method of printing in silver, as the ivory becomes stained in the operation. Collodion transfers can be made on ivory, but then the collodion film is not so good for colouring upon as the ivory, and, moreover, might possibly peel off when finished.

ALEX. HUTCHISON writes: "Will you kindly give me the formula for salting paper? I wish to make some prints on a special plain paper, and I cannot find a formula in any of my ALMANACS, as I suppose it is such a rare thing now to prepare paper that it is thought unnecessary to give one."—In reply: Innumerable formulae have been published. Here are three: select that which is most likely to suit.

1. Chloride of ammonium	50 grains.
Gelatine	16 "
Water	10 ounces.
2. Chloride of barium	200 grains.
Gelatine	45 "
Water	30 ounces.
3. Chloride of sodium	60 grains.
Gelatine	30 "
Water	10 ounces.

Boil, strain, and use when cold.

S. PHILLIPS says he has met with an accident to one of his lenses. The camera fell over and one of the glasses is cracked. He asks who is the cheapest man to put in a new glass, as he thinks if he sends the instrument to the maker his charge will be too high, and it is only one glass that requires replacing.—Our correspondent had better send the lens to its maker, who will have the necessary data, and probably will charge no more than another optician who has not. Furthermore, the instrument may then be relied upon as being as good as at first, and by the maker whose name it bears.

J. BURNSIDE inquires: "How would you proceed to put a photograph on to ordinary ceramic ware or china? We practice carbon printing, but what is required is that it should stand 'burning in.' Would it be best transferred on to the biscuit ware, or after the ware is glazed?"—In reply: If instead of carbon a vitrifiable pigment is mixed up with the gelatine, then will the problem be solved for our correspondent, especially if precaution be taken to ensure the gelatine containing the vitreous powder not puckering up when subjected to the heat of the furnace. Our own experience has been mainly with glazed ware.

CASTLE.—1. We have referred to the pages quoted in this year's ALMANAC, and find no mention of either of the formulae. You have evidently made a mistake. However, if a solution is saturated, it is impossible to make it more concentrated. For portability you had better take the materials in a dry state and dissolve them as required.—2. It may be obtained at most photographic warehouses, also at some of the oil shops. It is troublesome to make on a small scale.—3. The cause of the precipitation of the gold is that there was some impurity in the water, or perhaps the solution was put into a dirty bottle.

SILEX writes: "I see by an answer in your last number that only qualified chemists are permitted to sell poisons. Is there any reason why others could not give them away? For example, 'Every purchaser of five shillings-worth of goods to be presented with, say, half an ounce of bichloride of mercury.' There would be no selling.—We quite imagine the law is stringent enough to meet such a case as this. Practically it would amount to selling or vending the poison in contravention of the Act, and would doubtless be treated as such by the Court. You had better not attempt to evade the law in this manner.

J. H. B. writes: "I am anxious to know what are the most expeditious methods of obtaining a photo-relief in wet gelatine and also in dry gelatine, with a difference between highest elevation and lowest depression of about one-one-hundredth of an inch. Can this amount of relief be obtained, in true gradation, in the operation of developing a negative? and what are the conditions favouring it?"—In reply: The conditions which favour obtaining relief in a gelatine negative are, blotting off all surface moisture upon removal from the washing bath and drying before a fire by as great a degree of heat as the film will bear without melting. You may also obtain relief by varnishing the negative with gelatine containing bichromate of potash, and exposing to light through the image, afterwards treating it with water.

S. S. writes: "My enlarging lantern with nine-inch condenser and Ross' symmetrical lens (nine-inch focus), stopped to *f*-11, works fairly well with a blow-through jet for enlarging, but when used for reducing (say half-plates to lantern slides) there is a faint blue circle formed on a screen placed in the position of the sensitive plate, even when the light is carefully adjusted in relation to the condenser. There is a falling off in the light, and consequent unequal development of the lantern slide where the blue shade shows on the screen. Can you tell me the cause, and advise as to the cure?"—In reply: To reduce an image under the conditions mentioned, the lens must of necessity be removed farther from the negative than when enlarging, and in order to get equality of illumination the light must be brought nearer to the condenser. If the optical system will not lend itself to this altered state of matters, insert a sheet of ground glass at a little distance behind the negative.

* * As promised, we give with this number the Group of the Members of the Convention. We will give the key to it next week.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, September 11, 1889, will be on *Doctoring Negatives*. Saturday outing at Hampstead. Meet afterwards at the Bull and Bush.

HOLBORN CAMERA CLUB.—Arrangements for September.—6th. Technical paper. 13th. Lantern slide making. 14th. Field day to St. James's Park; meet at the Duke of York's Column at three p.m. 20th. Flash-light photography. 27th. Social meeting and lantern display. 28th. Extra field day.

WORCESTERSHIRE CAMERA CLUB.—The first exhibition of this Club is fixed to take place in March next, in the Museum and Art Gallery, School of Science and Art, Kidderminster. It will remain open from the first to the fifteenth of March. Full particulars may be obtained from the Honorary Secretary, Mr. William Ray, School of Science, Kidderminster.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1532. VOL. XXXVI.—SEPTEMBER 13, 1889.

THE DESTRUCTION OR REMOVAL OF THE PHOTOGRAPHIC IMAGE.

At the present day, when to a very large proportion of photographers the chemistry of their art is a sealed book, many useful dodges and practical expedients are entirely unknown, though well understood and practised by a bygone generation. This is especially the case in connexion with the destruction or removal of the impression formed by the action of light, either before or after development.

It is true that the change from collodion to gelatine as the vehicle for holding the sensitive silver salt wrought a corresponding change in the behaviour of the film when submitted to similar treatment, and, undoubtedly, it must be confessed that the collodion picture offers far greater facilities in this respect than gelatine does. To give only one instance, we may mention the action of persulphate of iron upon a developed but unfixed collodion and gelatine negative, respectively, to which we shall refer presently.

But it is not difficult to find many useful purposes to which the power of destroying the latent image or removing the developed one might be put if it existed in a workable form, as, for example, in restoring to a useful condition plates that have been accidentally exposed to light, in making reversed negatives, or even in rendering reusable a plate that has had a faulty image developed upon it. In an experimental way, especially with collodion, all these objects are readily attained, and in the case of Daguerreotype an impressed image may easily be obliterated and the plate restored to proper condition for exposure by merely submitting it to the action of iodine, bromine, or chlorine.

If a collodion plate, after exposure to light, be subjected to the action of chlorine, bromine, or iodine, or the corresponding hydrogen acids, the image or impression will be entirely destroyed, but the sensitiveness of the plate will at the same time be greatly diminished. Nitric acid, chromic acid, or bichromate of potash, permanganate of potash, and many other oxidising agents, as pointed out some years ago by Captain Abney, possess the same power, and with collodion films we have frequently utilised it in practice with complete success.

In the case of gelatine, however, the physical value of the film more than aught else intervenes to prevent full advantage being taken of this power when applied to *films*, though in connexion with *emulsion* the practice of using bichromate of potash to remove fog has long been a recognised one. It is not to be supposed that we mean that it is impossible to so

treat gelatine plates or films for the removal of fog or even of an image impressed in the camera, because only recently we restored and utilised a number of plates that had been accidentally exposed to light by simply soaking them in a five per cent. solution of potassium bichromate, well washing and re-drying. But for the practical purposes of the average photographer the trouble involved and the risk of slight or even considerable imperfection more than out-balance the advantage.

For making reversed negatives, or, to speak more correctly, for making a negative direct from a negative, or a positive direct in the camera, nothing is easier with a collodion plate, developed with alkaline pyro, hydroquinone, or ferrous oxalate, than to treat it after development, but without fixing, with almost any solvent of metallic silver, by which a transparency in bromide of silver is obtained. This is again submitted to the action of development after a short exposure to light, when, of course, a reverse result to that originally obtained is given. Nitric acid is the reagent usually employed, but a better result in every way is produced by ferric sulphate (persulphate of iron), or the double salt of iron and potassium known as iron alum. It must be observed that a wet or other plate treated by the "acid" mode of development is of no use for this purpose, as the image then consists of silver deposited *on* the film, not reduced from the bromide contained *in* it.

But with gelatine plates this method fails, on account, in the first place, of the solvent action of the acid upon the gelatine. We imagined that by substituting iron alum, which has no such action, but rather a hardening one, the difficulty would be overcome, but, curiously enough, another arises in the deposition in the film in place of the dissolved silver of a yellow basic sulphate of iron, which utterly destroys the result. A method of making reversed negatives on gelatine plates based on the removal of the first image was published by Mr. William Brooks some eight or nine years ago. In this, advantage is taken of the almost entire want of action of the alkaline developer upon iodide of silver. The image first developed is treated with a weak solution of iodine to convert it into iodide of silver; after well washing, the plate is exposed to light and redeveloped, the bromide of silver alone suffering reduction, the iodide being subsequently removed by fixing in hypo or cyanide. But the weak point of this method is that the bath of iodine wholly or partially converts the unreduced bromide of silver into iodide, with the result that the second image is an extremely feeble one.

To render a developed plate reusable—by the way, scarcely

a practical application of the principle, though possible by way of experiment—the image must be reconverted into bromide of silver, instead of being dissolved out. This is easily done with a weak solution of bromine or of hydrobromic acid, followed by copious washing, after which the plate may be re-exposed.

NEGLECTED PROCESSES—"WARNERKE'S NEW PROCESS."

THE process here alluded to—which, by the way, never received any definite or distinctive title—was one introduced and patented by Mr. Leon Warnerke early in the year 1881. At the time of its introduction it created considerable interest in photographic circles, inasmuch as in it was involved a new principle, or perhaps rather a new condition, in gelatine emulsion, which up to that period was unknown. Indeed, we may say that, even at the present time, it is not very well known to many whose experience in photography is but of recent date.

Mr. Warnerke made the important discovery that in a gelatine negative developed with pyrogallie acid the parts which have been acted upon by light are rendered insoluble in warm water, while those portions which have not been acted upon retain their original solubility. In fact, the gelatino-bromide film after exposure and development becomes precisely analogous to bichromatised gelatine—an exposed carbon print for example. The soluble gelatine can be dissolved away, leaving only those portions upon which the light has had no influence. One of the greatest advantages anticipated from this process was that glass in the field would be dispensed with and paper substituted in its stead, while, at the same time, other advantages would accrue. For example, halation would be avoided, and the operator would have more latitude in the exposure, as there would be practically two developments, both of which gave a means of modifying the ultimate result. Also, the negatives when finished could readily be either intensified or reduced to almost any extent.

The process is this:—The gelatino-bromide emulsion is spread upon paper instead of upon glass. The emulsion must contain no alum or analogous material—this is an essential. After exposure in the camera the image is developed with pyrogallie acid in the ordinary manner. It may afterwards be fixed or not, for it makes very little difference in the end. The negative thus far completed is squeezed, face downward, on to a glass plate, either collodionised or not, and then placed in warm water. In a short time the paper comes off, leaving the film adherent to the glass. By the continued action of the warm water the gelatine, which has not been affected by the joint action of light and developer, dissolves away. In the end the image consists of the reduced silver in different thicknesses of gelatine, while the deepest shadows are simply bare glass. The negative can now be intensified to any required extent and by any method, one of the simplest being a solution of permanganate of potash. It will be seen that, as the shadows are free from gelatine, there is nothing to be stained. If the image, instead of requiring intensification, is too dense, it may be reduced by using hotter water, precisely as in developing an over-exposed carbon print.

The negative thus obtained is reversed, and in that state is well adapted for collotype, or other processes requiring a re-

versed image. If it be required for silver printing, the negative can be developed on a flexible support and then transferred to a glass plate, or the negative can be stripped from the glass upon which it received the second development on to a gelatine film.

At first sight some might imagine that this process is somewhat analogous to the Eastman stripping process, but a little consideration will show that it is widely different. In the latter process the paper supporting the sensitive film is first coated with a layer of soluble gelatine, upon which the bromide emulsion is spread; this emulsion contains sufficient chrome or other alum to render it absolutely insoluble. In transferring an Eastman negative, it is not part of the emulsion itself which is dissolved by the hot water, but the soluble layer upon which it is supported. In the finished Eastman negative there is precisely the same amount of gelatine in the deepest shadows as there is in the highest lights; consequently, these negatives are not amenable to the same method of intensification as are the Warnerke ones—the permanganate of potash, or any of the dyes, for example.

One of the numerous applications of the Warnerke process, mentioned at the time of its introduction, is the production of carbon enlargements direct from the original, thus dispensing with both the transparency and the enlarged negative. In this case the pigment is added to the bromide emulsion, so that a "carbon tissue" is obtained, combined with the sensitiveness of bromide paper. The enlargement is made as with ordinary bromide paper, except that the image must be developed with pyrogallie acid; then it is squeezed on to transfer paper, and developed with hot water as a carbon picture; thus an enlargement in pigment and silver is obtained, but the silver can afterwards be removed, if thought desirable.

Mr. Warnerke's process is a thoroughly practical one, and at the time of its introduction we produced a number of excellent negatives by its aid, and which had all the qualities its originator claimed they should possess. The process, however, has not come into general use. Photographers, it is well known, do not, as a rule, care very much for extra trouble, notwithstanding that it might lead to better results. This process certainly does entail more trouble, and also requires more skill in its working than other processes by which very similar ends may be attained. First, a good negative has to be obtained, and when this is secured the experience of one familiar with the details of carbon printing is required for the second development and following operations. It will be very manifest that however good a negative might be in the first instance, it could be utterly ruined in the second operation, or in the later ones of transferring the film.

EVERY one knows the difficulty of filtering large quantities of material when the object is either to preserve a precipitate or classify a fluid. For example, a few pounds of chloride of silver cannot be freed from the major portion of the water accompanying it in residue collecting without a considerable expenditure of time, and the same difficulty is felt in purely experimental work with silver precipitates. Innumerable plans of folding the filter paper, or making the funnels with deep plates have been devised, the best for rapid filtration, perhaps, being the plaited filter. From Mr. Edison's laboratory comes another method still, the inventor being Mr. R. A. Fessenden, chemist at that eminent electrician's laboratory. Perhaps the simplest plan of describing it is to say that the filter is folded into the well-known form that schoolboys fold a small piece of copy-book to attach to the end of a splinter of wood to form a dart. A filter so folded is

clipped between opposite folds by a piece of glass rod bent almost double, and then placed in the funnel; by this means, the whole surface of the paper is exposed to the liquid instead of, as usual, one-half only; and, further, there is no impediment to the flow of the filtrate by a threefold thickness of paper for one-half of the exposed surface. The new method promises to be really useful.

It is a subject for surprise that, beyond coating rollers or plates with nickel or silver, no advance has been made in the direction of preserving from rust that necessary instrument for photographic finishing—the rolling press. Yet so liable is the polished roller, or the steel plate, to become entirely spoiled by the action of damp air, that it might be thought the inventive power of the producers would be brought to bear upon it. We cannot but think, and manufacturers may take the hint, that the Bower-Barff, or some cognate process, might with advantage be utilised to this end. Those methods of treatment cause the absorption of oxygen in such a form that it no longer attacks the metal under ordinary atmospheric conditions, and bright surfaces of iron and steel can, after being treated in the suitable manner, be exposed to air and rain without tarnishing or rusting.

THE present year has been marked by no great periods of continued excess of atmospheric moisture, like some of its predecessors, yet, for some unexplained cause, we have had brought before us a large number of cases in which mildew, which does not come in dry places, had attacked photographs—chiefly carbon prints worked up both in Indian ink and black chalk. Whether caused by the mode of treatment the artist had given them, or through the inherent qualities of the gelatine itself, we need not now stay to inquire; we would merely mention the expedient adopted by one of our readers to prevent such unfortunate *contretemps* occurring. He makes a point with every picture he puts in a frame to place at its back, and seal up with the pasted backboard, a few drops of carbolic acid. This being a great germicide, he believes that it would destroy all mildew spores that might gain entrance and otherwise grow and fruit and multiply—mildew being a low order of plant life which, when it comes to maturity, has a distinct fruiting period.

A PAPER on *Telescopes for Stellar Photography*, by Sir Howard Grubb, F.R.S., read before the Society of Arts, is now published. All who take an interest in astronomical photography will be interested by its perusal, and gain a much more intelligent knowledge of what photographing the stars really means than by any other single paper published. A most interesting description is given of the principles and method of star mapping as applied by the Congress of Astronomers at Paris last year—lenses, cameras, and the necessary clocks for driving, all coming in for a due share of attention and lucid description.

SIR HOWARD states that the instrument made for Mr. Isaac Roberts, of Liverpool, by which, in the "exceptionally wretched atmosphere of Liverpool," he obtained those remarkable photographs which attracted lately so much attention, is the first example, as far as he knows, of an instrument in which a successful attempt has been made to drive for any considerable time without eye and hand guiding. This is a vast improvement. "No one," says this expert, "who has not tried it can imagine the strain required to keep a constant watch on a star image for thirty or forty minutes, but if attention be only required for a second or so every few minutes, there is no difficulty or irksomeness whatever."

We may explain that if a fixed telescope were used for any star, the rotation of the earth would carry the star quickly across the field of view and out of sight. The astronomical clock obviates this by causing the whole telescope to turn so as just to counteract the disappearing tendency, with the result that the star keeps always in the centre of the field, or about that. "About it" is, perhaps, the most correct term to use, seeing that the image may move, and does move usually, out of the centre. The remedy is by means of another

telescope to keep the star really exactly in the centre, and when it appears inclined to deviate, to keep it rigidly in position by means of a hand attachment acting supplementally to the driving clock. And a very tiring task this is, as we just quoted; an instrument capable of acting so as to obviate all deviation except for a brief interval will be more than a boon; it will materially facilitate the progress of stellar photography. Let our readers imagine, if they can, the labour and pain involved in taking the great Nebula-in-Orion photograph, which required an exposure of about four hours, but which in the lecture is described as "an example of celestial photography never yet surpassed."

SIR HOWARD GRUBB refers to an article he wrote in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1869, in which he gave a sort of prophecy which has been fulfilled. He wrote then that "for the development of celestial photography we should have to look to the chemist, not to the optician—in other words, that until we obtained more sensitive plates we could not expect much advance." How true! and what advance has been made since the advent of such plates!

ECHOES.

THE "Jubilee" Convention is past and gone, and proved, as it was expected to be, a "big success," both as regards interest and attendance. But somehow or other it seems to have left a trail of dissatisfaction behind it. The editor of one of your contemporaries complains that he had to "pay to go in," so next year I expect the Local Committee at Chester will be wise enough to provide him with free quarters at the Grosvenor Hotel, place a carriage and pair, or a special saloon carriage, at his disposal for the excursions, together with a complimentary member's "pass." Such generous supporters of photography deserve encouragement.

Another contemporary editor finishes up a couple of columns of misstatement by asking the question, "Is this journalism?" I am sure I can't say with certainty, because journalism has its phases and freaks. But it is certainly a new feature in photographic journalism to attempt to make capital by a venomous attack on a rival editor, based upon an untruth which is almost deliberate from the carelessness of facts displayed. It must be consoling to the feelings of the editor of this journal, the one attacked, to know that his contemporary is at home in that spot in the Midlands to which the perpetrators of "shady" acts are usually relegated.

My own only complaint against the Convention is in connexion with the Exhibition, but I dare say I may be wrong in my view. That is, that the Exhibition, in London at any rate, was unnecessary and a mistake. In a provincial town the collection together of the latest novelties in pictures and apparatus may prove an interesting attraction to non-photographic visitors, and even to some of the country members. But in London these latter will naturally gravitate to the headquarters of the principal dealers and picture makers, where they can see more than it is possible to condense into an Exhibition. In fact, the case was very admirably summed up by a "lay" acquaintance of my own, who had devoted an evening to the Convention: "I didn't think much of it; I have seen better in the windows in Regent-street."

From the London Convention to the Paris Congress is but a step, but so far as I can judge from the meagre accounts supplied, the latter appears to have been as much a failure as the Convention was a success. I fully agree with the spirit of the leading article in the JOURNAL, but it is a pity it subjected poor Professor Stebbing, in his capacity of your correspondent, to the indignity of having to take a "back seat" at the dinner, to which he was honoured, along with M. Warnerke, with a "free ticket." But I cannot coincide with him in thinking that the lavish expenditure of two free dinner tickets entitles the French authorities to be considered as having dealt handsomely with foreign representatives. The remission of 20 francs entrance-fees to two self-styled delegates is, too, rather a symptom of credulity than of special welcome to England.

After all, what has been the result? Practically nothing. The Congress has endorsed the British standards for screw flanges, has

proposed a new one for diaphragms, and suggested a scheme for using the acetate of amyl lamp as a standard of light. But this last really desirable question is left in a delightfully uncertain state for anybody else to work out to a practical issue, for it is very certain that the next year's Congress will prove flatter than this. The most comical part of the light-standard question is, however, that, out of compliment to M. Warnerke, the Council mention his standard sensitizer in order to say that they do not recommend it!

Reverting to the subject of caustic alkalies, it has suggested itself to me that in following the instructions and figures given in the leading article a week or two since, the photographer may be placed in a position of the greatest uncertainty on account of the unreliability of the carbonates obtainable. Washing soda, or crystallised carbonate, for instance, is sold of very varying composition, containing from two to ten equivalents of water of crystallisation, and these crystals are, moreover, subject to efflorescence. Carbonate of potash, on the other hand, is so very deliquescent, that it is almost impossible to keep it in the anhydrous state: consequently, the poor photographer will find himself little better off if he trusts to the commercial supply of carbonates. It may be useful, then, to remind your readers of a ready means by which pure anhydrous carbonate of soda or potash may be obtained anywhere where a pharmaceutical chemist exists. This consists in taking the corresponding bicarbonate as the basis to work upon, and driving off the loose atom of carbonic acid by heat. This can be done by exposing on a plate in a hot oven for an hour or so, or by "roasting" on a clean fire-shovel over a clear fire, or boiling the solution for some minutes. Or the bicarbonate may be treated directly with calcium hydrate, proper allowance being, of course, made for its difference of atomic weight; that is to say, for the proportion of real alkali it contains.

JUNUS.

ROYAL CORNWALL POLYTECHNIC EXHIBITION AWARDS.

PHOTOGRAPHIC DEPARTMENT.

Professional Section.—First silver medal: W. J. Byrne, F. W. Edwards.—Second silver medal: W. W. Winter, H. P. Robinson.—Special first bronze medal: R. W. Robinson.—First bronze medal R. Keene, T. Protheroe.—Highly commended: Mrs. Chenalls & Sons.

Amateur Section.—First bronze medal: A. K. Barnett, Henry Littler, F. C. Cembrano, M. E. Austin.—Second bronze medal: A. R. Dresser, Rev. H. B. Hare.—Highly commended: E. Brightman, Miss E. L. Hare, A. Stieglitz.

Photographic Appliances.—Second silver medal: F. W. Hart.—Highly commended: Catheart & Peto.

Full report in next issue.

THE PHOTO-MECHANICAL PRINTING METHODS AS EMPLOYED IN THE JUBILEE YEAR OF PHOTOGRAPHY.*

RECENT METHODS OF MAKING TYPE BLOCKS FROM HALF-TONE SUBJECTS.

ANY impression in a fatty ink, of the nature of printers' ink, which may be transferred to stone or zinc for printing after the lithographic method, may be considered as the germ of a typographic printing block, as, if such an impression is transferred to a zinc plate, the uncovered parts may be etched away so as to leave the covered parts standing in high relief. The details of the method of thus etching a zinc plate have already been given. Let us take the reverse case. One has a typographic block, and it is more convenient to print impressions by the lithographic machine than from the block; it is only necessary to make a print from the block and transfer it to the stone. Thus it will be seen that lithographic printing and typographic printing are very closely connected, so closely that when a subject is prepared for one it may be printed by either, as convenience may indicate. The *Official Gazette* of the American Patent Office is set up in type, but the printing of all, excepting the index sheets and the covers, is done on a litho machine.

These remarks bring us to the point where photo-lithography and photo-typography may be considered together, and that the making

of a fatty transfer is equivalent to the production of a printing surface suitable for printing by either method.

In making a type block from a graduated photograph, the first step is to translate the evenly graduated tints of the latter into a line system, or a stipple of corresponding intensities. When a photograph is transferred to a wood block, this is done by the personal skill of the individual who engraves the block; but this is by no means to be regarded as photo-engraving proper, so my remarks will be confined to processes in which the translation is effected automatically.

There are many methods of so translating the tints into points, lines, or dots, that even to mention all would be impracticable.

In an earlier part of this paper, the method of Asser was referred to, a photo-lithographic transfer being made on a sheet of starched or pasted paper, made sensitive by means of potassium bichromate; and by putting down such a transfer on zinc, and etching into relief, excellent results may be obtained. It may also be mentioned that, as long ago as 1866, Messrs E. & J. Bullock, of Leamington, obtained a patent for a mode of photo-lithography in half-tone, and a print issued during the year in question with *THE BRITISH JOURNAL OF PHOTOGRAPHY* shows that their work was equal to anything that has been done since. Why, then, you may ask, did not the process become a great thing commercially, and make its mark? The answer is simply this—the invention came before its time, neither good lithomachining nor zinc-etching being practised at the time. The expired patent of Bullock Brothers, (No 2954, 1866) will be read with interest, and its value is well illustrated by the fact that the essential points of it have been claimed by very many subsequent patentees. Bullocks claim the production of reticulated transparencies; by copying a negative over which a grained surface is laid this transparency affords the means of making a grained negative: but the method by which their best work was made is a second process included in the same patent. Ordinary or photographic paper is coated with a glutinous substance, and printed with a reticulated pattern. Let me now quote from the specification:—"In this case the specks of ink themselves form a medium, and by their aid excessive contrasts are avoided, and half-tones secured. Such a picture, when so obtained, is passed to a lithographic stone or zinc plate, and a printed proof produced therefrom; by the aid of chromo-lithography coloured proofs may be produced." The coating of the paper with a glutinous substance may "be conducted in connexion with bichromate of potash or bichromate of ammonia." The said transfer paper may be used, "whether the impression be a lithograph, a zincograph, an impression from an electrotype, or from an engraved or etched plate."

By transferring a coarsely grained collotype to stone or zinc, a very good grain image is obtained, and the coarse reticulation of the gelatine is very much facilitated by adding chloride of calcium to the sensitive mixture. The following answers very well:—

Gelatine.....	6 parts.
Water.....	60 "
Bichromate of ammonia.....	1 part.
Chloride of calcium.....	2 parts.

Printing surfaces thus obtained, whether lithographic or typographic, resemble those of Pretsch or of Dallas on the one hand, and those of Sprague on the other hand.

In order to obtain a transparency in which the tints are translated into points, lines, or dots, Algeyer and Bolhoevenner have recently suggested a method in which a collotype plate is exposed under a negative; and after this plate has been soaked and inked up in the usual way, the fatty image is reinforced by dusting with an opaque powder. This method is of course dependent on the reticulation of the gelatine for the production of a grain. From such a transparency a negative may be made by contact printing, and from this a photo-litho transfer by any one of the well-known methods.

Meisenbach, of Munich, has recently obtained a patent in which he claims some details as to well-known methods of breaking up the grain of a photograph by means of a network, and he more especially claims the shifting of the network during the time of exposure. As regards this point, something similar was described by Bertschold in the volume of the *Photographic News* for 1859. Notwithstanding the fact that one cannot find any very striking features in the patent of Mr. Meisenbach, this gentleman has produced some typographic blocks of surprising excellence, examples of which are now before you.

We now come to an important feature in connexion with the subject, that is to say, the direct translation, by mechanical means, of the gradations of depth existing in the Woodbury relief into corresponding shades of stipple or granulation; but before entering into these, let me call your attention to a method of granulating the relief itself, which Mr. Woodbury has made the basis of a method by which excellent printing blocks have been made.

* Concluded from page 590.

Mr. Woodbury exposes his ordinary relief tissue under a transparency with a piece of network interposed, the effect of this being to produce a decided grain all over the high portions of the resulting relief and no grain over the deep parts, intermediate portions being grained to an intermediate extent. A reverse cast from the grained relief thus obtained is the printing block. This mode of procedure is subject to one disadvantage in actual practice, as the various printing parts of the resulting block do not lie accurately on one plane, as is the case with a block made by etching a plate of zinc into relief. Mr. Woodbury, however, overcame this objection by a modification of the process in which a transfer is obtained directly from the relief.

The following quotation from Woodbury's specification of 1873 will serve to fully elucidate the nature of the process referred to:—"I prepare sheets of bichromatised gelatine, such as is used in the process called 'Woodburytype,' and expose these under a photographic positive to the action of light, but interposing between the positive and the gelatine film a transparency on collodion or mica of what is known as mosquito netting, Brussels net, tulle, and so forth, which has the effect of breaking up the resulting relief into a multitude of fine square hexagonal lines; or for some subjects I interpose a transparency on mica or collodion of any design of a similar nature that will have the same effect, such as an impression from a grained stone, or the same from a number of fine ruled lines. The sheet of gelatine, when washed, will give a relief having the positive photograph represented by a number of lines, instead of the simple half-tone it originally possessed. I then take an impression from this by means of hydraulic or other pressure in any soft metal, and use the block so obtained for printing at a type press when only a few copies are wanted; but when large numbers are required, I electrotype the same in the ordinary way. I prefer to use diffused daylight or sunshine through ground glass or tissue paper to produce the relief, as in that case the light in the parts that represent the white creeps round the lines, thus partially obliterating them in that part, and leaving them strongest only in the parts printing dark. I sometimes adopt another method. I take a negative of the network by transmitted light, and copy this together with the negative to be reproduced, thus producing a positive with the lines already thereon, from which I proceed to make a relief and blocks as stated."

Mr. Fred. E. Ives, of Philadelphia, published, in 1878, a method of translating the smooth photo-relief into stipple, and this method may be regarded as a new departure. According to the method of Ives, as described by him in 1878, and patented in the United States, the essential features of his method consist in inking the Woodbury relief, and pressing against paper which has been grained or embossed, somewhat after the fashion of bookbinders' cloth. Under these circumstances the projections on the paper become completely crushed down by the inked relief where the gelatine is thickest, and a solid black results, while the more shallow parts of the relief only tip the projection on the paper with ink. Intermediate thicknesses of relief produced a medium effect. You will now please note the effect of pressing this sheet of grained paper against the inked Woodbury relief, a picture in black and white resulting, the shades of the original being represented by the varying extent of the closely packed dots which constitute the picture. The translation into stipple thus obtained may be used as a transfer for putting down on stone or zinc, but if preferred it may be re-photographed. Ives also made printing blocks by casting from the grained surface which had been compressed by the gelatine relief, although these were not found to be quite equal in quality with those obtained by the first-mentioned method. A subsequent modification of Mr. Ives's method gives results much more easily and economically, as he has succeeded in substituting a "swelled gelatine" relief for the more expensively produced Woodbury relief. In a letter to me, Mr. Ives says:—"The relief which I now employ is a plaster cast from swelled gelatine, which is secured so easily that an apprentice, seventeen years of age, makes them acceptably for Crosscup and West. On the relief the lines and stipple are impressed by means of a printing film of elastic, V-shaped, stippled lines, in a manner which gives the operator considerable control of the effect. The line and stipple picture on the plaster relief is then stripped off for lithographic transfer or etching, by a method so simple and perfect that it astonishes all who see it done. Formerly, I had to reproduce the impression by photography in the camera, and by this operation could not avoid losing much of the delicacy of the original, which is wonderfully delicate, sharp, and clear in line. I have to secure ruled plates for moulding closer lined printing films before I can apply the transfer method of reproduction for fine work; so it may be months before I shall show you what fine results I can secure in this way."

The following reprint of Ives's original declaration will be of interest:—"Ithaca, New York, August 12, 1878. I, the undersigned,

have to-day invented a method of obtaining relief plates for the typographic printing press from ordinary photographic negatives, which may be described as follows:—1st, From an ordinary photographic negative, a relief in gelatine, similar to that used in the Woodbury-type process, but perhaps in lower relief, is obtained. 2nd, This relief is carefully and uniformly inked with fine printers' ink, and pressed between two flat surfaces (or between rollers) against paper or other material, upon which is stamped or otherwise produced a fine grain or other suitable surface. The inked relief being highest in the black parts, presses down the grain of the paper on the corresponding parts, and the removal of the ink by the paper from those parts of the relief produces a black impression, while upon those parts where the relief of the gelatine is lower, the grained surface is pressed less, and the ink taken up in spots, the size of which depends upon the grain of the paper, and the amount of pressure, and producing an effect similar to that of crayon sketches made upon such a surface. 3rd, Relief plates may be made from this impression, either by the usual photo-typographic processes, or, perhaps, by obtaining a cast or electrotype of the impressed surface of the paper or other material used to receive the impression from the gelatine relief.—FRED. E. IVES."

The broad principle of the Ives method, which consists in pressure of the relief against a grained or stippled surface, has been the subject of several subsequent patents and inventions. We find that, in 1879, Petit, of Paris, took out an English patent for a method nearly identical with that of Ives, and soon after another patent by Dredge followed; this latter, however, indicating novel methods of working. A process of quite a similar character is the "Crayontype" of Ad. T. Eggis, which was published more recently. Mr. Eggis, instead of inking the relief, takes an inked film, such as manifold copying paper, and lays this on the relief. The grained paper is now placed over and pressure is applied. If the grained paper sold for producing crayon effects in lithography is used, very excellent transfers are obtained.

Mr. Eggis, writing in the *Photographic News*, thus describes the method:—"This process gives results good enough to have allowed the taking of a patent, but I find it preferable to describe it for the public benefit. I call it crayontype, for the images it produces are much like those obtained by the artist with a lead pencil (crayon in French). This is how I proceed:—I procure or produce, to begin with, a gelatine positive on best plate glass (*glace*), obtained by the known ways, in relief. The highest point when dry should not have more than one millimetre. The other necessary implements are, first, grained (or lined) paper, of same kind as is used by the artists for their drawings destined to be etched; second, a few sheets of blue or black transferring paper (*papier à calquer*, thin paper coated with a greasy substance and coloured); third, a small press. Having these at hand, I take the gelatine positive, lay it on the stone or metal table of the press; on the relieve I place a sheet of transferring paper, the prepared face turned upwards. On this I lay the stippled or grained autographic paper, face downwards, touching the greased sheet. Over all this I place a fine polished steel sheet, well planed. I put the whole under the press, and slowly pull down the lever in such a manner as to give a smooth and graduated impression. Afterwards separating the whole, I find on the grained paper a good and often a perfect stippled reproduction of the gelatine relief. This reproduction being formed by a greasy substance, I am able to transfer it at once directly on stone for lithographic purposes, or on metal to be etched in the usual manner. The production of such an image will be easily understood; it is much the same as the direct drawing with a pencil on the paper. Instead of the artist pressing more or less his graphite on the paper, the gelatine relief (which corresponds more or less to the lights or shadows of the photograph) presses more or less on the paper, and gives the true gradation of the original. The work of the hand is mechanically imitated very closely indeed. The crayontypes present a different grain, which may be chosen according to the work to be done. It is at least more artistic than the usual regular stippling."

Other modes of effecting the translation of the relief by pressure on grained surfaces have been patented by Mr. Zuccato.

The first method consists in first planing a piece of type metal or similar surface in a series of ridges, or a series of pyramids, as the case may be. The plate is then inked, and instead of pressing the relief directly on the inked plate, a piece of very thin paper is interposed; the relief crushes down the pyramids in proportion to its depth. The pyramid of type metal is spread out, and forms a sharply cut outline on the paper, and in this way a transfer is obtained which has a remarkable clearness of outline, almost like the cleanest cuts of the graver.

It will illustrate the matter better if, instead of inking the plate first, the relief is pressed directly against it, and you will then be able to see the flattening of the lines or pyramids.

Two other modes of working have also been patented by Mr. Zuccato. In one he interposes between the relief and a sheet of transfer paper a piece of gauze, or a piece of silk which has been inked with transfer ink. Of course, what then takes place is similar to what happens in the case of the plate; the threads of the gauze get crushed out to a greater or less extent, and form lines of greater or less width, but this method in which the gauze is crushed down is not nearly so perfect as the method with the plate of type metal.

The Woodburytype process and the Collotype process, not having undergone any very remarkable developments of late, and being generally known as regards their main features, do not need special consideration in relation to our present subject. THOMAS BOLAS.

COLOURED PHOTOGRAPHS.

VI.

WE have now come to a point when a very serious matter has to be considered—the choice of materials. There is nothing more essential to an artist's securing comfort in his work and completeness in his effects than the quality and appropriateness of his materials. On this point let us banish all considerations as to price; the one and only consideration should be that they be good—the best, in fact, procurable. Take my word for it, they will, if really good, very soon and effectually reimburse you for your extra outlay. In my own case, I find it pays me, in saving of time, to use a good brush for work that may to many appear workable with second-rate ones. But, as I say, my time is saved, and to such an extent that the difference in cost of the good and the middling brush is a matter worse than foolish to hold in serious consideration.

In starting on the subject of materials, especially when in connexion with photography, I think it only fair to place in the foremost rank Mr. James Newman. His colours are undoubtedly good, but it is not altogether on this score that I mention his name here. It is because he has devoted years of study in producing various specialities that may help the artist in his task of colouring photographs.

One of his specialities is his "sizing preparation," which will be found a great help in more ways than one. All who have attempted to colour photographs must have noticed how awkward the various surfaces appeared to be, and how difficult it was to get the colours to work nicely upon them. This difficulty is overcome by the use of the above or Newman's "prepared size." The latter is very strong, and should be diluted with water before using—three parts water to one of size is a safe proportion. Change of climate will not affect this preparation. On some photographs it is difficult, if not almost impossible, to get a wash of colour to float evenly over their surfaces. This may be the result of the natural quality of the photograph, or be owing to the fact of the surface being rubbed in some way. To smooth this difficulty we cannot do much better than use the "sizing preparation" mentioned. A little of this "size" may also be used with the colours to some advantage, as it produces in them a tendency to become fixed, and so allow of their being worked over without much risk of disturbing them. I need scarcely say that I am treating water-colour painting for the moment; oils will come later. Washed over carbon prints, it greatly enhances their appearance as well as fits them for the application of colour, but does not impart a gloss all the same. This latter is a very considerable advantage. Thus we have prepared our photograph, and, assuming for the moment that we have coloured it, we can now use Newman's "Diamond" enamel paste, which imparts not only a beautiful finish (to either plain or coloured work), but also a depth and brilliancy combined with a certain degree of protection from the evil influences of exposure to the atmosphere. There are many cases where a bright surface would be a disadvantage, and in such it should not be used; but where suitable, it will not only produce a bright surface, but it will also hide all offensive touchings or markings which might be too prominently observable without its application.

Brushes! Ah! how troubled are we at times to get good ones! Every working artist should keep a goodly supply in reserve, and they should be the best. He must have some fine-pointed *sables* for stippling and working out the finer details, and larger ones for laying in the washes and broader portions of his picture. There is no absolute rule which can be laid down for the selection of brushes. For fine work do not get the brushes too small; see that the point is fine, but let the sables themselves be of moderate size. If anything, incline to the larger than to the smaller sizes. A good brush should spring well when pressed with the finger, and always preserve a good point. Tastes vary as to use of brushes, and I think I am safe in saying that every one should select those which afford the maximum of comfort

in working, but they should *always* be the best in quality. It is altogether a matter of taste, too, whether they are mounted in quill or metal. Personally, I use the latter, as they stand the wear and tear better. This may be considered as the *economy* of art. As I have said, a *fine-pointed* brush should be used for stippling; for hatching, such is not necessary, in fact, it may be considered rather a disadvantage. A red sable brush that has been in use some time, and which has the point well worn off is best adapted for this method of working. It is best to hold it as far as is conveniently possible from the point, between first finger and thumb, with the middle finger under it as a kind of extra steadier. It must be worked, too, in such a manner as to allow of the free movement of the wrist and arm. It should be our constant endeavour to acquire a firm touch with the brush, and not work too much upon the point of it.

For many years past (too many to insert here) I have been in the habit of using Winsor and Newton's brushes, and have invariably found them reliable and good. They are not cheap, nor do they profess to be as regards price, but they always try to supply the best article. I have always held that a really good article is worth a fair price, and I feel sure all sensible men will think the same if they give the matter due consideration. I have known them rise their prices at times considerably, and when I inquired why they did so, they very kindly explained that it was owing to the difficulty in procuring the sable with sufficient *spring* that necessitated their charging more for the production of a first-class brush. One should not murmur at the price varying a little, provided there be rational cause, but it would be quite another thing if the *quality* varied. This, I must say, in common fairness, I have never found; their brushes are always well selected (this is most observable when sables run bad), and if they sell you a set of brushes and say they are first class, you can confidently rely on them. At least, such has always been my experience.

I do not wish to infer by this that good brushes are produced by this firm alone, or that a *cheap brush* by some other maker may not be a good one, but I do say that such brushes as the latter are not, as a rule, dependable.

We should be provided with a china palette, a nest of saucers, and one or two slanting tiles. When we wish to apply large washes it would be impossible to have sufficient colour mixed upon a palette, and, in such instances, the saucers or slanting tiles will prove our friends. India-rubber, ink eraser, sharp knife, scraper (procurable at any artists' colour shop), should also form part of our kit. Some painters use a lancet, while others use a needle. Poor artists in the dull season generally have the latter. It is very unpleasant. I have experienced it, and know.

Some very finely powdered pumice stone, a bottle of gum-arabic water, not too thin, as by dilution with little water it can easily be reduced, an agate burnisher, and a few drawing pins, may be said to almost complete our list of wants other than our colours. If engaged on large work or oils I would recommend the use of a *mahlstick*, as it gives considerable freedom to the hand in working.

If any considerable portion of your work comes under the heading *large*, an easel will be necessary, and for general work and usefulness a "Corbould" is undoubtedly the most desirable. Any easel, however, if sufficiently firm, will answer our purpose quite well enough. For the smaller work an easel will not be indispensable, and may be found even awkward. If, however, we have one, by all means let us use it. One soon gets use to it, and I know many who prefer its use even for the smallest work. When thus used we will have to include a drawing board, to which—mounted on the easel—we pin our work and go ahead. I think a desk suitably placed upon a table will be found more convenient, notwithstanding, for the very small work.

I may here mention that a small pot of prepared *ox-gall* will be found very useful at times. For working on ivory it will not be required, but for albumenised paper, which at times appears very greasy as it were, it will prove of great assistance and be almost indispensable. The less used, however, the better, as too much will have a ruinous effect upon the paper or photograph, and in some cases destroy the delicacy of a transparent tint. All cases in which ox-gall appears necessary, it should be washed over the entire surface of the picture, in weak solution, with a camel's-hair pencil. Camel's-hair pencils are not practically useful for painting generally, and this is owing to their not having sufficient *spring* to give a reliable touch.

Some prefer red sables to any others on account of their greater stiffness, although the brushes made of black sable almost invariably have better points. The smaller sizes of sable generally used for stippling should not be too small, as working with same would lead to an excess of finish, or rather fineness of stipple, which would materially discount the higher objects of art—viz., depth, solidity, and colour.

We now arrive at the most important part of all—the colours. As

in the case of the brushes, I have ever given the preference to the colours produced by Winsor & Newton. I have never found them vary in quality, and have always found them easy and agreeable to work with. This is more than can be said of all other colours. For very many years I have mostly used moist colours and have always found those supplied me by Winsor & Newton, although they retain their moisture while in the box, dry consistently and in convenient time when once they are applied to paper. These qualities are both very important ones to an artist working, and I feel sure any one adopting their use will derive complete satisfaction therefrom.

We may classify the colours used in portrait painting under two headings—those used in painting the flesh, and those more strictly adapted to painting draperies, background, and other accessories.

The colours mostly used for painting the flesh are as follows:—Chinese white, raw sienna, Indian yellow, Venetian or light red, vermilion, pink madder or rose madder, Indian red, brown madder, cobalt blue, burnt sienna, Vandyke brown.

The colours used for draperies, backgrounds, &c., in addition to those above, are gamboge, yellow ochre, sepia, lake, carmine, French ultramarine, smalt, indigo, Prussian blue.

Chinese White.—This is a most valuable pigment. It is prepared from oxide of zinc. It works well in water, has a good body, and is thoroughly reliable as regards permanency. There is no other white which has been used up to now as a water colour which can compare advantageously with it for these properties. It should, nevertheless, be used with moderation (as a water colour), and preference always given to transparent and pure colours for flesh. There are naturally times when a combination of other colours with white is not only advantageous, but absolutely necessary, but when not so I recommend working without it. As there are many kinds of Chinese whites in the market, I have tried several experiments during the past three years or so to test their various qualities, and have had some strange experiences. As a result, I have found Winsor & Newton's permanent Chinese white far and away the best for working. It possesses all those qualities most essential to its free and successful use without any of the pasty and clogging properties combined with a deficiency in body to be found in many of the other makes. As I say, use it very sparingly, but when used at all, it is invaluable having the best product at one's disposal. It is mostly limited to putting in the white spots in eyes, or the working out of lace, gold ornaments, and such other high lights. If an error should be made, it will be found useful in correcting same, as we will see further on.

Raw Sienna.—A natural earth of yellow colour, and much valued for its delicate transparency. It is a beautiful colour, and a wash here and there in foliage produces great variety and relief. It also combines with pink or rose madders in producing a very delicate flesh, and is generally a good and safe yellow to work into the face, that is, of course, on such portions of it where yellow seems to assert itself.

Indian Yellow.—A beautiful intense yellow possessing greater body and depth than gamboge. Its reputation for permanency is not without doubt, but in its best form may be considered thoroughly safe. Mixed with Venetian red can be used for flesh. Is also very serviceable for draperies, &c., and makes, in combination with the various blues, some beautiful greens.

Light Red and Venetian Red.—These colours resemble each other closely. Light red is one of the most useful of colours. It makes a good base for flesh, is fairly transparent, low in tone, and more of an orange tint than Venetian red. It is most useful in landscape, as combined with cobalt it gives some of the finest greys, and also mixes well with other pigments. Venetian red, although very similar, is less orange in hue, less transparent, and decidedly more powerful in colour than its relative, light red. Like the latter, however, it is thoroughly permanent, either by itself or in combination with other colours.

REDMOND BARRETT.

LIGHT, LENSES, AND STOPS.

(An abstract of a paper read by Mr. John Edmonds at the ordinary meeting of the Birmingham Photographic Society.)

THERE are two theories by which the nature of light and its propagation through space are explained, namely, the corpuscular or molecular theory, and the undulatory theory. According to the first, light consists of minute particles emanating from self-luminous bodies, as the sun, a candle, or a red-hot piece of iron. According to the other, light is produced by waves or undulations of the molecules of an extremely subtle and rarified elastic matter called ether, existing everywhere, and set in motion by the causes which produce light; this is called the undulatory theory, and is now generally received. This ethereal medium is not light, but light is produced in it by the

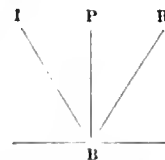
excitation on the part of luminous bodies of a vibratory motion, similar to the undulation of water that produces waves, or the vibration of air yielding sound. Water set in motion produces waves. Air set in motion produces waves of sound. Ether, that is the theoretical ether pervading all matter, likewise set in motion produces light.

The nature of a vibratory medium is better understood by reference to that which we know possesses the ordinary properties of matter, viz., the air; and by observing the analogy between the propagation of sound and light the difficulties of the undulatory theory become less formidable.

To illustrate vibration, take a small ball attached to a silk thread and suspended inside or outside of a glass bowl, so that it may touch the edge; set the glass in vibration by means of a violin bow producing sound, when the ball will be thrown from the edge and repelled so long as the sound is continued. This must suffice as to the theory of light. We know but little of its nature, but must proceed to consider briefly some of its peculiar properties.

All objects upon which the light falls are either opaque or transparent, but these terms are not absolute. Many objects are only partially transparent or translucent, none are absolutely transparent. We have to use the term a ray of light, but a single ray must be in reality a mere ideal abstraction. In practice we can only deal with whole bundles of rays, the larger of which are usually called *beams*, and the smaller ones, whether parallel or conical, *pencils*. It is, however, convenient to speak of small *parallel* pencils as *rays*, when convergent or divergent they may be designated pencils.

When rays of light fall upon a plane surface, as the flat surface of a mirror, a greater or less number of them are reflected, and the result is in accordance with a definite law by which the angle of incidence, as it is called, is equal to the angle of reflection. This is easily shown by a diagram.



Thus, the angle IBP , formed by the incident ray, IB , with the perpendicular P , is equal to the angle PBR , formed by the reflected ray, BR , with the perpendicular P . This is a simple law, but an important one, and the knowledge of it is essential in the various applications of mirrors and other reflecting surfaces.

When rays of light in their passage impinge or are incident upon and enter a transparent medium or material of a different density, their course becomes altered, and the line of their direction broken, whence they are said to be refracted. If the medium they enter is denser than that through which they were at first passing, they will be refracted towards a line perpendicular to the surface, or, as it is expressed, refracted towards the perpendicular. [This was shown by a diagram.]

Light is not simple but compound, and when a ray is passed through a prism it is divided into the primary colours of the spectrum, viz., violet, indigo, blue, green, yellow, orange, and red—the red, or visual rays, being the least refrangible, and the blue ones at the other extreme of the spectrum having the greatest refrangibility. This was shown upon the screen by a diagram, and afterwards by projecting rays through a prism by means of the limelight, when the brilliant rainbow colours of the spectrum appeared upon the screen. By interposing a double convex lens in the path of the ray, the colours were re-converted into white light.

The lecturer then explained that lenses were of two kinds, viz., positive, convergent or magnifying lenses; and negative, divergent or diminishing lenses—the one enlarging and the other diminishing the image of an object seen through it.

The principal forms were illustrated by diagrams, and described as convex, plano-convex, and concavo-convex, or meniscus positive lenses; and double concave, plano-concave, and divergent meniscus negative lenses.

In all lenses having the properties of prisms, spherical and chromatic aberration are inherent in them, and means were adopted in former times to correct these errors by altering the forms of the lenses so as to diminish the aberration, and by the use of diaphragms to compel the rays of light to pass through the centre of the lens, and thus improve the definition, this method, however, being very imperfect and attended with great loss of light.

Spherical and chromatic aberration were then briefly explained, and diagrams projected upon the screen showing the various forms of

achromatic lenses, constructed of two or more compound lenses made of crown and flint glass respectively, each kind of glass having a different density and refractive index, and the curves being so arranged that the negative aberration of the one counteracted the positive aberration of the other.

This was followed by a description of the achromatic view lens, the Petzval portrait lens, and the more modern doublets, rectilinear, and other lenses used in photography, also of the position and uses of stops to correct distortion, flatten the field, and regulate the sharpness of the image and the time of exposure required.

In conclusion, a series of instantaneous and other photographs were exhibited, taken under varying conditions as to exposure, light, lenses, and stops.

INSTANTANEOUS PHOTOGRAPHY.

It seems a hopeless task to persuade the embryo amateur that he should begin at the lowest round of the ladder and work upwards. He has his mind's eye on horses at full speed "just going under the wire," and kindred subjects. To tell him that the taking of such pictures requires considerable experience in the art of proper lighting and development, places you, in his mind, in the category of those who are still groping in the darkness of wet-plate work.

To commence: The photographer should instruct himself carefully in the use of stops, and then test those he is constantly using in various kinds of lighting. This is a necessity, as on the stop depends the speed at which the instantaneous shutter may be worked to obtain a properly-timed negative. A vast majority of photographers, both amateur and professional, believe that an instantaneous (?) exposure with the shutter is necessarily under-timing. Now this depends entirely on the operator. If, even with very bright sunlight directly on the subject, a very small stop be used, most assuredly the plate has not received sufficient exposure. But, on the other hand, if a very large stop be used, the plate becomes over exposed.

Another matter of great importance is the question of intelligent development. The usual course is to prepare an ordinary developer and pour it over the plate. If it comes up all right the operator has "hit it," and if not, he has "missed it." This may suit those whose only object is to occupy their leisure time, but for the benefit of those whose purse is limited and whose time is valuable, I say *STUDY* development. It is the basis of all good work. I have had plates placed in my hands which have had twenty-five times too much exposure, by actual calculation; but, knowing this fact previously, and exercising care in the development, I have made good negatives from them. But, say you, it is under-exposure, not over-exposure, we are complaining of. To begin with, unless the light is *very* poor, or your shutter faster than any I have yet seen, there is very little necessity for any under-exposure. I have used a variety of shutters, from the simple drop to the latest combination of springs and triggers, and find that with all of them, in a bright, unclouded sunlight, a stop equal to $f/16$ or $f/22$ in the country, or $f/11$ to $f/16$ in the city, gives me sufficient light to capture railroad trains at full speed (three-quarter view), bicycle riders, and other kindred subjects. When I say sufficient light, I mean sufficient exposure for the production of a good negative by any one of average experience in development. I think a majority of the failures may be attributed to the idea which the average amateur seems to possess, that a lens advertised to take a 5×7 landscape must necessarily take it instantaneously. I find that for 5×7 instantaneous work, an 8×10 size of lens is about right, and am using myself a No. 2 Euryscope for that class of work. But suppose that the negative is, for example, under-timed. Did you ever try hot water to develop it? No? Why not? No, it won't melt the film if the plate is cold. An experiment recently made has shown that a warm plate will melt with ice water for development, while a cold plate is unaffected in this respect by developer quite hot. Do not imagine, however, that it must burn your fingers, for there is a limit even to this. This warm-water treatment will frequently bring out the most obstinate cases of under-exposure. However, if it does not, why soak the plate awhile in water and some sal-soda until the film is wet through. Then pour off and add your developer—tepid, however, this time. Do you catch the idea? Yes? Well, try it.

—*Con. Number St. Louis Photographer.* ROBERT E. M. BAIN.

BLISTERS.

THE season of the year reopens the discussion of blisters. It will not be denied that it is a subject worthy of consideration, of thorough examination, of close observation, and of careful study as long as there is any doubt as to their cause, as to the conditions under which

they are likely to occur or not to occur, and as to the remedy or remedies which may be used to prevent them.

As to their cause: The immediate cause of blisters is *carbonic acid gas*, generated by the action of the hypo on some compound, *nit* determined, which is probably formed in the operation of printing. That blisters are caused by carbonic acid is proved by taking a wide-mouth bottle half filled with pure lime water; put into it a sufficient number of large, well-filled blisters, which should be detached from as much of the superfluous paper as possible. Break the inflated gas bags under the lime water by means of a glass rod. The bubbles of gas will rise to the top of the water, but as the gas is heavier than the air it will remain in the bottle, floating on the water for a short time, although not visible, the same as oil would do, while the air will be crowded out to give it room. The bottle should now be tightly corked to keep the gas from escaping, when, after shaking, the lime water will assume a milky appearance, due to the formation of carbonate of lime in the solution. This is exactly what will happen if carbonic acid obtained in any other way—from marble, for example—be mixed with the lime water. Moreover, if a few drops of hydrochloric acid be added the milkiness or precipitate will disappear in one case precisely as in the other. Undoubtedly carbonic acid is the cause of the precipitate in each case, it being obtained from the blisters in the one, and from the marble in the other.

Under what conditions are blisters most likely to occur? First, they are more likely to occur in warm weather than in cold. This is so generally recognised that the summer months are, by common consent, called "the season of blisters." Second, the condition which I believe to have the most powerful influence in producing them is an old silver bath surcharged with organic impurities.

When albumenised paper is floated on a new, strong, silver solution the latter renders the albumen insoluble, forming the albuminate of silver, but at the same time the silver solution redissolves a small portion of the albuminate, just as a strong solution of common salt precipitates the so-called insoluble chloride of silver and then redissolves a portion of the precipitate, and just as the negative bath redissolves a portion of the iodide of silver, which it precipitates.

Every time a sheet of albumenised paper is silvered a little more of this nitro-albuminate of silver (if this is the right name) is added to the bath until it can hold no more. At this point its ability to produce blisters appears to be at its maximum.

In addition to the above predisposing causes, it is proper to say in passing that an often-used hypo bath is more likely to produce blisters than a fresh one, and that paper silvered for some time previous to being used frequently shows, when the trouble is epidemic, a stronger tendency to blister than that freshly silvered.

I have nothing to say about bad paper, musty, mouldy, partly decomposed, or otherwise unsanitary. I refer only to conditions under which strictly first-class, sound, healthy, highly albumenised paper is liable to be affected by the malady. Nothing is better known by dealers in photographic supplies than that the best paper in the world is sometimes sent back, loaded with maledictions as loud as they can be produced in black and white, as unfit for use, all on account of its atrocious blistering propensities, while another will find the identical paper highly satisfactory, and in all respects worthy of commendation. Cause: probably a large excess of nitro-albuminate of silver in the bath of said complainant.

Let it be borne in mind that the bath may be thoroughly sunned without ridding it of this impurity. A strong silver solution strongly charged with it will often remain clear in the sun for days, and the printer may therefore presume that his bath is in fine working order; prints look fine and brilliant, tone beautifully, when lo! after fixing, the blister plague breaks out in malignant form—batch ruined. Another trial with some little modification, read about or heard of; result, surprisingly similar.

Right here is an opportunity for a neat little experiment. You have all read that if you have your albumen thoroughly coagulated you will have no blisters. Probably I thought so once myself. Whether I did or did not, it is a mistaken notion all the same. If your bath is sixty grains strong, and the prints blister almost or quite unpreventably, no matter whether you leave the paper on it two, three, or six minutes, just reduce its strength to forty grains, and sun it a few hours. Then laugh or weep as you feel most like doing, when you miss the jolly faces of your dear familiar pets from your next batch of prints.

But the best way to treat your bath when it gets into this condition is to boil it down and carbonise the organic matter. Do it well while you are at it. This can be done with an oil or gas stove and a porcelain evaporating dish. The latter need not be very large, one that will hold two to four quarts being sufficient. It is not necessary that it should hold the whole, or even half, of the solution at once; this

can be added, with a little care, from time to time as room is made for it in the dish. When the water is boiled out, and nothing remains but a frothy mass, the heat should then be continued, stirring the mass with a glass rod until it settles into a quiet and liquid state. It is now fused nitrate of silver. In doing this there is danger of breaking your porcelain dish if it is placed where there is a draught of air from any window or door. It is a puff of cold air, and not the heat alone, that breaks the dish. It is safest not to turn off the heat suddenly. When cool, redissolve and reconstruct your bath.

Even with a good bath there is in the summer months, and other months also, a margin more or less in width available against the entire exclusion of the pest. In my own mind I have no doubt that the compound from which the hypo bath liberates the gas which makes all this trouble is due to the oxidation of the albuminate of silver, that this oxidation takes place to a greater extent in some states of the weather than in others, and that when the bath contains this albuminate in solution a portion of it is transferred to the paper, increasing the supply of the material from which the gas is produced, and, as a consequence, a more liberal supply of blisters is formed. But this last is speculation, which, though based on facts observed, is not proved.

The facts, however, remain. In practice the cause of the difficulty cannot be wholly removed; we must therefore have recourse to some means of preventing the formation of the blisters, even when the gas is present. This is most effectually accomplished by the liberal use of common salt. I do not mention this as an item of news, but because so many other ways are brought forward as better. As nothing can be simpler, cheaper, easier to use, and, at the same time, more thoroughly reliable, so nothing is likely to supersede it in the hands of experienced photographers. Let any one who doubts its merits dissolve a pound of this cheap article of household use in a gallon of water, transfer his prints into it from the fixing bath, then let them remain ten or fifteen minutes, then make the change from salt to plain water by letting the latter run on to the prints while the other is drawn from the bottom of the vessel through a siphon. Unless he has an incredibly desperate case on his hands, his prints should be entirely free from blisters.

A little ammonia in the fixing bath acts towards the same end; likewise carbonate of ammonia, which may be used much more freely without endangering the brilliancy of the albumen surface.

The conclusion of the whole matter—blisters are preventable accidents.

W. H. SHERMAN.

—*Con. Number St. Louis Photographer.*

THE INTELLIGENT USE OF THE DETECTIVE CAMERA.

[A Communication to the Liverpool Amateur Photographic Association.]

SEEMING that most amateur photographers nowadays either possess or are about to possess a detective camera, and this being the season of the year when it can best be used, I thought a few words on the subject might be acceptable to some, if not all, of you. There are so many various kinds of detective cameras now in the market for the amateur to choose from that it would be impossible for any one to say which is the best, as most of them have all and every movement that can be required, the chief difference being that some are more convenient to use than others, more notably one lately brought out by one or two members of this Society. This, however, is not so important a factor as knowing how and when to use the camera for its special purposes. As I am anxious not to weary you, I will commence by calling your attention to some of the advantages, as well as disadvantages, of this class of photographic work. As to the former, it is well known that its chief characteristic is *concealment of purpose*, thus enabling the operator to obtain "shots" at bits that probably could not be obtained with the ordinary uncovered camera, even though the same be held likewise in the hand. Again, the detective camera is very conveniently carried, always set up, and ready for an exposure. And last, but not least, we can alter the stop of the lens or speed of the shutter in less time than it takes one to write it. Many persons seem to think that this is all that is needed to enable them to take any kind of picture. That this is far from correct is only too painfully understood by the thoughtful worker.

When speaking of instantaneous pictures, Mr. H. P. Robinson says: "Instantaneous pictures of a sort have become so easy of accomplishment that our exhibitions are flooded with them. The photographs may be very useful to painters, because they are real bits from nature—real machine views, at least; but they are not art. Yet if you look through an acre of them you will find every now and then you will come upon a gem."

On looking through my work done with the detective camera, I have

noticed that the greatest failures arise from bad focussing, or shake of the camera when pressing the trigger of the shutter. Of course there are other faults, such as, that some of the subjects were not worth taking; but then this applies to nine-tenths of photographic work, let it be with the detective or field camera, it matters not which.

Focussing.—This is a most important matter, for however good otherwise the picture may be, if it is not in good focus then it is practically useless for enlarging from or making lantern slides, whilst as a print it is anything but satisfactory. On looking over the many faults and errors made by myself and others, I find that, perhaps, quite twenty to thirty per cent. of the exposures made are, to more or less extent, faulty in this respect. In some price lists of lenses we are told that a certain lens of six-inch focus will define sharply all objects over nineteen feet away, when using the lens at $f-8$. That this is not borne out by my $5\frac{1}{2}$ -inch Wray lens there can be no doubt, for with $f-8$, and keeping the distance reasonably sharp, the objects in the foreground to be in focus must not be nearer than forty feet, whilst with $f-5.6$ neither I nor a photographic friend can get any sharp focus at all, thereby showing that this power, as a working one, is purely imaginary. We are also told by experts that the depth of definition of a lens is governed solely by its length of focus, or, to put it in other words, that all lenses equal in focal length have the same power of depth of definition. This then being so, it can be easily understood why a lens of comparatively short focus (that will cover the plate well) is the best for use in the detective camera, for its real value and suitability lies in its power of giving great depth of definition, which is so valuable in a picture. This then brings us to the question, What is the proper focus, say, for a 5×4 plate? Having worked two lenses on this sized plate of $5\frac{1}{2}$ and $8\frac{1}{2}$ inches focus respectively, I find that the best focus for general use is one not over 6 inches, not even excepting shipping work, which is usually considered to require long-focus lenses. Of course, if you cannot get near enough to the objects, then a long-focus lens is a necessity. Many of you use finders with your detective cameras, I do not, as it requires but very little practice to enable one to know the angle the lens gives; besides, how can any one snap his shutter at the right moment unless he is carefully watching the object instead of looking at a finder, which gives so small an image that makes it practically impossible for him to see the various changes properly. If I do use a finder it will be for the purpose of obtaining a finer focus of the objects exposed upon. For instance, I would first place a man just sufficiently far away from the camera as would with say, $f-8$, or other stop in general use, give me the man and extreme distance equally sharp. On the ground glass of the finder I would then mark in parallel lines the length of the man; I would then place him at a nearer point, and again show the length of the man on the ground glass, and so on, until the man was of such a size that it would be unwise to proceed further on account of the great lack of depth obtainable in the picture. About three different sizes would be found sufficient. And now another matter may be mentioned; when working with very large apertures, pictures are often found faulty in focus on either the margin or middle. Now this is not always the fault of the lens, but of the worker, for two persons may work with the same lens and stop, and on the same view, yet one picture may appear better focussed than the other, for while one focusses sharply on the centre of the plate, the other does so on the whole of it, and thereby obtains sharpness generally.

To illustrate this, I will ask you to look at this group taken on board ship. You will notice how sharp the persons in front are, whilst those at the back and sides are far from sharp. The stop used was $f-16$, and this one might have thought would have brought all into focus, but no; the picture has been spoiled by my not focussing a point further off which would have brought the two sides of the picture into better focus, and thus have equalised the focus all over the plate, which the lens would do if properly used. Therefore, when I determine an object to be in focus at, say, five yards distance, I choose that it be only just in focus, and thus throw the difference on further objects into focus at the same time also. It is only by careful attention to these trivial points that the detective camera can be used successfully, not to say intelligently. And now we come to consider how the camera should be held when the plate is being exposed. Some, or perhaps I ought to say most, people hold it under their arm, at the same time peering into the view finder. I myself prefer to bring the camera up in front of me, and whilst keeping my eyes fixed on the object, waiting for the correct moment to press the trigger. I may here mention that some time ago I developed some instantaneous shots for a professional friend (or, I should say, dealer) who did not like to risk spoiling the plates himself, as they were for a customer who was an artist. They were all views of fishing-boats and men, and I think I never saw such a capital collection of incidents. Somehow or other the figures were all caught at the right moment, neither too soon nor too late.

Quoting Mr. Robinson once more, he says:—"Nothing but a sound knowledge of those laws and constant practice will enable a photographer to make the immediate and lightning-like application of them which is necessary in instantaneous photography. In photographing scenes containing groups of figures, the best artists will get the best pictures. A photographer without a knowledge of art would simply 'fire into the brown of them,' as a sportsman would say, and trust to luck; while a photographer who knew something of the rules of composition would wait until his figures arranged themselves to advantage, and would know when was the best moment to pull the trigger of his camera."

Development.—After many trials of different developers for instantaneous work I decidedly prefer the following, namely:—

Sulph. pyro.....	20 minims.
Saturated solution soda	90 "

to each ounce of developing solution.

The sulph. pyro referred to is that made by Messrs. Sharpe & Hitchmough, of this city, which is said by them to contain one grain of pyro in every ten minims of solution. The saturated solution washing soda is made by putting into a jug a pound or so of the soda, and then pouring over it a small quantity of boiling water, after which the saturated solution is poured off and then filtered into the stock bottle. When quite cold crystals are formed, clearly showing that the solution is really a saturated one. I use no bromide whatever, as I have not found it at all necessary, even with plates over-exposed in the ordinary camera. As an instance of this I may mention that not long ago I gave a 10×8 plate eleven seconds with *f*-11 stop on an open landscape, and developed the plate with the maximum quantity of soda, and I neither got fog or flatness of image, because, as soon as I noticed the image flash up, I quietly made up a fresh developing solution with plenty of pyro in and no soda, then poured off the first developer and applied the latter, which quickly gave me the density, or rather, I should say, gradation, desired in the negative. With the detective camera all the plates, being under-exposed, require forcing in development, therefore I would advise that on no account should the pyro be at any time stronger than 20 minims to each ounce of developer, as, if so, the resulting negative is certain to be too hard or chalky, a disadvantage which afterwards cannot well be remedied, whilst a thin negative is always capable of being improved by intensification during development, or even after being fixed. The importance of keeping back the pyro cannot be too strongly put before you, this, and not the accelerator, being the key-note of the resulting negative.

Plates.—Those I prefer are Edwards's Isochromatic. My reason for this is (1), they are better coated; (2), trifle more sensitive; and (3), more suited to the ever-varying conditions of light than any other plate in the market. If expense is an object, this may be met by being more particular as to choice of subject, and thus expose a less number of plates, or when changing the double backs have half only of those mentioned and the other half either Fry's or Ilford Ordinary, using the latter when the light is at its best. That this is an important point in detective camera work I will prove to you by the four negatives I now pass round for inspection. The plates used were Wratten's Special Extraordinary, time of exposure about 6.30 in the beginning of June; light, bright sunlight, but very yellow—so much so, in fact, that do all I would I could not get density even in the sky, and yet where the whitewashed or painted roofs of the warehouses and the white sails of the boat come in these are dense enough. I am certain that had these plates been Edwards's Isochromatic I should have obtained a much better quality of negative. In dull or cloudy weather also, isochromatic plates are much more sensitive than the others named, thus enabling the operator with these plates to obtain detail in his negatives that would without doubt be lost if the cheaper ordinary brand of plates were used. There is also another advantage these (and, indeed, Carbutt's and other expensive plates) have over the cheap brands, and that is the ease with which they will re-develop up to proper density after all detail is got out of the plate. This is a most important factor, inasmuch as all plates used in the detective being under-exposed. This allows us to first develop out all detail, after which the pyro may be added, and a negative made that will do for silver or other printing, as the operator wishes.

Shutters.—The form of shutter I use is, as you see, a "Kershaw," the release being a press button. I don't know that this can be beaten, as unlike the string and other arrangements for this purpose the release does not jerk the camera. I do not, however, find the Kershaw fast enough for athletic sports or racing subjects, but as I am not anxious to make *silhouettes*, but pictures, the speed is all I require. I would, however, prefer a Thornton Pickard "time and instantaneous" shutter if I were buying another one, it being, I think, a faster, and certainly more generally useful article. Referring again to speed of the shutter, unless the

objects are very close and large, about eight turns of the tension spring is quite sufficient, my object being to get the maximum of exposure consistent with the non-blurring of the objects in the picture. I confess to a liking for a small amount of blur in street pictures, as they give some idea of motion, and do not look so stiff as when without blur or absolutely sharp. The distance of the subject must rule the speed of the shutter. If very close the speed must be great, but if reasonably distant then a few turns is all that is required.

In the foregoing I have dealt with my method of working the camera, and must now confess that the results of detective work are far from being satisfactory, or all that can be desired. I honestly believe that it, in one way or another, costs more, or at least as much, as working a whole-plate, and then what is the average of good work? It is almost fearful to contemplate; but, of course, some persons may be so easily satisfied that they put all their negatives down for gems, provided they give a print at all. As an instance of this, I remember reading in a photographic annual an article written by a well-known amateur, who claimed for a certain picture he had taken that the principal object was quite sharp and full of detail, whereas, having seen a print from the negative, I find that—(1), the object is not even in proper focus; and (2), it possesses little or no detail whatever. The latter I do not find fault with, as such a speed of the shutter must of necessity not admit of much detail being secured. It may be thought clever to photograph trains quite sharply running at the rate of, perhaps, fifty miles an hour, but, at any rate, it is not art. It would be interesting to criticise some of the many pictures which some writers speak so glibly of in our photographic journals. I am afraid the gilt would fall off some of them if carefully analysed.

And now, in conclusion, those who intend going in for detective work need not despair of success in the highest degree, provided they will work it in an intelligent manner, or, in other words, not expect their machine to do all that is requisite, but use their brains also. H. WILKINSON.

NOTES FROM NEWCASTLE.

THE approaching visit of the British Association is beginning to absorb public attention. It should have special interest for local photographers from the fact that Captain Abney is the President-Elect of the section Mathematics and Physics. Captain Abney has done, and is doing, such good, sterling work in connexion with the art-science, that I really think some effort might have been made on the part of the local devotees of the art to give him a suitable reception. The only local photographic society, as far as I am aware, is doing nothing in the matter; but I suppose it would be too much to expect this moribund body to do anything of importance.

Various handbooks have been published in connexion with the visit of the British Association, amongst others, an *Official Guide to the Industries of the Tyne and District*; an excellent paper on photography being contributed by Mr. Edwin Dodds. I don't know that I should have considered Mr. Dodds an authority on this matter any more than a dozen or two other gentlemen I could mention, but I must say, after reading the paper, that for good taste, expression, and as a clear and simple statement of progress, nothing could be better.

Mr. W. W. Tomlinson's comprehensive guide to Northumberland is a most excellent and interesting work, and should be on the shelves of every member of the craft in the county. Mr. Tomlinson divides the county into sections, e.g., Newcastle, Hexham, Morpeth, Rothbury, Bamborough, Alnwick, &c. &c. Every town and village of any interest whatever is described for the full benefit and information of the antiquarian, artist, and botanist; all the hills, loughs, crags, churches, ancient British camps, castles, and pell towers, the Roman wall, stations, and camps, ruined churches, chapels, and monastic houses, being properly described in due order. In addition to proper directions as to route, Mr. Tomlinson does not forget the hotels and places of accommodation for travellers. I would like to see every county in England and Wales treated in the same comprehensive manner. I have already heard of two amateurs who are now "doing" Northumberland on the lines laid down by Mr. Tomlinson.

Newcastle just now is certainly well supplied with photographic material, no less than five chemists now dealing, more or less successfully, in apparatus, &c.; and for prices I should say nowhere are they lower. Schering's pyro, in one ounce bottles, at 10s. 3d. a dozen; hypo soda at 7s. per cwt. cask; and fifteen per cent. off list prices for Lancaster's cameras, &c., is pretty good cutting. This sort of thing may easily be overdone; but I saw in one shop an enlarging lantern, with six-inch condensers and front lens, &c., at 6l. 6s., an exact counterpart of one in a London list (just received) without front lens for 9l., which shows that some of our retailers make big profits.

Returning by tram the other day from a short photographic excursion, I was honoured with some friendly confidences by the conductor, who, presuming upon my "legs," informed me, amongst other family details, that he also was a photographer, and had been out at the Cape, where he used a 15 x 12 camera, and had taken some excellent views for the Government with one of Dallmeyer's aromatic triplets!

EIKONOGEN AS A DEVELOPER FOR BROMIDE OF SILVER PAPER.

(Abridged.)

EVERY one who has experimented with bromide of silver paper will agree with me that iron oxalate, the developer hitherto most generally employed, although giving on the whole fairly good results, is not free from certain drawbacks. Among these I may mention the yellow iron spots which, in spite of the most careful manipulation, cannot be prevented from occasionally making their appearance, and the expense entailed by the considerable quantities of this reagent necessary for developing prints of large size. Another inconvenience, to which, however, we have almost become accustomed, though that fact does not diminish the annoyance, is the soiling of fingers, measuring glasses, dishes, &c. Some persons have sought to substitute hydroquinone for iron oxalate, but as far as my knowledge goes this reagent is not generally adopted for developing positives. At this I am not surprised, for the development with hydroquinone, which is very gradual, occupies a considerable time, and at the present day time is more valuable than ever. Many, too, have probably been deterred from employing hydroquinone by its high price. For whatever may be said in favour of the repeated use of the same developer, I have only been able to obtain really good contrasts of light and shade, with clear "whites," by using a perfectly fresh developer, and applying it only once. Iron oxalate is therefore still, even at the present day, in common use in spite of its defects. It seems, however, probable that it will in a short time be completely superseded by eikonogen.

The directions issued by the manufacturers of the latter reagent state that "old developer" should be employed to bring out the image, and fresh solution to intensify. I already stated some time ago, in the *Deutsche Photographen Zeitung*, that my experience showed that the results thus obtained were not very perfect, except in the case of over-exposed plates, when the best method of working is to commence with old developer to bring out the lights, and to finish off with fresh.

It is otherwise in developing positives. Here the developer, when made up according to the receipts given, acts much too energetically, and attacks the whites even after short exposure, producing, however soon one may stop the development, a monstrous, ineffective sort of image. As the composition of eikonogen is at present unknown, I didn't venture to alter the make-up of the developer, but contented myself with simply diluting it. In my experiments I employed Eastman paper, which, being of medium sensitiveness, enabled me to hit off more regularly the proper length of exposure. The developer when diluted certainly gave a better image, though it was still much inferior to that obtained by oxalate after similar exposure—the whites being hard and chalky, and the shades having an unpleasant green tinge, which neither a bath of water with three per cent. acetic acid, water acidulated with hydrochloric acid, or the alum bath, could get rid of. The addition of bromide of potash increased the hardness without imparting a good black to the shades.

As there seemed little prospect of improvement by continuing in this course, I experimented with a developer that had been already used, selecting one which had been employed for the development of a negative. The result was immediate and astonishing. Without any addition, without any dilution, I obtained an image with pure black shades, well modulated half-tones, and clear whites, in the softest and most harmonious gradation. The lighter half-tones especially showed a delicate silver-grey, such as one but seldom obtains with iron oxalate, and in the case of highly sensitised paper only when one has taken enormous pains to hit off the exact period of exposure. I developed three more positives that had been exposed for the same length of time in the same portion of developer, and obtained equally satisfactory results. After a variety of experiments, which space here keeps me from enumerating, I believe myself to have established the following method of procedure as the most satisfactory, and venture to recommend it herewith.

I make up the developer according to the directions given in the prospectus, and employ two different solutions. For each negative I take a fresh quantity of the developer and filter it, after finishing the development, into a long-necked flask, provided with a ground-glass stopper, which is always to be kept tight, that the liquid may, as far as possible,

be protected from the action of the air. Of course, developers to which bromide of potash has been added must be kept separate. This flask I mark "1." To bring out the image, the paper, after exposure, is softened by immersion in water as usual, and after the water has been poured off a suitable quantity from flask 1 is added. When the time of exposure is right the image is developed at such a moderate pace and so regularly that one can control the process excellently. When sufficient intensity has been obtained the developer is poured quickly off into flask 2, and the print in the dish rinsed repeatedly with water. Acidulated water is unnecessary; the image being fixed in the ordinary way with five per cent. soda solution; a subsequent alum bath is also unnecessary, as I have never found that crumpling takes place. The developer in flask 2, if kept well stopped, can be employed over again several times. I have gone as far as developing five different prints with the same solution, though I remarked that the development took place in the case of the last ones rather more slowly; the tone and the whites, however, remained satisfactory in all cases where the development was not in fault. On exposing a little too long, and developing with a solution employed several times before, the image attains a warm sepia tone that, though unsuitable for enlargements, imparts to landscapes a very charming effect.

I possess no data as to whether the developer permits of being subsequently regenerated, as my knowledge of chemistry is not sufficient to enable me to carry out experiments of this kind. Whether this should turn out to be the case or not is of very little importance, as the developer has in any case done its duty to the full. After drying, the photographs developed with eikonogen display a delicate silky brilliance that I have not hitherto seen obtained with gelatine paper.

A further advantage of this process, which should not be undervalued, is its great cleanliness—neither hands nor utensils being stained in the least, and no yellow spots appearing on the paper. That the developer in time becomes brown, as also the soda bath, after frequent using, does not affect the process in the least.

Above all, its extreme cheapness must not be left out of consideration. The price of eikonogen is 25s. per kilo (about 12s. per pound), at which many of my readers will probably shake their heads; but examine the figures. To develop a photograph 75 x 100 c.m., for example, one requires at least one litre of mixed oxalate developer, the cost of which is at least 60 pf. (7d.), and this can only be employed for one print; now the eikonogen developer not only costs nothing at all, since it has already paid for itself in developing negatives, but can also be employed over and over again. It may perhaps be objected that with pictures of this size the price is generally such that a small saving is scarcely worth considering; but he who does not reverence the penny will not soon be in a position to invest in the funds, and in a large business the saving is worth considering.

All things taken into consideration, I am of opinion that the new developer is destined soon to gain for itself a large number of friends, and this will be the case still more whenever it throws off its mysterious incognito, and appears before us either as an old acquaintance or as a new edition of the egg of Columbus. For the thoughtful operator there is always something unpleasant in working with unknown reagents, even when they possess such excellent qualities as eikonogen.

—*Deutsche Photographen Zeitung*.

C. HINCKELMANN.

THROUGH JAPAN WITH A CAMERA.

CHAPTER XI.—Nikko (continued)—THE JAPANESE LANGUAGE—JUSSENI—YOMOTO.

AT Nikko I was thrown on my own resources in the matter of language, and the Japanese language is a fearful one for foreigners. It is, in fact, a language that no foreigners really learn, except a few who make the learning of it their sole occupation for years, and even these get expert in it only if they are naturally good linguists.

There are two distinct languages, the written and the spoken, besides many variations of both of them. It is the latter that the foreigner generally tries to learn, and fails. Even it alone is probably about as great a task as to learn five or six European languages. One peculiarity of the language is the use of "honorifics." This means that every word, besides its own peculiar meaning, expresses the humility of the speaker, or his respect for the person spoken to, or conveys an opposite meaning. Besides this honorific modification of ordinary words, there are special honorific words and particles, and when a Japanese wants to be remarkably polite he dilutes all his ideas with these honorifics.

To take an example of what I mean by words having, besides their own meaning, a honorific significance: there are no less than twelve Japanese words for our word "wife." These words are all different, and represent a graduated scale of politeness. Of the first, or least polite of all, the

dictionary maker quaintly remarks that "A man may use it to his own wife, or to others to whom it is not necessary to be over polite."

The Japanese learn foreign languages with wonderful facility, considering the difficulties that are in the way of them. The greatest of these is that they have to learn a number of new sounds. The Japanese language is syllabic; that is to say, it is made up of a number of syllables—about seventy—each consisting of an initial consonant and a vowel. There is only one final consonant, namely "n," and those who have not been specially trained in foreign languages cannot pronounce any word which is not made up of these syllables. The result is sometimes curious. Thus, the one English expression which is known almost all over the country, "Good-bye," is generally pronounced "gooroo-bye." Foreigners find it necessary, as a rule, to adopt modified names with the uneducated natives. I am tolerably fortunate, as they can come as near my name as Booroton. An unhappy German, who has recently come to Yokohama, and bearing the unfortunate cognomen of Kuchler, has had his name Japanified into "Kokirooroo!"

Sometimes English inscriptions are put over the shops in the larger towns. Some of these are curious, being evidently constructed with the aid of a dictionary. Thus, there are in Nikko two shops owned by the same individual. One has printed over it "Root Store," the other "Diverging Shop;" evidently intended for "chief store" and "branch establishment." Sometimes phrases which must have been picked up orally are used as words with very strange results. One such case I remember is so very remarkable that I may give it. I relate the incident precisely as it occurred, but lest some of the expressions be considered too strong for the British reader, I must ask the Editor carefully to read the tale, and, if he considers it necessary, to introduce a judicious blank or two, so that, leaving the meaning clear, the eye may yet not be offended.*

I was conversing with a Japanese lady—or it would be more correct to say I was attempting, through the medium of my few miserable scraps of Japanese, to hold converse with her. She had shown no symptom of knowing or imagining that she knew any word of English till reference was made to a certain man, when she made the following astonishing statement, all in Japanese excepting the astounding compound adjective, "Oh! I don't like him; he is a God-damn-you-a-disgrace man!"

One understands readily enough, it being predicated that "shito" is the Japanese for man or men, how English sailors in Yokohama come to be designated "Damn-your-eye shito," but as to how the wonderful phrase given above was incorporated into the vocabulary of the Japanese lady as an English adjective, affords much food for unsuccessful speculation.

At Nikko is a very old bridge—three or four hundred years old, I was told—which is closed to the public. It is said that it is reserved for the use of the Mikado, and of certain other great personages. I consider it remarkable as exhibiting a peculiarity of Japanese structures. The upper part of the bridge is of wood; the supports are of stone. The Japanese are not a mechanical people. I don't mean to say they are not clever with their hands; they are exceedingly so; but they are not a mechanically inventive people, and when, in their structures, they came to adopt stone in the place of wood, they retained precisely the old shapes, as seen in the case of the stone supports of the bridge shown in the photograph. Apparently they were ignorant of the principles of the arch until it was recently imported from the West.

The Torii was undoubtedly originally always made in wood, and it will be noticed that the form is one well adapted to a wooden structure. It is still most frequently made of wood, but is often made of stone, and occasionally of bronze; but of whatever it is made, the form is kept precisely the same. This is not, I believe, because the precise form is one which has religious significance, but simply because the Japanese have not the mechanical instinct which induces Westerners to adopt a change in the form of a structure to suit any change in material which may be made.

From Nikko it is a glorious walk to a great lake, called Jusenii, and further to a hot spring village, named Yomoto. The walk is through a deep valley with a steep ascent from Nikko to Yomoto, 3000 feet, or thereby; and there are in the valley some of the most glorious waterfalls that I have ever seen, a river at places leaping clear over a precipice of three or four hundred feet high into a deep and gloomy gorge below.

I did not photograph any of these. I saw many photographs of them in Nikko, many excellent, but none that conveyed any idea whatever of them to one who had not seen them, and, to tell the truth, I believe that photography is not capable of giving an idea of them.

W. K. BURTON.

* It is surely a curious case of folly, this which permits the use of an "improper word" in print if part of it is represented by a blank, although the meaning remains as clear as if the word were written in full. I believe it has its origin with the sensitiveness of writers. They find it necessary occasionally to make use of such a word, but are in terror lest readers should suppose them so lost to all sense of decency as not to know that it is a bad word. They therefore adopt the use of a blank to indicate to the same readers that they (the writers), although they have to use a naughty word, are fully aware that it is such.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

- No. 15,892.—"Improvements in Photographic Dark Slides." R. W. THOMAS.—*Dated September 3, 1889.*
No. 14,126.—"A Combination Camera Stand and Case." F. BARR.—*Dated September 7, 1889.*

PATENT COMPLETED.

IMPROVEMENTS IN CAMERAS AND IN TRIPOD STANDS FOR THE SAME.

No. 13,868. JOHN WILLIAM RAMSDEN, Park-lane, Leeds, Yorkshire.—*August 17, 1889.*

THE object of my invention is to facilitate the setting up and the manipulation and adjustment of the camera, the closing or packing up of the camera, also to render it more convenient or compact for transport, and to increase the capabilities or capacity of the apparatus.

My invention refers, in the first place, to improvements in the construction and fittings of the base or bed-piece of the camera. Such base or bed-piece is formed as is usual in two parts, the one which is clamped to the top of the tripod stand being capable of being slid along the middle or centre part of the other to which the camera back is attached, or, more strictly, the latter is capable of sliding over the former when the same is attached to the top of the tripod stand. This outer sliding portion just referred to is provided with two longitudinal (i.e., in the direction of the sliding motion) slots or slits, through which pass the screws or studs for securing or clamping the back of the camera in position. The two portions of the base-piece are secured in their relative positions (to which they may have been adjusted) with regard to each other by the same screw or clamp by which the inner portion is secured to the top of the tripod stand. The final adjustment to focus of the camera back is effected by sliding the above-mentioned screws or studs in the before-mentioned slots or slits. These slots or slits are somewhat wider than the portion of the studs or screws passing through them, which allows the camera back to be inclined slightly towards one side or the other.

Secondly, to the attachment and fittings of the camera back. The camera back is not attached directly to the base or bed-piece, but is hung or hinged to a metal carrier, this latter being securely clamped to the base or bed-piece by the screws or studs. A slot in the carrier and a pin or screw passing through the same into the side of the camera back, limits the swing or inclination to the vertical of the camera back.

The frame of the image or focussing plate and also the dark slide are secured in the camera-back frame by means of short hinged plates, which are turned across the two top corners of the frame of the image or focussing plate instead of being slid along grooves.

The front side of the camera-back frame is provided with spring clips for holding the camera cloth or screen.

Thirdly, to the mode and means for inserting or holding the plates in the dark slide. The plates are inserted in the dark slide from the front, by inserting one end or edge of the plate in a groove provided preferably in the top side of the dark slide. This groove is provided with two or more springs, which yield when sufficiently pressed, allowing the bottom end of the plate to be pushed back flat into the slide, when the springs just mentioned force the plate, so that the same or bottom edge of the plate enters a groove provided therefore in the corresponding bottom side of the dark slide. This groove, however, is not sufficiently deep to allow the first-mentioned edge of the plate to pass beyond free from the groove containing the springs.

Fourthly, to improvements in the lens attachments. The front piece containing the lens is arranged capable of fitting sliding in tightly-fitting slides or guides at the front end of the camera box, and is attached to a pillar (D-shaped in cross section), which latter fits and slides in a corresponding hole or socket at the front end of the inner base or bed-piece, in which hole or socket the pillar can be secured at any desired height up to the extreme length of the pillar. The first portion of this arrangement allows the flexible sides of the camera box to be conveniently folded back for packing up, whilst the latter part of this arrangement allows of the lens being fixed close down to the base or bed-piece of the camera, or fixed at any height up to the extreme length of the pillar. This arrangement allows of the camera being readily and properly adjusted in many situations where it would be difficult, if not impossible, to obtain a proper adjustment with the tripod stand alone.

Fifthly, to the form or shape of the dark slide (which is usually arranged to take oblong plates), but I prefer to make the same square, and to take an exposure with the largest possible square field of view, the impression being printed from part only or the whole of the plate, so as to give an upright, oblong, circular, or square picture, as may be deemed to give the best effect.

Lastly, my invention refers to a special construction of the tripod-stand legs. As is usual, the lower half of each is made capable of sliding over or within the upper half, but according to my invention the lower half as well as the upper half is split, the two portions of the lower half being hinged together near the bottom. The split portions of each leg can be opened out and tied across by means of a hinged bar or bars fixed at any convenient height, preferably near the brass or metal slides connecting the upper and lower portions of the legs.

The claims are:—1. A base or base-piece formed in two portions, the one sliding outside the other and provided with slits or slots for facilitating the adjustment of the camera back to focus. 2. The arrangement and use of a swing carrier for supporting the camera-back frame from the base or base-piece so as to be capable of adjustment. 3. The combination or arrangement of lens plate and pillar attached thereto—with slides or guides attached to the camera box or bellows, the former capable of sliding in the latter so as to facilitate the closing or packing up of the camera. 4. The means herein set forth for adjusting the camera-back frame about an horizontal and an imaginary vertical axis with respect to the base. 5. A lens plate attached to one end of a flexible camera box or bellows and connected by a sliding connexion to the base. 6. The combination of lens plate and pillar with a socket in the base-piece for the

purpose of adjusting the height of the lens above the base. 7. The arrangement of grooves in opposite sides of the dark slide, one of such grooves being provided with springs, all substantially as described and shown and for the purpose specified. 8. The means substantially as described and shown for securing the dark slide or focussing plate in the camera back, consisting of hinged plates at the top corners and a recess (or projection) in the bottom of the camera back, with corresponding grooves or slits in the corners, and a projection (or recess) on (or in) the sides of the dark slide or focussing plate. 9. A base or base-piece formed in two portions, the outer portion, which slides over the inner, formed in two pieces connected together at one end by a broad flat plate, and at the other by a hinged cross-piece, substantially as described and shown. 10. A tripod stand with the legs constructed in upper and lower halves, the one capable of sliding over the other or within it, both halves being split, the split portions of the lower halves being hinged together at their lower ends, and provided with hinged bars for tying across the split portions when these are opened out.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 17	North London	Myddelton Hall, Upper-st., Islington
" 17	Bolton Club	The Studio, Chancery-lane, Bolton.
" 18	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 18	Bury	
" 18	Hyde	
" 18	Manchester Camera Club	Victoria Hotel.
" 18	Edinburgh Photo. Club	5, St. Andrew-square.
" 18	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 19	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 5.—Mr. P. Everitt in the chair.

Mr. A. M. Hastings showed a lens by Taylor, of Leicester, intended for detective camera purposes. It was fitted with an iris diaphragm and with Shew's spring shutter. A photograph illustrating the power of the instrument was also shown.

Mr. FRIESE GREENE then exhibited some photographs printed upon what he termed opal cards, also some printed upon sheets of white celluloid shaped and embossed in ornamental fashion with a raised flat space for the portrait. The printing was done by means of a gelatino-bromide emulsion, and the process of printing, developing, and fixing was demonstrated to the meeting, the exposure being made with a gas flame at a distance of about fifteen inches, for a time of from three to five seconds. Mr. Greene also read the following paper, dealing with the process and with some other photographic topics:—

Photography has so many attractive applications to one thing and the other at the present time that it has too much the effect of distracting the attention of some of the most important questions which it raises, such as the chemical and art knowledge which is in its power to revolutionize. Yes, we photographers can honestly say that now, especially to those who approach photography as a mere mechanical operation, and say that we need not possess taste, imagination, or even a knowledge of the rudimentary elements of pictorial art; some will say no mechanical process can long supersede the living agency of man's mind, and that photography is and never can be anything more than a servant of servants; and they will use arguments neither novel nor ingenious to say that photography cannot maintain the positions in which we admirers of the wonderful processes connected with our art are placing it. Now these remarks do not make the slightest impression on genuine practical workers; it is like water on a duck's back to me, and if I have anything to carry out I generally put wool in my ears until it is finished, or, at least, until the difficult part is over. I admit we lose a lot of thoroughness, or what ought to be done thoroughly, through the excitement produced by the marvels of the science, such as the want of taste in the point of view selected to take a picture, and the noticing of curious phenomena which crop up during our laboratory experiments, but as long as the world lasts we shall always have that; but what I mean is, for us to look at the progress year by year photography is making into everything. Chemists taught us at first, it will be soon, if we work earnestly, the reverse. We shall teach the chemist, for the more I consider the chemical question in relation to photography, the more strongly it forces itself to my notice, and I look forward to our occupying much larger space in the domain of chemical inquiry than is the case at present. The relation of light and heat and electricity is having plenty of fun with photography at present, but they must mind photography does not have some fun with them by and-by, and if photography is not a relation it will find out what relation one is to the other. There is plenty of food for photography to digest in the chemical rays of the electric spark causing the combination of oxygen, also measuring numerically the quantity of light absorbed in different chemical actions. It seems hardly possible not to indulge a hope that the pursuit of photography in chemical inquiry may, by degrees, conduct us to a mechanical theory of chemical action itself; so far for the field of photography in the way where day by day we can go on improving. Look at the grand lenses made now, and the results we obtain through them; but we still want magnitude, and the beauties of perspective not diminished. There is a good field for lenses. We photographers should not be too frightened of getting the sun into our lens, and turn our back on our best friend, and lose all the cross shadows which give the stereoscopic effect to a picture. I have found the most pleasing effect produced where the sun is shining towards the lens. Now, as to novelties, I am going to show you a few to-night. Firstly, my opal cards, which I will demonstrate; secondly, those few ivory pictures, upon which I should like to hear your candid opinion, therefore I will say nothing more about them, but pass them to you; thirdly, I have brought this scroll, as I am anxious to know if any one can tell as how the ornamental border is done. It is not done in England; I have never seen anything so fine produced here. Still, we are not beaten in everything, not even by our American cousins, for here is a camera with one movement constructed to take three or four pictures a second by simply turning a handle, a thing which has never been accomplished before.

The CHAIRMAN invited discussion and questions upon it.

Mr. W. E. DEBENHAM inquired what was the complaint which Mr. Greene had to make against the perspective yielded by photographic lenses.

Mr. GREENE said that near objects were rendered disproportionately large,

and added that he had particularly noticed this when taking the Convention group, and trying to have a figure in the foreground; moreover, he could not get foreground and middle distance in focus at the same time.

Mr. DEBENHAM maintained that the perspective given by the ordinary non-distorting photographic lenses was absolutely correct, and represented objects in the position in which they would appear on a sheet of glass held in front of the eye of an observer placed in the same position as the camera.

Messrs. A. H. HADDON, COOKE, and ATKIN endorsed this view.

With regard to a remark of Mr. Greene's referring to an attempt to photograph a positive direct in the camera, the CHAIRMAN said that on one occasion he had added some solution of ferricyanide of potassium to the developer in mistake for pyro; the image on the plate disappeared, and on washing and developing with a fresh solution a positive instead of a negative image resulted.

Mr. HADDON inquired whether the opal cards upon which Mr. Greene made his prints were absolutely waterproof.

Mr. GREENE replied that they were so for a short time.

Mr. HADDON said that there was a great want of a really impervious varnish for many purposes in the arts.

Mr. GREENE said that he had had several applications for the varnish that he used for different purposes, one being for making water-tight wrappers for tea.

Mr. COOKE wished to know how long washing the cards would bear.

Mr. GREENE replied: Three minutes. A great advantage of these cards was that two or three dozen prints could be delivered the same day. Sepia tones could be obtained by modifying the developer. A print illustrating this statement was handed round. In preparing the cards it had been found that the ink with which in some cases they had been printed had caused a plentiful crop of spots and fog, reminding one of the messes on a wet collodion plate.

Mr. F. W. BRIDGE inquired whether it would be possible to obtain this waterproof material for photographers to apply to their own cards.

Mr. GREENE replied that in time that would be arranged.

The CHAIRMAN inquired whether the prints on celluloid would stand fairly rough usage.

Mr. GREENE: Yes.

Mr. J. J. BRIGHNSHAW inquired whether the celluloid was coated with emulsion in the same manner as the cards.

Mr. GREENE said that it was, but in order to overcome the repulsion of the celluloid it was first treated with wood naphtha.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 3.—Rev. E. Healy in the chair.

Mr. P. SPENCER, who had just returned from India, showed views of buildings, balloon ascents, groups of Indians, &c.

The Chairman, and also Mr. W. Bishop, showed views taken by them during the summer.

Mr. SPENCER stated that an unfortunate accident happened to his lens while travelling over rough roads in India, one combination having been reduced to powder by the vibration. He supposed that the glass must have been a little loose in its cell, but advised members to carry their lenses in such a way as to avoid all risk.

The CHAIRMAN advised the use of spirits of turpentine for reducing halation in negatives, as more powerful than methylated spirits.

The next meeting will be on September 17, at eight p.m.; the subject will be *Holiday Experiences*. Members and visitors are invited to bring prints and state experiences.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

SEPTEMBER 6.—The President (Mr. F. W. Edwards) in the chair.

Seven members were elected and one proposed.

Further contributions of lantern slides were made by Messrs. Dowling, Gardner, and Kelly.

A large number of prints and negatives were handed round for inspection, amongst them some fine 24 x 18 platinotypes by the President.

Next meeting on Friday, October 5, at 76, Peckham-rye. Paper on *Lenses* by the President.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

AUGUST 29.—Mr. A. W. Beer in the chair.

The minutes of the previous meeting were read.

The following gentlemen were elected:—Messrs. J. W. Smith, William Whiteside, Walter De Wolf, and C. Mortimer Booth.

Reports were given upon the excursions recently held. That to Tonge, Boscolob, and Lillishall Abbey consisted of a small party, who enjoyed fine weather and had a pleasant outing. Twenty exposures were made with fair results. The excursion to Pont-y-Pant, on July 22, was held under less favourable weather. The party consisted of six, and fifty exposures were made. The excursion to Eastham Lake, on August 10, was affected by St. Swithin more or less, indifferent weather prevailing; however, a pleasant day was passed. Seventeen took part in the excursion, and sixty exposures were made. Mr. Forrest showed prints taken on the occasion. The excursion to Raby Mere, on Saturday, August 24, consisted of twelve; sixty plates were exposed. The weather was mixed, and, owing to the heavy rain prevailing for the week previous, the lanes gave some trouble, causing many divergencies to avoid the mud, &c.; however, some very good subjects had been met with, and the day was pleasantly spent.

Mr. H. WILKINSON then read his paper on *The Intelligent Use of the Detective Camera*, which proved of great interest.

A short discussion followed, in which Messrs. Illingworth, Pearson, and Lange took part.

The PRESIDENT was of opinion that Kershaw's shutter was quite quick enough, as seen by Mr. Wilkinson's prints, which were of a very good order,

large in quantity, and artistic results being secured. He considered it mattered very little how the camera was held so long as the results were satisfactory, and thought the discussion would be useful in throwing minor lights on the subject. We know what an exceptional experience it is to obtain a large proportion of good results from hand camera work, therefore any practical notes for the more successful working of the shutter box should be worthy of very careful digestion and assimilation.

A cordial vote of thanks was then passed to Mr. Wilkinson.

Messrs. Earp & Swinden's detective camera was then exhibited, the principal features being—twenty plates carried, or any less number; plates changed instantly by a single action, and without opening the camera or attracting attention; compact and of small dimensions; an intermediate shutter which cuts off all light from the plates is provided; has a door at the side, so that exposed plates may be removed when required; no carriers used, each plate being backed with non-actinic paper; provision is made for vertical as well as horizontal pictures; it may be used on the tripod for ordinary or slow exposures; has a rising front; the lens carrier is moved by rack and pinion worked underneath, so as to focus for various distances; it is provided with a view finder and Kershaw shutter.

Mr. H. J. NICHOLLS explained a recent improvement he had applied to his hand camera, by which the "cannon-like optical hole" was covered by a metal plate made to hold an address card, which, upon being moved to one side, wound up the shutter. Referring to Messrs. Earp & Swinden's camera, he thought it the *ne plus ultra* of apparatus for detective work, and most workers would find their *impedimenta* reduced to the smallest and most portable style; as an expensive camera it would be difficult to surpass. With his own camera he had been enabled to take very good groups, &c., where he would not like to venture a shot with an ordinary hand camera.

The PRESIDENT thought the camera introduced and invented by Mr. Nicholls would meet with much acceptance, and was sure the exhibits before them had been instructive and interesting.

A cordial vote of thanks was unanimously passed.

Referring to eikonogen as a developer, the PRESIDENT said, By the kind attention of our Hon. Secretary, I have been enabled to give a practical test to the new developing agent prepared by Dr. Andresen, of Berlin. This material, of a pinky dead colour, and of an earthy character, is, without doubt, of the quinol group, but its exact component parts are not revealed. The formula supplied to me I made up, with a slight but useful alteration, and is as follows:—

No. 1.

Soda sulphite	14 ounces, 30 grains.
Eikonogen	3 drachms.
Ammonium bromide	20 grains.
Water	26½ ounces.

No. 2.

Carbonate of soda (washing soda)	3 ounces, 5 drachms.
Water	26½ ounces.

You must mix and use these two solutions with discrimination. For instance, the published instructions say three parts of No. 1 to one part of No. 2; now, I have found very few occasions when that was the best proportion to use the developer. I commenced by developing lantern slides by contact, and found that the full strength of developer was only suitable for strong negatives and correct exposure, and that *one-third* less of No. 2 (soda) gave better results. At the same time, except a slight decrease of time required for development, I could not find that it had any advantage whatever over hydroquinone. As a matter of fact, it seems to me to have certain disadvantages compared with that reagent. Hydroquinone is as near an approach as we are likely to obtain to an automatic developer. If the subject is not over-exposed one may almost drop the plate in the hydroquinone developer and leave it alone until it is completely developed. Not so eikonogen, which requires as careful watching and constant rocking as our old friend pyro. The development certainly proceeds with much greater rapidity, but I do not consider that any particular advantage. I pass round for your inspection four transparencies developed by the eikonogen formula. Some I intensified to test the receptiveness of the film, and found that it took Werner's intensifier very well. Turning to negatives, I found I had three undeveloped 10×8 plates, and, as it happened, they were by three different makers, viz., Thomas's, Kingston Special, and Britannia, all landscape, and with normally correct exposures. These three were all developed with the same three ounces of developer, and they might be all from the same batch of plates. I must mention that my system of printing requires *thin* negatives, so that these specimen plates are not by any means as dense as the developer would give. The developer was in this case diluted by two-thirds of an ounce of water to three ounces of the mixed developer, and I think I added a few drops of a ten per cent. solution of bromide of potassium. There seems to be great reducing power in the developer, and when an accurate knowledge of the best restraining medium to use with it is obtained we may find it a capable and useful developer for general all-round work.

Samples of eikonogen were distributed for members to experiment and report on by Mr. Paul Lange, and he also exhibited Tylar's lantern mask cutter with a revolving table, as made by F. Eaton, 31, Highfield, Rock Ferry.

LEWES PHOTOGRAPHIC SOCIETY.

SEPTEMBER 3.—Annual meeting.—The President in the chair.

Mr. R. C. Bennett was elected a member.

The HON. SECRETARY then read the report of the Council for the past year.

The Treasurer's report showed a balance in hand of 27. 0s. 1d.

The Society at present numbers thirty-eight members.

The Council wish to thank the press, local and otherwise, for the kind notices of the Society meetings.

The balance sheet was then read.

All the retiring officers were re-elected with the exception of Mr. A. N. C. Corder, who had resigned the Committee in consequence of business engagements. Mr. G. J. Wightman was elected to fill the vacancy.

Several slight alterations were made in the rules.

A letter was read from the Hon. Secretary of the Brighton Society, extending an invitation to the Lewes Society to join them in an excursion to Shoreham on the 14th instant. The invitation was cordially accepted.

An excursion to Groombridge was also arranged for the 28th instant.

DARLINGTON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 9.—Mr. W. F. K. Stock in the chair.

In consequence of many of the members not having returned from their holidays, it was thought advisable to postpone the show of "holiday work" until the next meeting, to be held October 14.

It was decided to hold a competitive exhibition in February, 1890.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 4.—Annual meeting.—Dr. Anderson (Vice-President) in the chair.

Messrs. Fittes (Architect) and Murray (High School) were elected honorary members, and Messrs. J. Wilson and J. Duncan ordinary members.

Dr. ANDERSON, in his address, gave a *resumé* of the work of the past year, and noted particularly that the best attendance was always when practical work was to be done; and, therefore, suggested that that, with exhibitions of work and lantern slides, should form a good part of the ordinary meetings.

The Association is in a flourishing state, numbering now over thirty members. The Treasurer's report showed an income of 9*l.* 16*s.* 9*d.*, and a balance of 4*s.* 5*d.* in favour of the Association.

The following office-bearers were then elected for the ensuing year:—*President*: Mr. William Shaw Adamson, Careston Castle.—*Vice-Presidents*: Dr. Anderson and R. A. Scott, M.A.—*Committee*: Baillie Lawrence and Messrs. Mackie and Braid.—*Curator*: Mr. J. C. Middleton.—*Treasurer*: Mr. William Stewart.—*Secretary*: Mr. James D. Ross, 13, Park-road.

Correspondence.

Correspondents should never write on both sides of the paper.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—Mr. Graham Balfour is kind enough to think he has got me on the horns of a dilemma. He says:—"Either Mr. Robinson is asking to see Dr. Emerson's pictures, which he has seen himself any time for the last six years at the Pall Mall Exhibitions and in illustrated volumes, or he has been criticising and condemning the work of a photographer without taking the trouble to qualify himself for his self-imposed task by examining the work in question."

I do not believe that Mr. Balfour would be consciously discourteous, but there is a grave suspicion of the unconscious variety in this sentence, for it suggests that I have been criticising without seeing, which would be a literary dishonesty. I think I have seen nearly all that Dr. Emerson has published or exhibited, but that is not the point, and is only mentioned to show I am not the Rip van Winkle Mr. Balfour calls me. This is the important point. I have never, as far as I am aware, criticised Dr. Emerson's work (by which, I presume, is meant pictures) except once, when I said that his *Poacher* was one of the best pictures in the Exhibition. I have admired many of Dr. Emerson's pictures, but the best, in my eyes, did not always illustrate his theories.

It is not, therefore, for my own gratification only that I suggested that the naturalistics should show us the results of their theories, but that photographers generally may have an opportunity of seeing them, and perhaps becoming converted. I don't think judges would be required, but I should not object to Mr. Graham's suggestion of the last three A.R.A.'s.

Mr. Balfour makes a comparison of those who employ dressed-up models, combination printing, &c., and those who study long and patiently out in the country. There is a fallacy here which the naturalistics persistently use. I can assure Mr. Balfour that those who practice photography as I do, think as much of "long, patient study in the country" as do the naturalistics, and could, possibly, pass as stiff an examination on the phenomena of nature as any of them. Nature is not the copyright of any class or school.

There is one question I should really like Mr. Balfour to answer. Where does he find that I have ever "assumed that all who differed from him had been swallowed up?" This he gives as the cause of his letters. I did not know that I claimed to be the possessor of the voracity of Aaron's rod.—I am, yours, &c.,

H. P. ROBINSON.

To the Editor.

SIR,—Mr. Robinson, in recent articles and chapters, has, in his good-humoured, confident manner, made such distinct invitation to those of a naturalistic way of thinking to declare themselves, that it was to be expected he would reply to so fully adequate an opponent as Mr. Balfour. This he declines to do on the ground of having fully discussed the subject already. Mr. Robinson is, perhaps, surprised to find that there are any naturalistics at all in photography, and that these ungrateful upstarts do

not read his books in the hope of gaining any instruction, but only to controvert them and stem their evil influence.

Now, instead of having fully discussed the subject, in the opinion of some of those who think they understand the meaning of Naturalism in art, and believe in it, Mr. Robinson has made no effort to meet the actual attacks which it makes upon his teaching and practice. He has either quite misjudged the real force and meaning of Naturalism, or has intentionally limited his attention to one feature of its principles, in which he was certain of sympathy from the million, whose one idea is sharpness everywhere, at all costs. Mr. Robinson appears to hold that Naturalism is defined by the word *fuzziness*, and by going somewhat unfairly for this evil of his own invention, he succeeds easily, with his characteristic mixture of smile and sneer, in exciting the ridicule of the *unnaturalists*. At another time, however, some suspicion is aroused that he is hoodwinking his own supporters, for, in excusing himself to those of an artistic turn, he claims that he has always fought for a "moderate amount of focus" only, and for a "certain amount of softness." Now, were the whole battle fought on this one point, Mr. Robinson would, from his practice, have to disclaim the great body of topographers who support him, for they do not want even this amount of "softness."

Mr. Robinson has tried to make Naturalism a bugbear to photographers, but the impartial student will find there is nothing very terrible in it, and that as far as mere focus goes, even Mr. Robinson himself (presumably under compulsion of his lenses) might be included within the sacred pale. Unfortunately, all hope of Mr. Robinson's regeneration is denied his naturalistic friends by his attitude on other points, in which he is diametrically opposed to naturalistic principles. On these points Mr. Robinson is judiciously silent, for, if he brought into prominence a defence of combination printing, and of dressing ladies as country girls and fisher lasses for his pictures, he would find even his quondam retainers, the topographers, alienated. It is not in man, even in *5-ft* man, to overlook the unnaturalness of joinings in photographic pictures, and the too visible drawing-room drapery air about attractive ladies playing at haymakers and fishwives. Naturalism does not stand or fall upon a question of how much or how little softness of focus is admissible, but it certainly is diametrically opposed in its view to the much worship of register marks, and to all unnaturalism in figures and their attire. Its creed is, *Truth, and the best of everything*. This differentiates it from the ordinary school, which, instead of considering exclusively the actual colouring, harmonies, tone, feeling, character of a subject, imparts what is termed imagination into the work, and treats much of the colouring, drawing, and selection from a consideration of theories or conventional ideas deduced from an analysis of the works of former successful painters.

As regards the discussion concerning the manner in which the eye actually sees a landscape picture, it would appear that in embarking on this scientific enterprise Mr. Robinson has got upon uncongenial ground. It is not so much a matter of what the eye can do if the mind wish it, but what, under certain circumstances, it actually does and is desired to do by the artist. Every one will readily admit that whilst the eye is fixed on a centre of absorbing interest the rest is only felt, that is, is out of focus; and equally readily it may be admitted that the eye can range, though but slowly, over a landscape so as to bring every part into fair focus, even to any number of degrees. But this is exactly where the whole point comes in. The eye can do so, but it does not. In a great number—the majority—of pictures the interest is concentrated on some specially beautiful or strong incident, and in such a picture, whilst it is quite true that the eye could pass successively from one plane to another, it does not do so, nor does the artist wish it to do so. There is the subject, and that is the supreme moment to fix it. If there be nothing of special beauty or importance in a scene, the eye ranges in a general way over it, or makes in succession a few points of rest for itself, a state of things which no one but a combiner of several negatives could hope, or would wish, to imitate in pictures.

As a matter of fact, Mr. Robinson greatly over-estimates the rapidity with which the eye accommodates its focus to several planes successively, as any one can test for himself.

It would occupy too much space to go further into the question and support the contention that even the principal centre of interest of a picture is best not rendered with all its detail, but the man who does not see and feel this after some study is, in my opinion, lost to the best that is in art.

There are one or two minor personal points in Mr. Robinson's letter which I cannot resist the temptation to refer to. In replying to Mr. Balfour, he declines to argue further in words, and calls for works, and a competition between himself and the naturalists, as though he himself and the public had never yet seen the practical outcome of naturalistic principles. Doubtless Mr. Robinson has a charming picture in store for the Pall Mall Exhibition which he is justified in feeling some exultation over, and which we shall all be interested to see—and dissect; but I cannot help thinking that this part of his letter would have been better devoted to a defence against Mr. Balfour's able attack of his peculiar and astonishing doctrine that the distinctive quality of photography is definition.

Mr. Robinson's reference to the fact of his being on the Hanging Committee at Pall Mall seems still more difficult to account for. Surely he does not imagine that the Hanging Committee would, under anybody's influence, spoil the best arrangement of the pictures for the purpose of

facilitating the decision of a squabble between rival schools of photographers.

Trusting, sir, that Mr. Robinson will feel able also to play me off against Dr. Emerson for my "fairness and good temper," as in Mr. Balfour's case,—I am, yours, &c.,
Camera Club, 10th Sept.
GEORGE DAVISON.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the Editor.

Sir,—Kindly permit me to remind intending exhibitors that Wednesday next, September 18, is the last day for receiving "packing cases" from the country by our agent, Mr. Bourlet, 17, Nassau-street, Middlesex Hospital; and also that the same day is the *only one* for receiving pictures and apparatus at the Gallery. Any further information can be obtained from me.—I am, yours, &c.,
Edwin Cocking, Assistant Secretary.
5a, Pall-mall East, S.W.

THE CELESTIAL SOURCE OF PHOTOGRAPHIC CHEMICALS.

To the Editor.

Sir,—Doubtless many of your readers would like to know from what *raw material* "eikonogen" is made. May be, the enclosed cutting will throw some light upon the matter.—We are, yours, &c.,
22 and 23, Soho-square, London, W.
Messrs. MARION & Co.

"From these pages" a good deal may be gathered touching the strange and silly superstitions of the Chinese, but of all singular hallucinations one can scarcely conceive anything more senseless than the rooted conviction which many of these Celestials entertain that photographic chemicals are made out of the eyes of deceased children, arguing, as they do, that if they were not, how could a little water and white powder see to make such correct pictures, especially when they are shut up in the dark in a little black box. Whenever children are missing from a family, the common rumour runs that they have been made away with by the Europeans for photographic purposes."

THE PHOTOGRAPHIC CONVENTION.

To the Editor.

Sir,—I should not have thought it worth while to reply to the remarks in Mr. Peasgood's letter published in your contemporary, had not Mr. L. E. Morgan referred to the matter. At the outset, I must question Mr. Peasgood's right to set himself up as an authority in respect to the position of the Convention, inasmuch as he has in no way been officially connected with it since its commencement, beyond the appointment last year as one of the auditors, a position that evidently caused him much perturbation.

A statement of one or two facts in connexion with Mr. Peasgood's attitude towards the Convention will give some idea of the sincerity of his motives, and the dependence that may be placed upon them. At the annual meeting last year at Birmingham the proposition for holding the Convention in London was stoutly opposed by Mr. Peasgood; finding, however, the tide of opinion too strong for him, he with a deliberate change of front actually seconded the resolution before the meeting, at the same time expressing himself in favour of the same. The London meeting is scarcely over when another right-about-face movement is perceived in the avowed hostility to the Association evinced in his letter referred to. Comment on such erratic conduct is superfluous.

Turning now to a more congenial subject, I am able to assure your correspondent, Mr. L. E. Morgan, that far from being in an unsatisfactory position, the Convention has made steady progress since its foundation, each meeting resulting in an increased muster-roll, and this in spite of interested detractors, who find the movement in conflict with schemes of their own. That the Convention has done good work since its foundation is an admitted fact. The many able and valuable papers that have been read at the Convention meetings would alone be a justification for its formation. Thoroughly representative in character—its members being drawn from the whole of the United Kingdom—it is competent to discuss questions that no local society of itself is able to take up, a want much felt, and a desideratum that should entitle the Association to the support of all interested in photography. While, from a social point of view, it is unique in the photographic world, as a means to a pleasant periodical reunion of all ranks of the fraternity and the establishment of firm friendships—not the least of the many enjoyable features associated with it.

With regard to the remarks under the heading *Convention Notes*, in THE BRITISH JOURNAL published last week, I must point out that the second paragraph is scarcely correct. The fact that the Convention was not opened by either of the Patrons was certainly not due to indifference on their part, but from an unfortunate choice of the time the Convention was held. In every instance save one, notification of the inability to be present through absence from London was accompanied with the heartiest good wishes for the success of the meeting, and a regret that, from the causes stated above, the writer was unable to take part in the proceedings.

The foot-note that you refer to, that appeared in conjunction with Mr. Pringle's letter in the *Photographic News*, calls for some explanation from me. Printed slips of the papers to be read were distributed each evening to the whole of the members and the press assembled, the editor of the *News*, of course, included, to whom, on the evening in question, I notified

* *The Land of the Dragon*. By William Spencer Percival. (From Morning Post.)

the situation as regarding the publishing of the papers, leaving him at liberty to take his own course in the matter. You will remember that prior to the meeting, to prevent your *Journal* having an undue advantage, by reason of your having the articles in type, you undertook to copyright all papers for one week. It is now known to me that that was impracticable.—I am, yours, &c., J. J. BRIGGS, *Hon. Sec.*
128, Southwark-street, London, September 9, 1889.

Answers to Correspondents.

- J. F. BLACKMORE.—Cold bath process.
F. R. M. S.—You are quite right. Such re-shashes only appear through inadvertence.
F. J. SKILL.—Having first brought the pieces of the negative in close contact, make a transparency and retouch out the marks of junction; then from this make another negative.
F. W. MUXEY.—1. A very full exposure is required, and the development should not be carried too far.—2. Yes.—3. The action of light causes a reduction of the silver.
DOUGLAS DITT.—From the appearance of the spots, they are more likely to be caused by something external—the covering tissue paper, for instance—than by want of care in the fixing and washing. One of the most convenient tests for hyposulphite of soda is iodide of starch.
G. BRADSHAW.—The “carbon” used in the manufacture of carbon tissue is usually “vegetable black.” In the finest tissues a medium quality of Indian ink is generally employed.
SEPTIM.—We cannot express an opinion as to the purity of the mounts without making an analysis. Better place them in the hands of an analytical chemist, who will report upon them after examination.
ANXIOUS LEARNER.—1. Your work is so good as to prompt us to say you have nothing to learn.—2. For getting the maximum of density with the brand of plates mentioned, give very long development.
H. B.—1. Sulphur. It should be washed to remove the silver and then rejected.—2. An excess redissolves the precipitate.—3, 4, 5. A formula for the sulphocyanide toning bath will be found on page 628 of the *ALMANAC* for the current year.—6. Thorough washing.
HENRY MORTON.—Small Albion presses are made which would stand upon a table. Such presses would, no doubt, do for printing very small collotypes. We do not know the price of them, but it would probably be from 10*l.* to 15*l.* Any dealer in printing materials will quote a price.
DAYLIGHT.—There are no works specially devoted to the subject of lighting and posing the sitter. The only work of the kind that has been published is Bigelow's *Album*, but that has been out of print for many years. Study the published work of the leading photographers; this is the best method of acquiring the requisite knowledge.
R. C. P.—1. There are no means of eradicating spots on collotype plates.—2. There is also no method of repairing the plate when the film gets damaged.—3. In clarifying gelatine with white of egg, the solution should be strained through close flannel, in the same manner as cooks clarify jellies. Straining through muslin is of no use whatever if a bright result be desired.
R. G. M. I. (Edinburgh).—It is only some kinds of blacking on the insides of dark slides that affect the plates, not all. Ebonite is very good, but many object to it on account of brittleness and that it cannot be hinged like wood. Most of the ebonite shutters used are made to draw quite out. To allow of this the shutter must, of course, be specially constructed. Any manufacturer will supply them to order.
W. CONNOR complains that in printing chromotypes he is often troubled with the prints sticking to the glass, although he well waxes it, using the best white wax.—The trouble very probably arises from the use of the white wax, which is very often largely adulterated with spermaceti, &c. Pure beeswax is the best. This is generally best when obtained direct from some one who keeps bees; its purity can then be relied upon.
G. W. S. writes: “In reply to an advertisement I last inserted in your paper, a photographer in a town in the Lake District wrote to me and asked to see my photograph. I forwarded to him at once a cabinet. I have not since heard from him nor received my photograph back, notwithstanding I have repeatedly written and asked him to return it. What means can I take to recover the same?”—Send us the photographer's name and address. You might also communicate with the superintendent of the police in his town.
S. S. S. S. writes: “I am much troubled for an hour or two in the day with the sun shining into one corner of the studio, but I cannot afford to stop out the light there with an opaque blind, and if I put ground glass in then it will stop out just the light I want on dull days. Can you suggest anything that would answer the purpose as well as ground glass, and yet be easily removed when not required?”—The plan we should suggest is to make a light wooden frame and cover it with tissue paper. This might then be fixed up when required, or it might possibly be hinged to the sash, so as to turn out of the way when not wanted.
D. G. T. writes: “Can you assist me by letting me know the best artificial light to use to photograph by night. I have used the flash light very successfully with my friends, but when I get ordinary sitters it is a failure. They seem to move or get frightened when the flash comes, or they have closed their eyes. I want to know can I procure a steady light and one that will take good photographs, and please give me the best means.”—The best artificial light for portraiture at night is undoubtedly the electric arc light, though its introduction is somewhat costly unless there happens to be large installation in the vicinity from which the current can be obtained. Fairly good portraits are, however, obtained with the flash light, though our correspondent appears to fail. We should advise him, failing the electric light, to try magnesium ribbon, using it freely and burning it at a good distance from the sitter.

ALICUIS.—The plate appears to have a medium coating of emulsion—about the right proportion.

CASTLE writes: “I enclose print, and should like to know cause of the bright red and yellow spots. The prints were well washed in galvanised iron pan painted with ‘Aspinal’ inside and out, fitted with a siphon, for about three hours, then allowed to soak all night, and again washed for about two hours—drained and placed between blotting paper, the ordinary white blotting paper. There they were allowed to remain for three or four days (without being seen to). Can the yellow spots be caused by mildew, or are they due to the prints adhering together when being washed? If so, what causes the red spots? Is the blotting paper at fault? I have about three dozen whole-plate size spoilt, and had as many last year. Can you help me?”—The spots are clearly due to mildew. If blotting paper be left damp for several days it usually becomes mouldy. If prints be kept in it in a moist condition, they will quickly become spotted with mould like the one forwarded. The washing of the prints had nothing to do with the evil, it is entirely due to mildew.

RECEIVED.—L. O'Broom; C. C. Vevers; A. M. De Silva. In our next.

CARDIFF EXHIBITION.—The time for receiving applications for space has been extended from the 16th to the 30th of September.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, September 18, 1889, will be *Dark Room Illumination*. Saturday outing at Greenwich.

AT the National Eisteddfod, held at Brecon last week, Mr. John Owen, photographer, &c., Broad-street, Newtown, was successful in carrying off the first prize of 25*l.* in the photographic series of views in the county of Brecknock.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY EXHIBITION.—We have received the rules, regulations, and conditions by which this exhibition is to be governed. Two silver and two (2) bronze medals are to be awarded in the champion class by the Society, in addition to others by plate makers and journalists. Wall space will be charged for at the rate of sixpence per foot, with a minimum of two shillings. It is to remain open for five days, commencing on October 28th. Entry forms, procurable from Mr. F. W. Dew, Hon. Secretary, must be returned not later than October 19th, and all exhibits must be delivered, *carriage paid*, on or before the 25th.

SMART WORK.—A quick bit of photography in connexion with the Searle-O'Connor sculling match was successfully carried through by Mr. Harold Furniss, of Barnes, on Monday last. Acting on behalf of Messrs. Hare & Co., Limited, the well-known engravers, he took a shot at Searle as he passed the winning-post at Mortlake at exactly forty-seven minutes past one. A bromide print from the negative was delivered at the *Sporting Life* office in Fleet-street at a quarter past three, and a pen-and-ink drawing from it was completed by six o'clock. This was duly engraved by photo-zincography, and the block appeared in the above-named paper the following morning.

THE PHOTOGRAPHIC CONVENTION.—Mr. William Lang, jun., President of the Glasgow Photographic Association, and one of the earliest members of the Convention, writes:—“What is the meaning of those men who were elected at the general meeting on the Wednesday being excluded, and by whom have their names been withdrawn? The thing is perfectly monstrous and irregular. I do not know how others here will take it, but it is quite clear to me that if the different provincial men are to be ignored in this way, then but little success will attend future meetings. It is, of course, impossible that men from the north can attend Council meetings in London, but for all that this ought to have been discussed in an open manner at the meeting, and after being elected I, for one, decline to be simply wiped out without letting myself be heard on the matter. If the Convention is to become a London club then good and well; it will require to have its annual meetings there. But if the leading towns here and in England are to occasionally receive the Convention, I do not see how the provincial men can be ignored. Fancy putting on the Council a certain number of men of a particular town—the town that is being made use of for the time being—and then for ever afterwards ignoring ‘every mother's son’ of them. Selfishness, thy name is Convention! It won't do.”

OUR CONVENTION GROUP PICTURE.

The publishers inform us that a few (not exceeding a hundred) of the Convention Group pictures which were sent out with our issue of last week were inferior in quality to the others, owing to the exceptionally high temperature which prevailed at the time of their being printed, thus inducing a softening of the collotype plate. To meet this, some others have been printed, which will be sent to any into whose hands these imperfect copies may have fallen, and who will return them to us with name and address written legibly on the back.

In the key to the group it will be observed that there are several blanks, representing members whose names we do not remember. Perhaps they or some of their friends will kindly supply the omission, which we will publish at an early date.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1533. VOL. XXXVI.—SEPTEMBER 20, 1889.

HOME-MADE GOLD AND SILVER SALTS.

In our recent series of articles on *Economy in the Printing Room*, we undertook to treat the question of the economy of utilising residues for the purpose of making the salts of the precious metals for studio use, instead of sending to the refiner, receiving cash in exchange.

Let us first consider the silver chlorides and sulphides. It is almost impossible to collect these in a state of absolute purity; organic matter will be thrown down with the insoluble salts, and it would be a most difficult task to ensure perfect freedom from the chance entrance of foreign matter. Otherwise, the chloride—the sheet-anchor of the residue-saver—might be reduced to the metallic state very easily, without heat, by the aid of iron, and the sulphide similarly, but with heat. We strongly advise, in every case where silver residues are to be converted into salts, that the metal is first brought into a state of fusion. In whatever state the silver is obtained, the next step is to dissolve it in nitric acid, and when the nitrate so obtained is to be used simply for sensitising paper it can be used without being crystallised, and will make an excellent bath. It will be difficult to bring the solution sufficiently near to neutrality by simply allowing the acid to remain in contact with excess of silver; but this can readily be remedied. A small quantity of solution is precipitated with caustic alkali (or, even, carbonate), and the precipitate, after being washed, is added by degrees to the silver solution first obtained until no more is taken up. All that is then necessary is to filter the liquid and ascertain its strength by a silver meter when it is quite ready for use.

When it is desired to obtain the nitrate in the form of crystals, the solution has to be concentrated by heat and set aside for crystals to form, and the mother liquors saved for further concentration and recrystallisation. Whether, except as an interesting and costly experiment, it is worth any one's while to make nitrate of silver crystals, except by the thousands of ounces, we leave to our readers to decide after perusing our calculations.

The lowest market price, we believe, which silver has touched is three shillings. Let us work from that low price. As standard silver contains ten per cent. of alloy, we must first find the price per ounce of the silver it contains; if pure silver were bought a certain increase of price beyond the market value would have to be charged for manufacturing it, so to speak; hence we do not treat the subject from that standpoint, but

take market price only, thus giving every advantage to those who would make nitrate.

$$42 \text{ pence} \times \frac{10}{9} = 46\frac{2}{3} \text{ pence,}$$

the market price of the silver in "standard silver."

We readily find the cost of the silver in an ounce of nitrate thus:—

$$46\frac{2}{3} \times \frac{9}{17} = 29\frac{1}{7}.$$

Therefore, an ounce of nitrate of silver costs, for silver alone, nearly half-a-crown; but as the precious metals are sold by troy weight, this is the price of a troy ounce; and, to fully understand the relations of the prices, we must find the cost of an avoirdupois ounce, that being the weight that chemicals are sold by. Therefore—

$$29\frac{1}{7} \times \frac{437.5}{480} = 27 \text{ almost exactly.}$$

We thus learn that the nitrate of silver, which can be bought in quantity at half-a-crown an ounce, leaves a margin of three-pence, or ten per cent. on the selling price, for cost of making, interest of money, waste, labour, and nitric acid!

The question, whether it "pays" any one to make his own nitrate, answers itself, even if no crystallising be attempted and the simple solution of the metal in acid be produced. If we make this into a readily remembered fraction, we may say the silver in an ounce of nitrate of silver crystals, as sold in the shops or stores, costs $\frac{9}{17}$ of the sum per ounce as which silver is quoted in the market reports of the London papers.

Such a margin is not a profit, and at one time the explanation of this "working at a loss" was that nitrate of silver solution was a bye-product in refining, which it was cheaper to turn into crystals than reduce to the metallic form again. But it is now required in such immense quantities that no bye-product could possibly suffice for supplying even a small proportion of the present demand.

The further explanation has been suggested that to sell at such cutting prices adulteration must be practised. Of course, every chemical is liable to adulteration; but we have had the curiosity to make accurate assays of silver nitrate from two separate sources; and, so far from its being adulterated, we found the salts examined to be marvellously pure examples of commercial chemicals—the water present being almost nil, and the total amount of foreign substance a fraction of one-tenth

per cent. Many crystals of other salts sold as "chemically pure" could not show such a register as that.

To calculate the cost of chloride of gold in the same manner would lengthen this article to too great an extent, and we will, therefore, defer its consideration to a future occasion.

THE DESTRUCTION OR REMOVAL OF THE PHOTOGRAPHIC IMAGE.

RESUMING this subject where we left off last week, we shall point out an application of the "reverse" method of working, which presents very particular advantages over the direct plan.

Before, however, referring to these we ought to mention one point which we overlooked in our article last week. It is well known to old collodion workers that an image may be removed by any of the methods of solution already described, and reproduced with the greatest ease by means of any form of acid silver development, notwithstanding that all sensitive material and all visible trace have been removed. This occurs whether the original image has been produced by alkaline or by silver development, and the removal and reproduction may be repeated time after time, provided the plate be well washed after each operation.

In consequence of this peculiar difference in the behaviour of the two kinds of development, some very curious experiments may be performed. For instance, a wet plate, we will say, may be exposed and developed, treated with nitric acid or iron alum, and washed, when it will present the same appearance as if unexposed; it may then be "fixed," when to all appearance every trace of an image, latent or otherwise, will have departed. But on the reapplication of a silver developer the original picture will come up with all its pristine vigour, or even more, and the removal and reproduction may be repeated frequently if the precaution we have mentioned be observed.

Or we will suppose an alkaline-developed collodion positive to have been treated with nitric acid or iron alum, as for the purpose of making a reversed negative, but instead of redeveloping by the alkaline method we will apply acid pyro and silver. At first, or after the lapse of a short period, the negative image commences to form, but gradually the shadows darken and fill up, until the whole surface presents an even shade of blackness on which no sign of an image of any sort is visible. In this case the developer has acted both upon the previously intact bromide and upon the original impression of the removed image, the result being an even deposit of silver over the whole surface. But if the plate be now treated once more with one of the silver solvents, it will be restored to the same condition as after the first similar application, and will present the appearance of a perfectly graduated negative, in which the different grades consist of bromide of silver. If pyro or hydroquinone with alkali be now applied, a perfect negative will result, as these developers have no action on the latent traces of the removed image. This explains why silver intensification should never be resorted to in this process of reproducing negatives.

Whatever the influence may be which remains to enable this repeated reproduction of an apparently destroyed image, the means exist by which it may also be discharged, and the power of redevelopment removed. This consists in treating the plate with solution of chromic acid, preferably in combination with a soluble bromide, chloride, or iodide, and in very particular cases followed by immersion for a second time in the fixing solution. After the treatment, silver development or in-

tensification may be resorted to without any fear of fogging or filling up the shadows of the picture.

In making negatives of line or stipple work for reproduction by any of the photo-mechanical printing processes, it is well known that negatives combining great density with perfect clearness of the lines or stipple are a *sine quâ non*, and it is equally well known that the natural difficulty inherent in this kind of reproduction is increased by the necessity for the extreme density. The tendency, too, of the developing action to spread laterally and fill up the fine intervening lines still further complicates matters, and this class of work is only, as a rule, satisfactorily performed by those who constantly practise it.

But if instead of attempting to intensify the original negative, a positive be made on a collodio-bromide plate, the development being carried to the fullest extent, and this be then treated with iron alum, a perfectly clean negative will result, in which the lines are formed of bromide of silver. This is next treated with chromic acid to thoroughly destroy the previous image, and it is then ready for redevelopment.

In this particular instance, where extreme density is required we should prefer, before redevelopment, to treat the film with a moderately strong solution of iodine to convert the image into iodide of silver; then, after a very thorough washing, flood it with a solution of nitrate of silver, expose to light, and proceed to develop with pyro and citric acid, when a negative combining perfect opacity with absolutely clean glass will be the result obtained with an ease entirely unknown in the direct method. In this manner such fine work as the "wet" negatives for photo-mechanical printing processes are admirably executed.

HAS the substitution of dry plates for wet ones in the studio been any very great advantage to operators generally in large establishments? We do not mean from the point of convenience, and the relief from the worry and anxiety when working with wet plates, such as the drying of the film on hot days, the risk of movement on the part of the sitter during a prolonged exposure, and similar troubles. The advantages of dry plates from this point of view are incontestable. But have they tended to shorten the hours of labour or otherwise? In the wet-plate process the negative had to be developed directly it was exposed, and the fixing followed immediately. In fact, with collodion, so far as the operator was concerned, the negatives were always finished within a few minutes after the sitting, and were usually all dry and ready for varnishing by the time for closing business; hence the hours of the operators were necessarily comparatively short. Now, we understand, it is customary in some houses to defer the development of a large proportion of the negatives until the business of the day is over. Consequently, it is no unusual thing for operators to be fully occupied till eight or nine o'clock at night, for it must be borne in mind that as a rule, a larger number of negatives of each sitter are now taken than used to be the case formerly. This makes long hours to work in an oppressively hot studio during the day, and in a small, and too often ill-ventilated, dark room for the whole of the evening. To operators so situated dry plates can scarcely be considered such an inestimable boon.

In the wet-collodion days one of the greatest essentials in an operator was the ability to prepare and keep in order his chemicals, so that the plates could always be in the best possible condition for the camera. Here, it must be admitted, considerable experience was necessary to obtain good plates under constantly varying conditions. No such skill, at least in this direction, is required now that the plates are supplied ready for use. Yet we hear loud complaints that really first-class operators are quite as difficult to obtain as when the wet process was in vogue, if not more so. This fact was accounted for to us by the principal of a high-class establishment, a few days back

as follows:—"When a man becomes a really first-rate operator he prefers to be his own master, and generally finds the means to commence business for himself." We have little doubt but that there is a great deal of truth in this statement. Certainly there is a considerable amount of common sense.

COMPLAINTS are still rife of the detention or appropriation of operators' or retouchers' specimens. To retain specimens of the work of an operator seeking employment is contemptible. But when they are kept and exhibited as specimens for the showcase, or the reception room, it amounts to one of the most deliberate and cruel frauds that can well be perpetrated. It is nothing short of swindling. When specimens are sent and not returned in due course, we shall be glad to have the names and addresses of the offending parties.

OPERATORS and others, in answer to advertisements, should forward specimens only to those who give their *bond fide* names and addresses in full, and not to anonymous advertisers. We have heard of instances where those who have done so have afterwards seen their pictures shown as examples of the exhibitor's own work. Clearly, in such cases, the pictures were obtained under false pretences, and we question very much if the offenders could not be prosecuted in the police court. We are not aware, however, that proceedings of this character have ever yet been instituted. Operators out of employment rarely have the time or the money to expend in legal proceedings. However, when specimens have been forwarded, and their return cannot be obtained, a note detailing the circumstances, addressed to the superintendent of the police of the district, will usually lead to their restoration.

THE non-return of specimens must not always be attributed to actual dishonesty, as it sometimes arises from negligence, oversight, or accident: or it may be from thoughtlessness. A few prints are often looked upon in a photographic establishment as of little value. So they may be, intrinsically, but they are often of inestimable value to the owner, as perhaps they are the only ones he has and are, therefore, his only hope of obtaining a situation. From whatever cause the specimens are not returned the hardship is all the same to the unfortunate *employé*. Sometimes, however, the fault does not rest with the receiver, but with the sender. Often the reply to the advertisement is by letter, while the pictures are sent by book-post, without any intimation as to whom they belong, and perhaps the wrapper gets mislaid or destroyed. If the owner's name and address were written on the back of each photograph mistakes of this kind could not occur.

THE business in the cheap varnished lithographic views of seaside places does not appear to be at all diminishing. Collotypes, bound up in a similar fashion, and at about the same price, are to be had in some districts, but their sale, we learn, is nothing approaching that of the lithographs. Strange as it may appear, we are informed that many of the public actually prefer the lithographs to the collotypes, as they say they are more clear and distinct. If hardness and crudeness, in the eyes of those who prefer them, means distinctness, then the lithographs certainly have the advantage over the collotypes, which, for the most part, are fairly good work. Somehow or other collotypes are produced at a very low rate. We have before us, as we write, some collotypes of a fashionable seaside resort, of the half-plate size, mounted on an elaborately embossed cardboard mount in imitation of a frame, and measuring about twelve inches by ten, with a ring to suspend it by, which were purchased *retail* at a penny each. When it is considered at what price they must be sold at *wholesale*, it would appear that collotype printing must carry a very good profit at the prices sometimes charged.

A MODIFICATION IN THE STANNOTYPE PROCESS.

IN an "Answer to Correspondents" a week or two ago, mention is made of a means of obtaining relief in a negative by coating with bichromated gelatine, and exposing through the negative, afterwards developing in warm water. I have never previously seen this

suggestion in print; but it is many years since I first tried it for another purpose, and five or six years since I practically utilised it in connexion with the stannotype process.

As far back as 1864 or 1865, very shortly, in fact, after the publication of the details of Swan's carbon process, I adopted, or attempted to adopt, this plan for simplifying the production of the "tissue." It will be remembered by some of my readers that Mr. Swan's first tissue was made by spreading the bichromated and coloured gelatine upon collodionised glass plates, from which it was stripped when dry, and printed collodion side towards the negative. It was then attached with indiarubber cement to paper for development. The stripping but especially the necessity for a double transfer process in order to produce an unreversed image, seemed to me very irksome, so I hit upon the very ingenious (?) plan of coating the varnished side of a negative, previously rubbed with oxgall, with the sensitive pigmented gelatine, and after drying exposed through the negative in the ordinary manner.

The development was performed while the tissue was still *in situ*, the negative itself taking the part of universal support; when finished, a final support of paper was attached by means of gelatine, and when this was dry the print was stripped from the glass. I say from the glass and not from the negative, because it is scarcely needful to remark that the latter came with the print, or, at any rate, *most of it* did, for the glass not having been specially prepared for stripping, portions of the film stuck. With a little ether and alcohol I removed the negative image from the print, and laid bare, perhaps, the best carbon print I had succeeded in getting up to that time.

It would scarcely be worth while at the present day to make your own tissue, for the sake of utilising so simple (?) a process for producing one print, but the application I am about to describe is a really practical one, and saves a great deal of trouble to those who may be working in a small or experimental way.

From your recent description of the stannotype process, in the number for July 5, the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY will know that in this process a relief in gelatine is made from a positive instead of from a negative, as in the original Woodbury process, and that this relief itself, faced with thin foil, is employed as the actual printing surface, instead of, as in the other process, being pressed into a plate of type metal to produce a "reverse."

Now, the greatest trouble in the process lies in the making and drying of the tissue employed for the relief. It must necessarily be very thick, that is to say, very much thicker than ordinary carbon tissue. It must be absolutely faultless in character, that is, free from dust and other imperfections; and as its great thickness results in very slow drying, it will be seen that the operation is not a comfortable one, and, so far as I am aware, the article is not obtainable commercially.

There are two methods of proceeding, each of which has its disadvantages, while neither is remarkable for any special features to render it a desirable task. The one consists in mixing the bichromate with the gelatine before pouring out, which presents the advantage of giving a tissue that is ready for use when dry, but the serious disadvantage that the gelatine is liable to become partially insoluble during the long drying, especially if gas or other fumes get into the drying chamber, and it is, above all things, essential that the full solubility of the unexposed film should be retained. The other method consists in making and storing the tissue in an insensitive condition, but this, of course, necessitates after-sensitising and a second drying, in the course of which it is very difficult indeed to prevent the thick gelatine from twisting and warping in such a condition that it is impossible to get contact with the negative.

The tissue is made by squeegeeing moistened paper on to the bottom of a shallow tray, and pouring the gelatine in to the required depth. If this plan be adopted, when the gelatine has set hard the paper can be lifted bodily from the glass, and the tissue will then dry much more rapidly, but with a strong tendency to curl and warp. The plan preferred and recommended by Mr. Woodbury himself was to rub the bottom of the tray with talc or wax and collodionise, pour in the gelatine, and, when set, to squeegee the moistened paper on to the surface.

It will be seen, therefore, that the trouble of making the tissue is very great, but in practice the greatest difficulty is in the handling or using rather than in the making, as the thick gelatine tissue is so

refractory. For instance, to one even well accustomed to the development of ordinary carbon tissue, it will at first be next to impossible to get the Woodbury tissue to adhere to its support during development, even if everything has gone right up to then, and if any loosening occur it is fatal to the relief.

As a way out of many of the difficulties when working stannotype, some years since I resorted to the plan of applying the pigmented gelatine directly to the transparency. By this means there is no necessity for stripping, no danger of curling, absolute contact in printing, and the transparency itself becomes both the developing support as well as the final support for the relief in printing, for which latter reason it is essential that it be made upon plate glass.

When I suggested the plan to Mr. Woodbury, he recognised at once its advantages under some circumstances, and we tried it together, but not with very favourable results, though the cause was not attributable to the process. As a matter of fact, Mr. Woodbury invariably employed carbon transparencies for printing the relief, and unfortunately, by this method of working, the relief of the transparency and the hollows or intaglio of the mould coincided, and *vice versa*, and to a certain extent neutralised one another, the result being a general flatness and total absence alike of high lights or depth. Later, however, I tried the plan with gelatino-bromide as well as collodion transparencies, and found this the easiest and best way of working.

It may be said that if the relief proves a failure the transparency is lost. So it is, and if it were the case of the original negative, or if the transparency is the only one existing, this would be a fatal objection. But if the negative is in existence, it is so easy a matter to make another transparency, or to reproduce a transparency where the negative is not available, that the objection falls to the ground. In the ordinary way of working, when a successful relief has been made, the transparency is of no further use and has to be cleaned off, so that may be put as a set-off against the necessity for cleaning off a spoilt relief in the other case.

Mr. Woodbury, as I have said, invariably used carbon transparencies, and, after those, placed "in order of merit" collodion emulsion. Gelatine would not do at all, at least not in those days—I am speaking of seven or eight years ago—though I see no reason why it should not now. I made several gelatino-bromide positives for him, but none came up to his requirements—*absolute clearness and transparency in the lights*. That was before the days of "sulphite," and the pyro stain in the transparency lowered the whole tone of the relief made from it.

To explain this I ought to describe the principle of the double "safe edge" necessary in stannotype. In the first place, the transparency is printed with a perfectly clear margin of, say, a quarter of an inch all round. In the case of a carbon print it will be obtained as a matter of course from the "safe edge" employed on the negative, but whether the positive be carbon, collodion, or gelatine, this perfectly clear margin must be provided.

But if this transparency were at once used for printing on to carbon or Woodbury tissue, the margin would be rendered insoluble and repellent, and would never adhere to the developing support, for which reason it is absolutely necessary to provide the transparency with a second "safe edge" by pasting opaque or semi-opaque paper, or by applying pigment to the depth of an eighth of an inch all round the plate, which will then be surrounded by an outer strip, opaque or nearly so, and an inner one perfectly transparent, then the picture.

Now, in the relief the outer band will consist of a depression, or, looked at by transmitted light, would represent nearly clear glass; the next or inner band represents the fullest action of the light, and is the highest relief that exists in any portion of the plate. It regulates the thickness of the layer of ink that forms the picture, and constitutes the absolute high light on the zero from which all others start.

This being the case, it is clear that if the high lights of the transparency are at all veiled or stained, those parts cannot stand so high in the relief as the margin, and consequently a layer of ink of more or less thickness be deposited on them and so degrade them. There is, in fact, no zero to the scale of such a picture.

But this is a digression I have indulged in merely to explain the

kind of transparency required for this process; and as transparencies are so easily made by either gelatine plates, or for this purpose, perhaps, better with collodion emulsion, I think the modification I have outlined will be found a great saving to all workers of stannotype.

W. B. BOLTON.

ECHOES.

THE suggestion contained in Mr. W. M. Ashman's "Convention" paper, to found an Institute of Photography as a memorial to Fox Talbot, is a good one, if it could only be properly carried out, which I think would be very unlikely. I do not mean for a moment to say that the thing is impossible, but that under existing circumstances the chances are strongly in favour of the whole job being spoilt. If the objects of the Institute were to be the furtherance of the science of photography, it is long odds that it would drift into the hands of the "South Kensington clique," with the usual result. If, on the other hand, a merely technical training for commercial purposes were aimed at, I think it would be a pity to take the work out of the hands of those who already execute it—the technical institutes who specially lay themselves out for that class of work.

If such a movement were set on foot the aims should be scientific rather than commercial, dealing with the chemistry and general technique to the utter exclusion of the mere money-making element. The management should be in the hands of men of high scientific standing, not merely successful photographers, and it must be confessed that as yet the ranks of photography number but few of the right sort. I do not say there are none who have not some claim to eminence in photographic science, but the very paucity in number ensures that they would, in any case, be consulted by Government, or any other authority, with the inevitable result that photographers would have the pleasure of paying for what would be practically another branch of the South Kensington Nursery of Science.

On reading the editorial article in the series of *Neglected Processes* devoted to Warnerke's "new" (how time flies) "process," I could not help agreeing with the expression of surprise that so little use has ever been made of it. I do not know if the patent is still in existence, or whether it is free to be worked by any one who may choose to do so, but there are many applications of it which would prove eminently useful.

One especially, with which I worked experimentally some years ago, I will make a present of to those interested, though it is quite probable that the idea may have already occurred to others besides myself. In photo-zinc work blocks are frequently wanted at a few hours' notice, at periods and on occasions when the light is so bad that the ordinary methods of transferring the picture to the etching surface are useless. By Warnerke's method, however, a drawing or sketch may be photographed on to rapid sensitive gelatine paper by artificial or other light, developed, squeegeed on to the zinc, treated with hot water to remove the paper support and soluble gelatine, and the remaining image forms the "resist" for etching. The whole process of taking the negative and transferring to the plate ready for etching need scarcely occupy more than a quarter of an hour.

Of course, a specially thickly coated paper would be necessary, and if not a specially soluble gelatine, at least no alum or similar substance must be used in the preparation. Once, in the very early days of gelatino-bromide paper, I succeeded in getting a result *à la* Warnerke on the commercial article, but since that time so much alum appears to have entered into the composition of commercial emulsions that the papers are entirely unsuitable. If the patent has lapsed, I think it would pay some manufacturer to place on the market a paper thickly coated with an emulsion made from perfectly soluble and preferably English gelatine.

I am rather reluctant to differ from any statement editorial, but I cannot help thinking that the commendation awarded in a leaderette a fortnight ago to the novel method of folding a filter attributed to Mr. Fessenden, Edison's chemist, was written before the plan had been tried. It is certainly ingenious, and reads very well on paper, for which reason I very soon proceeded to try it. But here I got into difficulties at once, for there are various ways of reading the directions, to clip it "between opposite folds," &c. Commencing by clipping two opposite folds in such a manner as, while keeping the thing together

the centre of the filter remained open for use, I found that the angle presented by the sides was so obtuse that the filter would only lie across the mouth of the funnel, and that any liquid poured into it flattened it out and escaped over the sides. Even when folded up close, as when inserted in the schoolboy's "dart," the angle presented by the junction of the four separate wings is far too obtuse for the ordinary funnel; however, I tried clipping it across "between opposite folds," so as to keep the centre closed. This practically converted it into four distinct filtering compartments, the sides of which are composed of a single thickness, and under the weight of liquid the paper gives a little to the angle of the funnel, but still "wobbles" very seriously. My trial was made with a good stout sample of paper, and even this would not nearly bear being filled, so I do not know how the thin Swedish and English papers would answer. Perhaps I have not yet got at the right way of clipping.

Nevertheless, I have derived some advantage from the plan by a slight improvement that converts it into a nearly perfect filter. When folding the paper, fold with and *outside* it a piece of stout cap muslin, or, better, hair gauze, such as is used for making sieves. Instead of clipping it as above, run a couple of pieces of string through between the opposite folds, and, rejecting all funnel assistance, suspend the arrangement from any convenient support. Now every portion of the filtering surface—of a single thickness—is firmly stayed by the gauze, and filtration is both rapid and safe. The danger with the pleated filters and those not in contact with the sides of the funnel is that they are so liable to break at the folds.

In another leaderette wonder is expressed that so little ingenuity has been exhibited in the protection of the rollers and plates of our rolling machines. Silver I have had no experience with in connexion with rolling presses, but nickel I have seen come off in scales, both after constant use and after practically no use at all. Moreover, it is, to my idea, more trouble to keep in order than unprotected polished steel. My experience with a tricycle "plated in parts" was decidedly not favourable to nickel. If left for a day or two untended, especially in damp weather, the nickelled portions became absolutely "blue mouldy," or something very like it, and it was only by the most assiduous attention and constant polishing that the plated parts were kept at all decent. In consequence, they required renovating long before the enamel showed any signs of deterioration, and before the unprotected screwheads and outs, that had received less care, had lost their brightness.

The suggestion to employ the Bower-Barff process is a good one, but the question naturally arises, Will it answer? I have seen some beautiful results by the process, and there can be no doubt whatever as to the suitability of the surface for rolling purposes. But will it last? The film of oxide must be infinitesimally thin, which, though it promises that there shall be no "shelling off," rather suggests that it will not long withstand the temptation to rub off under the heavy pressure of work. However, the best way to settle the question is for somebody to have his press "Bower-Barffed."

It has been said that photographers, as a body, are too much given to "jumping at conclusions without sufficient ground to jump from." I don't like to differ from Mr. W. H. Sherman, who has made many excellent suggestions in photographic, especially printing, matters; but it seems to me he is acting up to that principle in attributing blisters in albumenised prints to the over-saturation of the bath with nitro-albuminate of silver. I can see little force in his arguments, and little connexion between his facts and the result. My own experience is, that if a paper means to blister it will do so with equal freedom whether the bath is old or new, used or unused, the only element that at all tends to modify the result being the strength of the bath in silver, not its freedom, or otherwise, from organic matter.

Apropos of the very slight differences in working that will produce identically opposite results, I may mention a case in point of blisters that was related to me some time ago. Two individuals divided a ream of paper between them, and one soon commenced to complain bitterly of blisters, while the other was quite free from them. The unfortunate one tried everything he knew; changed his samples of silver, gold, and hypo to the same as those his friend employed; used the same strength of bath, the same toning formula, and in fact left, as he thought, no stone unturned—but still blisters. So he got his

friend to pay him a visit and see if he got blisters when using the same materials. He did not; for when he came to fix, it turned out that he was in the habit of using less than half the strength of hypo!

JUNUS.

LANTERN SLIDE MAKING.

[A Communication to the Birmingham Photographic Society.]

To some extent the amateur photographer is bound to admit that his long periods of seclusion in the dark room render his hobby a somewhat selfish one, at least so far as his non-photographic friends are concerned. How often I have been reminded of this I scarcely care to think. Happily for me, a lingering desire to possess an optical lantern became a firm resolve. The instrument once at home, the temptation to increase my limited number of slides was, of course, irresistible. On the conclusion of my first display the universal congratulations convinced me that my efforts were appreciated, and, strange to say, resulted in the withdrawal of all further opposition to "that dark room terror," as my sanctum was designated.

My knowledge of the "wet" negative process aided me considerably for a time; it formed the basis of my operations. I found, however, the deposit was coarse, and that a different developer to that used for negatives was necessary.

Fifteen years ago photographic literature, especially that suited to the amateur, was by no means plentiful, and one could often seek in vain for information now afforded in every elementary handbook. This led to experimenting and careful observation on my part, and I believe that schooling was very beneficial—so much so that I cannot but regret the meagre superficial knowledge possessed by the average amateurs of the present day.

Let us consider the requisites of a good lantern picture. First, of course, comes artistic composition, the arranging of the subject in such a manner that as the eye wanders over it its beauties continue to grow, and the imagination receives an unalloyed feast of satisfaction and pleasure. To some extent I think it possible to teach the art of composition—at all events so far that its simplest canons may escape violation—but the capacity of rendering true art is a gift of nature. Secondly, the technical excellence of the picture, its mechanical production—upon which, with your permission, I shall address you this evening.

The wet process, properly understood, I believe it is generally admitted, yields the best results in many cases. That it is at times a somewhat troublesome process I frankly admit, still, with care and observation its difficulties can be overcome. I shall treat of the collodion process only, leaving that of albumen for a future paper. Collodion (that is pyroxyline dissolved in ether and alcohol) forms the vehicle to receive the sensitive salts, and a collodion that has been iodised some time is necessary, otherwise the high lights of the pictures will suffer. Thin glass cut to the standard size is taken, and after standing some time in sulphuric acid and water it is carefully dried with a cloth free from soap or other grease. One side of the glass is then coated with the following solution, which must first be filtered through filter paper:—

White of one egg, well beaten.

Ammonia liquor '880 1 ounce.

Water (according to quantity of albumen) 15 to 20 ounces.

The coating is performed by pouring a small pool in the centre of the plate, then gently inclining it so that it runs to each corner—the excess may be thrown away.

So soon as the plates are dry they are ready for use. With a soft brush carefully dust the prepared surface, flooding it with collodion in a similar manner, but returning the excess to the stock bottle. This is to avoid dust, a serious enemy. During the draining the corner should be kept in contact with the bottle, and the plate gently rocked to avoid a streakiness or uneven setting of the collodion. Directly it is sufficiently set (the best test for which is trying the upper corner with the finger) it is steadily and evenly lowered into the sensitising bath by means of a dipper.

A good bath for lantern slides is made as follows:—

Pure nitrate silver recrystallised 40 grains.

Water distilled 1 ounce.

Rendered slightly acid with C.P. nitric acid, one or two drops of which will be sufficient for 12 ounces of solution.

When the bath is mixed, for each twelve ounces add half an ounce of the iodised collodion and shake very thoroughly, let stand a couple of hours, then filter. The bath should now be quite clear and in good working order, but may occasionally be placed in the sun for a

few hours and afterwards filtered, when it will work cleanly until the silver is exhausted.

When the plate has been in the solution about two minutes it should be slightly moved to help the escape of the solvents, and in about four minutes may be examined by yellow light. If the surface is free from greasy lines it is ready for exposure in the camera.

A good negative is necessary for a successful slide. It should be "plucky," so as to admit of a fair exposure.

A good developer is made as follows:—

Protosulphate iron	$\frac{1}{2}$ ounce.
Acetic acid	2 $\frac{1}{2}$ ounces.
Honey	1 ounce.
Alcohol	$\frac{1}{4}$ "
Water	16 ounces.

Use plenty of developer, and cover the plate in one even wave, never mind spilling a little, but practice will enable you to avoid this. As soon as all detail is well up, thoroughly wash and intensify with—

Pyrogalllic acid	24 grains.
Citric acid	24 "
Acetic acid	$\frac{1}{4}$ ounce.
Water	24 ounces.

Enough to cover the plate is taken, to which, immediately before use, a few drops of the silver bath is added.

Do not over intensify, as the picture does not loose much in fixing, for which operation hyposulphite of soda may be used on the ground of safety, but cyanide of potassium acts more quickly and perhaps more cleanly. Slides by this process are a good colour, and do not need toning. A coat of clear varnish improves the transparency of the shadows. The apparatus for lantern slide making, patented by our member, Mr. W. Griffiths, is very handy and cheap. I have one here for your inspection. The slideholder requires to be made in wood, with silver wire corners to adapt it to the wet process.

I am quite aware that the dry plates now made for lantern slide purposes are very popular, and I think most of them deservedly so. Personally, I use a lot of Messrs. Fry's, Mawson's, and Thomas's. My various sets of Norwegian slides, numbering some hundreds, are made upon them, and I will next show you the methods of development most successful in my hands.

Whether printing in contact or by means of the camera, I strongly recommend a full exposure. Gelatine plates are sure to show fog if forced, and however slight that may be it should ensure their immediate rejection. Indeed, it is well to select a really good slide as a standard both as to density, tone, and clearness in the high lights, and those that do not come up to it should not be kept.

For dry plates I prefer a soft negative full of detail. If the skies are not sufficiently opaque they must be stopped out.

The solutions required are ten per cent. ones of the following:—Pyrogallol, bromide of potassium, ammonia, carbonate of ammonia, and carbonate of potash.

The pyro is mixed as follows:—Four ounces of sulphite of soda are dissolved in boiling water and rendered acid with citric acid. The pyro is then added, and the whole made up to ten ounces with water.

The other chemicals are simply mixed with water, and all will keep well. A developer giving a beautiful purple tone with Mawson's and Thomas's plates is—

Pyro solution	30 minims.
Bromide	30 "
Ammonia	30 "
Carbonate ammonia	30 "
Water to make up to	1 ounce.

The same colour can be obtained with Fry's plates by slightly increasing the exposure and bromide, while a fine engraving black is got by shortening the exposure, increasing the ammonia, and leaving out the carbonate of ammonia.

Sepia is obtained by full exposure and using carbonate of potash or soda in place of ammonia, but some makes of plate will not yield the sepia tone.

While the plates are developing keep them in motion, it adds to their vigour, and prevents flatness, and also deposit settling upon them.

After fixing and moderately washing they may be cleared in—

Alum	2 ounces.
Citric acid	$\frac{1}{2}$ ounce.
Water	10 ounces.

The addition of two ounces of protosulphate of iron and a quarter of an ounce more of citric acid will considerably moderate the tone, and by slightly reducing the slide increases the clearness of the high lights.

If any deposit appears upon the surface rub gently with the finger or a tuft of cotton wool. The slide is now well washed, allowed to dry slowly away from dust, and then varnished.

I will now proceed to make several slides, which I will afterwards exhibit on the screen by means of the oxyhydrogen lanterns, and show the various tones obtainable by the variation of the developer. The results both by wet and dry process, you will see, are equally good.

E. H. JAKES.

PRACTICE AND THEORY.

PRACTICE and Theory should go hand in hand—one supported by the other; if they do not agree, it is very certain there is something wrong somewhere. It is proposed in the following article to touch a little on both the theory and practice of taking photographic negatives and printing them—printing being the ultimate use to which such negatives are put, and may be expressed in silver, platinotype, bromide, or carbon. Negatives produced especially for photo-mechanical work will not be taken into account, for their useful career is ended when the blocks are made. Photographic printing methods, such as are familiar to most photographers in their everyday practice, will be the only kinds that will come under consideration. It is well known that by skilful printing very indifferent negatives can be made to produce good results, but undoubtedly the best negative will produce the best work (other things being equal) with the least trouble and least waste of material. How to produce the best possible negatives, or how the best possible negatives should appear when produced, has hitherto been a much debated question. Opinions differ; much depends on the purposes for which they are required, or the special effects aimed at; for the very best process, if there is a best, and the very best negative, will in some hands only produce very indifferent results.

Qualities which have hitherto been considered *essential* to good work, as, for instance, brilliance and delicacy, have, by a recent writer on photographic art, been somewhat pilloried as faults; the essential quality of such negatives as points of absolute clearness and absolute opacity, rejected as something that had not ought to exist and evils to be avoided. A soft half-tone pervading the whole composition is set forth as about the only quality a good negative should possess, definition being altogether antagonistic to artistic results. No one will dispute that softness is a very good quality when combined with something else, but *alone* leaves much to be desired. In any kind of print in which half-tone exists, the greater the range of gradations the better the picture. To get this scale, we must have negatives with clear glass in the deepest parts and absolute density in the lightest—it does not follow there need be much of either, so long as these extremes exist it is sufficient. The printing of the negative regulates the final tone and harmony of the production, but to start with any chance of success the negative must possess these qualities. The *general* density of negatives may vary—in fact, ought to—to fit them for the kind of surface on which they are to be impressed. A matt surface or salted paper requires a stronger negative than for bromide printing, on which a negative so thin as to be unsuitable for other work gives the best results. A perfect negative will, however, give *good* results on any surface, although different densities for different processes are practical advantages not to be neglected, one of the principal points of which is freedom from waste. In looking through a number of prints from a negative that is not so good as it should be for the work required, it will be found that they (the prints) vary very much, both in colour and brilliancy. One out of a dozen will probably be infinitely superior to the others, the one causing dissatisfaction with the rest; but, on the other hand, given a suitable negative, there will be evenness of results, possibly all the prints will be good, or at worst but very few that it will be necessary to discard: this consideration is of very great importance where much work is done. Those who advocate flat negatives are certainly not well versed in photographic printing, and possibly are satisfied if by dint of frequent trials they can get one or two good and satisfactory pictures. However this may be, a negative deficient in scale will never be popular with those who have to print them, on the score of difficulty in getting uniform results. Connoisseurs will note their want of "sparkle," which, by-the-by, does not mean either hardness or loss of detail in the shadows, but simply a quality of freshness and brightness throughout the whole work. It is patent to every one acquainted with painting, or its associated arts, that it is a matter of impossibility to equal by any process the brightest lights or deepest shadows to be observed in nature; so artists and photographers approach it as nearly as they can by starting with pure white at one end of the scale and pure black at the other, not that there should be much of either. We see the most absolute blackness in nature when we look into the mouth of a deep cave, the

interior of which is absolutely devoid of any illumination; in such case we see the blackness is simply produced by absence of light—there are no reflections, nothing to reflect; the blackest paint or the deepest photographic colour would be, by comparison, grey.

Since we are handicapped so severely in our power to imitate, we, by judicious contrasts, increased the apparent force of light and shadow. Hazy indistinctness, an effect so dear to painters, is almost the only method of representing atmosphere with fidelity, or producing an effect of realism on the observer. At any rate, it is the plan generally adopted. With photography, atmosphere can be obtained without blurring or imperfect focussing. Suppose we examine a landscape critically on a perfectly clear day—no one would venture to say atmosphere was absent. Clear as it might be, objects in the distance would be fainter, bluer, and lighter in colour than those in the foreground, but *not blurred*. The time by a church clock might with a telescope be read if miles distant. We only see these things through a veil of minute particles; the deeper the veil the more indistinct objects become, till, in the end, they are altogether obscured, and the land merges into the sky, or, as Professor Hartley says, the blue colour of distance is owing to the presence of ozone. We, therefore, in this case get the impression of distance through a perfectly transparent but coloured medium, and it is only when there is a considerable amount of heat radiated that an indistinct outline in a transparent atmosphere is given, and this is owing to the mixture of atmospheres of different degrees of density, the heat radiated from the ground mixing with the cooler air above. Therefore it is not absolutely wrong to give blurred images to represent distance; but sharp images are equally correct, providing they do not err in colour and intensity. An argument advanced in favour of blurred images is that the human eye only sees one small space sharply at one time. This is right enough so far as it goes, but we must also take into consideration that the eye involuntarily and rapidly is always changing its focus to suit the different planes, so we practically see everything sharply defined when we look at a landscape, *unless* the view is interfered with by local conditions. There is also an involuntary movement of the head to see things that lie to one side or the other of the line of sight. The lens will include all this, being stationary, on account of it being constructed to include a much wider angle than the natural eye, and this extra angle is practically equivalent to moving the head. The perception of atmosphere, in all probability, differs in different individuals, and is dependent in a measure on the personal equation of the observer—in fact, on the sharpness of his sight. As the lens has no personal equation, and can see, so to say, far more distinctly than the most acute vision, depicting objects with much greater clearness than many persons can appreciate as a true rendering of nature from their own standpoint, they challenge its accuracy. No one will dispute that different persons see differently, and effects that will be vividly striking to one will be unnoticed by another, not because of lack of art education (although this is an important factor when we come the purely artistic), but simply because of a variation of strength of sight. On this hypothesis it can be readily understood why some efforts rendered by photography convey different impressions to different persons, why some insist on definition and some on fuzziness; either effect to one particular observer is correct and the other wrong. It is the case of the gold and silver shields over again. I cannot help thinking that the out-of-focus method advocated so strongly is wrong on every point, unless photography and picture-making are to be divorced for ever and aye. My idea is to get atmosphere by the proper exposure and development of as sharply defined a picture as the lens will give, worked with a judicious art knowledge.

The use of wide-angle lenses for ordinary work is a mistake, both photographically and artistically, if the whole of the angle given by the lens is included in the picture. A photograph taken with a lens giving ninety degrees on the base line would in most cases look out of drawing, awkward, and inartistic, the foreground would be much exaggerated, and even examined from a near point of view, say the length of the lens focus, or by bending the picture into a concave form, it would look unnatural and unsatisfactory; but cut off a considerable portion of the margin of the picture, the central part would not only be quite correct but appear so. Any attempt to include an exceptionally wide angle in the view from a stationary camera with a wide-angle lens is simply courting failure, from an artistic standpoint, for all but very exceptional subjects. EDWARD DENMORE.

(To be continued.)

CONTINUATING ACTION OF LIGHT.

THE statement, casually encountered, that where it is suspected insufficient exposure has been given to a surface of silver bromide the postponement of development for a time, presumably weeks or

months, will remedy the error, or, in other terms, effect such a reduction of the sensitive body to the state of sub-salt as to obviate any deliberate deviation from one's normal course of developing procedure, appears to invest the action of light upon the silver compounds with a property not hitherto generally assigned to it, and to be worthy of something more than passing scrutiny by reason of the considerations to which, if the theory, besides novelty, has the features of feasibility, the assertion must give rise.

Every one is aware that the precise change produced in the silver compounds by light is far from being clearly proved and understood, and that the explanation most commonly received is that the action is chiefly, if not wholly, a reducing one, thus symbolically represented: $2 \text{ Ag Br} + \text{Light} = \text{Ag}_2 \text{ Br} + \text{Br}$. In taking a photograph, when we have arrived at an approximate idea of the relative sensitiveness of the emulsion we are employing, and have familiarised ourselves with the respective "values" of our lens and the light on the picture sought to be obtained, the practical realisation of the above equation, which may be broadly esteemed as the small pivot upon which modern photography mainly turns, is only a matter of the impression of the illuminated object upon the plate for so many seconds or fraction of a second, and nothing more. Certain portions of the haloid salt suspended in the gelatine film are thereby altered to the condition of sub-salt, and this, scientifically expressed, is the attainment of the immediate end we had in view when removing the lens cap or setting the shutter in motion.

That the action of light is a continuing one, that it is prolonged and sustained after the effective rays have been cut off, to the instigation of further chemical changes than those actually induced by the prescribed and measured impact of light, which we call the exposure, is a theorem that the present writer does not remember to have seen previously put forth in relation to the subject of the undeveloped negative image. All the same, as it is not an easy affair for an individual to possess himself of the gist of a literature that has expanded so immensely as that of photography, there is the saving chance that the fault is his own. However that may be, it would be rash at the first blush to argue that there is any law insuperably antagonistic to the principle of continuation; indeed, on simple, physical grounds it might be permissible to urge much in support thereof, were it not for the awkward fact that it may be closely established from the positive evidence of practical experience that the assumption of a continuing action of light in the silver salts is unwarranted and erroneous. As it is, a fair inference that a remark of the tendency of that with which these lines are prefaced is animated either by a belief in the correctness of the continuing theory, or some imagined substantiation of it in real practice, there is no need to apologise for the demolition of what I respectfully regard as a pure delusion, or, at least, its relegation to the airy regions of the mythical.

Let it be provisionally granted that the action of light is sensibly prolonged after the duration of the exposure of the sensitive film in the camera, although it is not appreciable until the lapse of weeks or months, and there is an end at once, in an enormous number of instances, to the comparative value of experience, judgment, exposure tables, photometers, as aids to the proper observance of the great and vital preliminary in photography—the exposure. Most persons of average sense, by the way, need no such assistance to the estimation of exposure; tables and photometers are the absurd encumbrances; but this may pass. What are the phenomena that are irresistibly prominent if we countenance the existence of this curious after-property of light? That there is always more or less danger of the effects of over-exposure in deferred development; that correct exposure in the camera must be rarer than we imagine, or that it is either largely dependent upon the length of time that passes between the removal of the plate from the slide and its treatment under the developing agents, or the merest guesswork. Furthermore, these phenomena inevitably split up into several sub-sections not less extraordinary than their parent stems. For instance: if correct exposure be given in the first case, then, on account of the continuing action, the image at the moment of development should—nay, must—exhibit symptoms, the seriousness of which is to be gauged by the time that has elapsed since exposure of being more or less overdone; this law issues naturally and symmetrically from the primary theory of continuation. In short, not to particularise too minutely, to a very ordinary mind a perfect crop of wild anomalies and perplexities must suggest themselves from the insurmountable fact that continuation cannot possibly be arrested in the sensitive body at any stage of reduction, but that so long as there is allowed to remain a layer of haloid capable of being influenced by light, so must the reduction by continuation proceed remorselessly to the bitter end of—solarisation? or what? It is impossible within the limits at one's command to pass in review even a few of the strange aspects in which photography would be, and ought

to have been, revealed to us if the theory were confirmed and reared on high for general acceptance; in the common phrase, they are more easily imagined than described.

It will not, I conjecture, be gainsaid that a statement of such a character seriously made in a technical publication requires to be traversed in cool, matter-of-fact style, however ludicrously incorrect the offending theorist may be. It is not an uncommon thing, as any one of experience will bear out, for intervals of months and years to elapse between the exposure and development of silver bromide plates. Many of us may modestly claim to possess adequate facilities for confirming or confuting the practical value of the continuation theory. Without indulging in a multiplication of adverse evidence, it can be alleged quite freely that where the trial development of a few plates leads to large numbers being placed aside for development at a future year or month, the guiding qualities of the negatives eventually obtained differs in no visible manner from those developed shortly after exposure. If the continuation theory holds water, the plates known to be correctly exposed should be found to be overdone; those under-exposed, to have acquired the requisite ripeness; and so on. Again, where large numbers of plates are exposed, and a few developed immediately afterwards, that exhibit signs of being generally under-done, the remainder, which are reasonably considered as being in error as regards exposure, should, after the best part of a year, "continue" to the proper, or, at least, an improved degree of reduction. Alas! for continuation; they are as badly under-exposed as the trials of the last year. In fine, the cream of experience is overwhelmingly fatal to the probability of light possessing this extraordinary property, save in a practically inconceivable degree. It has never before, I believe, been suggested that the haloid salts of silver are liable under any circumstances to reduction in the absence of the active agent; if operative light could be stored up at will, the gardeners would not be alone in their rejoicings.

The misconception may have arisen from inadvertently confusing with the properties of the silver salts the continuing action of development in the dark, which is a characteristic of a certain platinum positive method; but here the compound that is to yield the image is in intimate union with its reducer, which completes the work begun by light—if moisture be present. Or it may be inspired by the fact that for a long time there was an idea that the exposure necessary to produce an autotype-carbon print might be largely curtailed by placing the print itself in the dark, the printing gradually continued, and on development, after some hours, the picture was found fully printed. But this continuing action was afterwards demonstrated to be due to the presence of moisture in the atmosphere. I think there is ample justification for disputing that any measurably appreciable alteration takes place in the undeveloped silver image between the time of exposure and that of development; and so long as it can be confidently felt that exposed plates may be kept for months, even years, without the sub-salt undergoing further reduction through an assumed storage of light-energy in the film, it would be bootless to formulate a more scientific anathema for this pretty little photographic heresy.

THOMAS BEDDING.

COLOURED PHOTOGRAPHS.

VII.

In my last paper I set down for consideration the merits, demerits, and other qualities of Chinese white, raw sienna, Indian yellow, light red, and Venetian red. We can now proceed with the other colours.

Vermilion.—I have remarked in this colour a vast variety of shades as produced by the various makers. Indeed, they may be said to vary in hue to such an extent as to embrace a range from the deep reds of a crimson character to the paler ones of scarlet and orange. In chemical composition they may be said to be practically the same, and consist of sulphide of mercury. The "vermillion" of water colours, when used without any qualifying word, such as scarlet, orange, &c., may be said to denote the rather deep and crimson-hued variety. In its best form it is a very permanent pigment. Some believe that it blackens in time, as evidenced in some of the very old illuminations, but I do not think this change at all attributable to any chemical decomposition.

Sulphide of mercury is found to exist in two very different modifications, the one red and the other black. As far as chemists have discovered, these two modifications are supposed to possess the same identical chemical composition, and it has been suggested that this difference of colour is simply the result of the different arrangement of their "molecules" or ultimate particles. We have no proof, however, that the old illuminators, whose work in time has become so blackened, had been in the habit of employing the *pure* pigment.

The modern product, when pure, has a very good reputation as regards its permanence, and in *oil colours* this quality is admitted on all hands, and I think with every degree of justice. There is, however, in water colour, a difference of opinion on this point, as the results of experiments have shown, but I am of opinion, and I don't stand alone, that a great deal depends both upon the manufacture of the pigment and also upon the medium with which the colour may have been mixed. One or two authorities, such as Mr. Simpson and Professor Hartley, have declared, after putting it to severe tests, that vermillion deserves to be considered a permanent colour. These tests have embraced its power of endurance as tried by time, as well as by exposure to violent sunshine. On the other hand, however, Professor Rood has declared that it has become darker and also of a brownish hue after exposure to strong sunlight for three and a half months.

Vermillion possesses great opacity, and does not flow very well. When used in quantity, it is rather difficult to handle, as it shows an extraordinary disposition to wash up; still, when skilfully used, it is a most useful pigment. It has a tendency also to separate itself from other colours with which it may be mixed. This is caused by the fact that it is a very heavy colour, and on this account should, when possible, be used in conjunction with the heavier colours. It is not affected by atmospheric influences.

Mixed with pink madder or rose madder, it produces a very fine tint for the carnations of the flesh.

Pink Madder and Rose Madder.—These colours, although at one time somewhat different, may be considered nowadays to be identical, both as regards hue and its uses. They are most delicate carnations, and are in great favour on account of their very superior permanency. They are much clearer and more delicate in their *lighter* washes than either crimson, lake, or carmine, but of course lack their density. They are of a beautiful rose tint, inclining neither to crimson nor scarlet. Its "*wash*" is its great virtue, and I think I may safely say that rose madder affords us the most perfect carnation that is known. It is conceded that years of exposure to the ordinary diffused daylight will have little or no effect upon it, but if exposed to the violent and prolonged action of sunlight it will lose considerably in intensity, and tend more to a purple hue.

Indian Red.—It may be said to resemble light red and Venetian red, both in its chemical constitution and its absolute permanence. There is a vast difference, however, in its hue. It is a purplish red colour of considerable power, and is a most excellent colour for the shadows of the flesh, either alone or in combination with blue.

Genuine Indian red is a natural earth, mostly found in Persia and parts of India, notably Bengal, and is particularly valued for its purple hue, and for the beautiful clearness of its tints. This colour, however, is now replaced by *artificial* Indian red, and which is an exceedingly good imitation. Notwithstanding that Indian red is looked upon as a most durable pigment in itself, water-colour painters are almost universally of opinion that it helps the decomposition of the more delicate colours when mixed with them. Indeed, the action of the *genuine* Indian red upon indigo in this regard is a matter of notoriety. Many of our best authorities, however, hold that the artificial varieties of this colour (Indian red) are entirely neutral as regards its action on indigo. This is Professor Church's opinion on the subject, and I believe Mr. W. J. Winsor, who has made exhaustive experiments on this point, backs him up. Such evidence as this I feel sure we may take as conclusive on the question.

Brown Madder.—This is a most beautiful colour, and as useful as it is beautiful. It may be described as a very rich, transparent, *lakey*, russet brown. By its use the richest descriptions of shadows may be obtained when applied in a fair degree of strength, while its paler tints exhibit extreme delicacy. Combined with blue, it makes a delicate grey for the flesh, or soft tint for the shadows on the face, &c. It will be found most useful, too, for many of the darkest touches in the flesh. When the draperies are red, they are often too glaring and attractive; brown madder may be used in their dark shadows and elsewhere to lower the general tone and produce a feeling of harmony. It is a lake prepared from the madder root and possessing great transparency and depth of colour. It is pleasant and easy to work, and so useful for shadows, &c., as to be almost indispensable to the water-colour artist. Exposed to ordinary daylight this colour may be considered practically permanent, but if exposed to violent sunshine will be found to be visibly affected by it. Indeed, if exposed to the action of direct sunshine I think it will be found to be the least permanent of all the madders.

Cobalt Blue.—This is a most useful colour, is possessed of sufficient brightness, is permanent, and washes well. It is a fine sky-blue colour, and in water colours the very best pigment for producing the silvery

tints and pearly greys on the flesh. It will also represent the blue tints, and, mixed with Indian red, will produce the shadow colour for flesh. By artificial light it partakes somewhat of a purplish tint, but this in the flesh is not materially perceptible.

This colour is prepared artificially by calcining a combination of alumina and basic phosphate of cobalt. It is more or less a modern colour, having been discovered by a Frenchman, M. Thenhard, at the beginning of this century. Having discovered this most beautiful colour he should have changed his name, as he could not have been *then hard* up for a blue. Cobalt blue has not the depth and transparency of the genuine ultramarine, but washes better and is more easy in its general use. The most perfect examples of this pigment are of a beautiful, rich azure colour. Although proof against the most severe exposure to strong light, cobalt is apt to be considerably influenced by an impure atmosphere, becoming greener in hue.

Burnt Sienna.—It may be described as an orange of a very rich and transparent brown or russet hue. It is a most useful colour, and besides being invaluable for its many beautiful combinations with other colours, may be very effectively employed in painting warm complexion. Besides this it is useful in some of the ordinary flesh tints. It is most useful to depict the shadow tints of amber-coloured draperies. I have known it employed for the dark shadows of gold trinkets with very striking effect. In the greens of landscape backgrounds it will prove valuable, and in combination with indigo forms an excellent colour for green backgrounds.

Burnt sienna is simply raw sienna calcined, is extremely permanent, and may be classed as one of our most generally useful of water colours.

Vandyke Brown.—This is a bituminous earth of a very rich and transparent hue. A very valuable colour, but suffering from the bad habit, a desire to "work up." Whenever it is necessary to lay a great body of this colour, I think the moist will be found better than the cake. A very fine, warm, and transparent tint, and one much used as a warm shadow colour, is formed by the judicious mixing of vandyke brown and lake.

This colour is produced from a bituminous ochre: it is a fine, deep, and semi-transparent brown. The very best examples of this colour come from Cassel. It varies considerably in hue, and forms a subject for likely discussion as regards its permanence. Under normal conditions it is in all probability durable, but, most decidedly, exposed to sunlight it fades and gradually becomes greyer in colour.

The foregoing are the colours most useful and mostly used in the painting of flesh. There are, however, other colours which with them enable us to do justice to the other portions of our picture besides the figure. The production of a harmonious background is quite half the picture, and much of our success will depend upon our knowledge how to do it and what colours we should employ. In addition to those above mentioned, the following will be found most useful:—Gamboge, yellow ochre, sepia, lake, carmine, French ultramarine, smalt, indigo, Prussian blue.

Gamboge.—This is a fine yellow colour, somewhat inclining to green. It is easy to work, flowing well, and the resin which it contains forms a kind of varnish, which helps considerably in preserving its colour. Useful at times for draperies.

It is a kind of gum resin which comes from Ceylon, is a bright, pale, transparent yellow, and much used in water colour. I do not incline much to its use as it has no great depth, and in deep touches seems to shine, producing anything but a pleasant effect, suggesting almost a brown. Exposure to sunlight will considerably weaken gamboge; but in ordinary daylight I have reason to believe that it will stand uninjured by any serious alteration for years. Although put down as fugitive itself, it has the desirable quality, when used as a glaze, of being able to preserve or protect the most delicate pigments. For this reason I must hesitate to say too much against it—still I cannot recommend its general use.

Yellow Ochre.—This is a very useful colour for producing atmospheric effects, as it seems to possess certain qualities of light which render it most effective for skies, &c. It is sometimes used in flesh, but for this purpose I prefer Roman ochre. For the local tint of light hair it is very useful, also for certain parts of landscape backgrounds. It is a very permanent pigment and works well.

It is a native earth, coloured by sesquioxide of iron; some of the finest quality is found, I believe, near Oxford. It is but a tolerably bright yellow, of inestimable value to the landscape painters, and irreproachable as to its reputation for steadiness. It is a vexed question as to the advisability of using it in combination with other colours, such as the lakes of cochineal or intense blue, for it is supposed to have an injurious effect upon them, therefore we may do well in avoiding such mixtures until the point be finally settled by those who understand these matters chemically better than we do.

Sepia.—Is a very valuable cool brown pigment. Its pale washes are extremely clear and transparent. It lends itself favourably to mixing with other colours, and by this means a great variety of valuable tints may be obtained. Mixed with indigo it may be used for distant trees, for a general shadow tint, for very light backgrounds, also for the shadings of white linen and white draperies. In combination with lake it forms a fine warm tint resembling somewhat brown madder, and with lake and indigo an excellent black will result. It is transparent, permanent, and works well. Indeed, it may be said to be the best washing pigment in an artist's water-colour box.

It is obtained from a secretion of the cuttle-fish, *Sepia Officinalis*, is a very powerful, dusky brown of finest texture. If kept from very strong light it may be considered durable, but if exposed to sunshine will fade perceptibly. REDMOND BARRETT.

THE PROPERTIES OF ALLOTROPIC SILVER.

THE three forms of allotropic silver which were described in the June number of this JOURNAL—the blue soluble and the blue and the yellow insoluble—are not to be understood as the only forms which exist, but as the best marked only. The substance is protean, and exhibits other modifications not yet studied. No other metal than silver appears to be capable of assuming such a remarkable variety of appearances. Every colour is represented. I have obtained metallic silver blue, green (many shades of both), red, yellow, and purple. In enumerating these colours I do not refer to interference colours produced superficially by reagents, also wonderfully brilliant, but to body colours. As a single instance of colouration the following may be mentioned. I recently obtained a solution of allotropic silver of an intense yellow-brown. A little solution of disodic phosphate changed this to bright scarlet (like Biberich scarlet), presently decolorising with formation of a purple precipitate. Washed on a filter this changed to bluish green. The colours I have met with in this investigation can only be compared with the coal-tar products, of which one is constantly reminded by their vividness and intense colorific power.

Two of the insoluble forms of allotropic silver, the gold-coloured and the blue, show in many respects a close relationship and almost identical reactions. There are other respects in which they differ strikingly, and amongst these instability. Blue allotropic silver (dark red whilst moist, becoming blue in drying), is very stable. It may be exposed for weeks in a moist state on a filter, or be placed in a pasty condition in a corked vial, and so kept moist for months without alteration.

The gold-coloured form, on the contrary, tends constantly to revert to ordinary silver. This is especially the case whilst it is moist, so that from the time of its formation it must be separated from its mother water, and washed as rapidly as possible, otherwise it loses its brilliancy and purity of colour, and changes to a dark, dull, grey form of normal silver. On the filter its proper colour is pure black, with a sort of yellow shimmer (the gold colour appearing as it dries), often, especially if allowed to become uncovered by the water during washing, it will change superficially to grey. But if the washing is done rapidly, with the aid of a filter pump and a pressure of four or five inches of mercury, the allotropic silver obtained, when allowed to dry in lumps, or brushed over paper or glass, is at least equal to pure gold in colour and in brilliancy. With the blue powder such precautions are wholly superfluous.

Of the facility with which the gold-coloured form is converted into normal silver, I have recently had a somewhat singular proof. I brought with me to my summer home a number of specimens in tubes, some recently prepared, some dating back as far as ten and a half years, together with other tubes containing specimens of white silver spontaneously formed from the gold-coloured. On opening the box no tubes of gold-coloured silver were to be found; all had changed to white. But the same box contained pieces of paper and of glass on which the same material had been extended; these were wholly unchanged, and had preserved the gold colour perfectly. Apparently the explanation was this—the mere vibration caused by the jarring of a journey of six hundred miles by rail and steamboat had had no effect in changing the molecular form, but the material contained in the partly filled tubes had been also subjected to friction of pieces moved over each other, and this had caused the change. To verify this explanation I prepared fresh material, filled three similar tubes, each one-quarter full, but in one forced in cotton wool very tightly to prevent frictional motion. These tubes were packed in a small box and sent over two thousand four hundred miles of railway. The tubes with loose material came back much altered. One was nearly white, and, as the change has been set up, will probably in a few days be entirely so; another with loose material was also changed, but not as much as the first mentioned. The tube filled up with cotton came back unaltered, so that continued friction of pieces sliding over each other will cause a change to take place in a few days, which otherwise might have required years, or might not have occurred at all. The permanency of this substance is greatly influenced by moisture, so that

* When well washed, this form can also be preserved for a time in the moist condition in a corked vial, as I have lately found.

† Has since become so.

when simply air dried before placing it in tubes it is less permanent than when dried at 70° or 80° C. in a stove. Tubes placed in the same box containing the blue form remained unaffected by the motion, though only partly filled and allowed to move freely.

When gold-coloured allotropic silver is gently heated in a test tube it undergoes a remarkable change in cohesion. Before heating, it is brittle and easily reduced to fine powder. After heating, it has greatly increased in toughness, and cannot be pulverised at all.

Both the gold-yellow and the blue forms resemble normal silver in disengaging oxygen from hydrogen peroxide. These two forms, though differing so much in colour and stability, and differing also in specific gravity, and in their mode of formation, have many properties in common, not possessed by ordinary silver, and differentiating them strongly from it. They show a vastly greater sensitiveness to re-agents, and are also sensitive to light. The ability to form perfect metallic mirrors by being simply brushed in the pasty condition over glass was mentioned in a previous paper.

Many substances which react little, if at all, with ordinary silver, attack the gold-coloured and the blue allotropic silver with production of very beautiful colours due to the formation of thin films and resulting interference of two reflected rays. In my previous papers I called this the "halogen reaction," because first obtained by the action of substances which easily parted with a halogen. But I have since found that many other reagents will produce the same or similar effects. These are:—

Sulphides.—Paper brushed over with either the gold, the copper-coloured, or the bluish-green substance exposed to the vapour of ammonium sulphide, or immersed in a dilute solution of it, assume beautiful hues, though less brilliant than those obtained in some other ways.

Potassium Permanganate in dilute solution produces blue, red, and green colours.

Potassium Ferricyanide in moderately strong solution gradually attacks allotropic silver with production of splendid blue, purple, and green coloration.

Phosphorous Acid produces gradually a rather dull coloration.

The colour reaction is produced finely by substances which readily part with a halogen—such as ferric and cupric chlorides, sodium hypochlorite, hydrochloric acid to which potassium bichromate has been added—and by corresponding bromine and iodine compounds. In some earlier experiments I obtained effects of the same sort, but in much weaker degree, with alkaline haloids. But with purer products the results have been different. There is at first some darkening, but no true colour reaction, and the allotropic silver appears to be gradually converted into normal, so that it is no longer capable of giving the brilliant colour reaction with potassium ferricyanide, but, like normal silver, takes a pale and faint coloration only.

The perchlorides of platinum, gold, and tin, do not give the colour reaction, though by analogy one would expect that they should, since they can lose chlorine with formation of a lower chloride.

Action of Light.—In a previous paper was mentioned the remarkable fact that the gold and copper-coloured forms of allotropic silver can be converted first into yellow, and finally into white, normal silver by the continued action of light. The earlier specimens of the blue form became brown by exposure, but purer ones since obtained are likewise converted into yellow by exposure, becoming continually lighter as the action is continued. The conversion from the darker shades to a bright yellow, with full metallic lustre, is very easy, but when the previous paper was written I had been only able to obtain the white by keeping the paper on which the silver was coated moist by a wet pad, and by exposing for five or six days. Since then I have obtained the gold-coloured silver in a more sensitive form, giving a perfectly white product by exposure dry for half that time.

The white silver thus obtained has all the character of ordinary silver, and does not show the colour reaction with ferric and cupric chloride, potassium, ferricyanide, &c. Just in proportion to the exposure to light the ability to give this colour reaction diminishes, so that after a day's exposure, when the exposed part has become bright yellow, the colour reagents scarcely affect this yellow, whilst the protected part becomes intense blue, purple, or green. In this way it is easy to observe the gradual effect of light as it changes the allotropic silver, finally converting it into what resembles in every way and is undoubtedly ordinary silver.

—*American Journal of Science* for September.

M. CAREY LEA.

THROUGH JAPAN WITH A CAMERA.

CHAPTER XII.—CONCLUSION—A WORD ON JAPANESE ART.

I would like to say a great deal about Japanese art, or rather I wish that I were qualified to do so, because I have been deeply impressed by it. One thing, that what I have seen in this country has convinced me of is, that at home there is an utterly erroneous idea of what art is at all: the idea held by the vulgar multitude, at any rate—of whom I count myself one—that it consists in picture making, and statue making, and analogous performances, appears to me now to be very absurd.

I conceive that art which is confined to one class of a people, and extends to only one class of subject, is not true art, and that art in a whole people, if it is to be in the least true, must be spontaneous and unconscious, and that it must penetrate into all the works, of even the meanest, of the people. This is greatly the case in Japan.

The commonest thing that is made or used has a grace and beauty about it that is quite wanting in things for common use at home. I am struck with this much more in the case of quite cheap things for every-day use than in that of the more elaborate articles that commonly find their way to England. Amongst a set of common Japanese cups, saucers, and tea-pots, the whole lot—costing, perhaps, a shilling a-piece—of English earthenware looks positively barbarous; but a single Japanese cup will not look other than beautiful beside anything; and the same may be said of all the commonest things. A Saké bottle—the analogue of our decanter—which costs a penny or twopenny, would be an ornament anywhere. In the poorest houses, things that we would never dream of using—common rough bits of wood and stone—are used, and are disposed in such a manner that shows a true feeling for what is beautiful. The drawing of the Japanese is notoriously lacking in perspective, and I must admit that I do not vastly admire the more ambitious attempts, but I think the very common drawing that is used for decorating even the poorer houses is often perfect. A few strokes—made with a brush and black colour—indicate a flower or a gracefully bending plant, and one could not conceive that a line could be altered by the distance of a hair's breadth and show any improvement. These things are done not by professed artists, but merely by handicraftsmen.

I believe that all this results greatly from the absence of anything corresponding to the system of wholesale manufacture that we have. The Japanese are not, as I have already said, a mechanical people, and have naturally no idea of all the methods that we have, by division of labour, the use of machinery, and so forth, of turning out a vast number of articles. Every little thing is made, from beginning to end, by one workman, and, as a consequence, it contains, to a certain degree, a reflection of the individuality of the maker, without some of which, I imagine, no beauty is possible. In a certain sense every workman becomes an artist, and the thing must act and react. He is an artist in the sense of creating something that has some beauty in it; he becomes an artist in unconsciously learning to love that which is beautiful, and to hate that which is ugly.

It would almost seem as if unconsciousness were an essential part of such a feeling, for when a Japanese wakes up to the idea that he wishes to be decorative, he very frequently goes woefully astray, adopting, for example, the most wonderfully incongruous mixture of European ornaments—of a coarser, and often more gaudy type—with rather debased Japanese art; but I feel that I have got on a subject that I have really no right to talk upon, and that silence is the best thing for the present.

W. K. BURTON.

THE ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION, 1889.

(By a Special Correspondent.)

JUDGES' REPORT.

THE Judges have great pleasure in recording the continued success of the Photographic Department. They have noticed a slight falling off in the Professional Section this year, and great increase in the exhibits of the Amateur Section, the latter showing a marked improvement in several of the classes. They also notice the names of several new exhibitors in all sections of the departments, and many of the old exhibitors still keep to the front; especially noticeable is the name of Mr. H. P. Robinson, of Tunbridge Wells, whose productions have adorned the walls of the Exhibition for over a quarter of a century, and are always worth careful study. Mr. R. W. Robinson, his son, follows in his father's footsteps this year with a collection of *Artists at Home*, being most of the Royal Academicians taken at home in their own studios, which make an interesting series, about twenty-four in number. Mr. W. J. Byrne, of Richmond, whose works are hung this year on the platform in the Great Hall, are perfect as specimens of the art. Mr. W. W. Winter is also to the front again with some of his very fine work. The portrait studies of Mr. Protheroe, of Bristol, printed in platinum, are also fine specimens. Mr. F. W. Edwards takes the first award for landscape work. In the amateur section, Mr. Cembrano is represented by some exceedingly fine interiors in the Alhambra. Mr. A. K. Barnett, of Penzance, shows some very careful work, for which he receives a medal.

In lantern slides, Mr. Henry Little receives an award; also Mr. Dresser, for some very clever instantaneous pictures.

In the photographic appliance department, Mr. F. W. Hart takes the only award in the section for his patent magnesium flash lamps, the very best of their kind, as his specimens will show. The different exhibitors are dealt with as they appear in the catalogue.

PROFESSIONAL SECTION.

Mr. H. P. Robinson sends two composition pictures, viz., *Fisher Maidens* and *Lobster Boats*. To the latter has been awarded a second silver medal; it is rather smaller than some of this artist's works, but in

treatment it is very realistic. Mr. J. Milman Brown contributes four studies, the best of which is No. 753, *Declining Day*. Mr. J. P. Gibson is represented this year by several careful studies; *Heary* is a very artistic conception, and admirably treated. Mr. F. W. Dew sends several pictures, and the judges are of opinion they have seen some better work in former years. P. M. Law and Son show two pictures; *What is it?* shows considerable artistic taste. Mr. W. Winter, of Derby, takes an award, a second silver medal, for his charming portrait group, very tenderly and delicately treated, printed in sepia platinum. Mr. R. H. Lord shows two pictures, *Neddy's New Shoes* and *Try Again*, both genre pictures; the latter is by far the best. Mr. R. W. Robinson has apparently set himself a very difficult task, viz., photographing the principal of the Royal Academicians at home at work in their own studios, of which he sends about two dozen examples, and has been awarded a special first bronze medal. He also contributes several clever sketches well worthy of notice. Mr. Frank Hopps contributes some very good frost studies. Mr. H. Keene takes the award for his collection of interiors, viz., a first bronze medal. Mr. W. M. Harrison's chief exhibits are enlargements of local people, and instantaneous groups of Mr. Gladstone's visit to Falmouth. Messrs. Werner & Son have two large portrait studies taken direct, printed in platinum. Mr. T. Protheroe, of Bristol, has been awarded a first bronze medal for the best six pictures by the platinum process, portrait studies which are very soft and brilliant. Mr. W. Scorer shows a number of pictures, one or two showing a certain amount of artistic merit, and others not so good as they might be if they had been more carefully printed. Mr. F. Whaley's best exhibit is *Sunset on the Don*, being well and carefully treated. Mr. Frank Sutcliffe, of Whitby, contributes a subject well chosen, *Dinnertime*. Mr. W. J. Ankorn sends six pictures of the genre order, which have been carefully worked out, and humorous in style. Messrs. Itiley Bros., of Bradford, show a frame of lantern slides, and would look far better if they were of a warmer tone. Mr. John Pike sends two pictures, interiors. Mr. F. W. Edwards takes the first silver medal for the best landscape in the Exhibition, which is of large dimensions, printed in platinum; it is a marvellous production. There are several others of different style, and all of a very high order. Mr. J. W. Byrne, as usual, is well to the front with his well-known portrait studies, and takes a first award, viz., a first silver medal, for a large direct portrait of W. Backwell, Esq., being one of the most perfect pictures of its kind; there are several other pictures by the same artist of almost equal merit. A hunting group, by Messrs. Chenall & Sons, is highly commended, and must have been a rather difficult subject to treat.

AMATEUR SECTION.

Mr. W. H. Kitchen exhibits several pictures of animals of the Zoo order, which show careful manipulation. Home portraiture by flash light is well represented by Mr. W. Taverner. Mr. A. Dresser sends for exhibition a goodly number of works, especially in the instantaneous class, some very clever work of a dog jumping. To No. 911 has been awarded a second bronze medal; the same gentleman also contributes a collection of lantern slides of animals in the Zoo, and a great deal of beauty is lost by their being printed too black; there are several other admirable pictures by the same gentleman—*On Duty*, our *Couteguard*—being the best. Mr. A. K. Barnett, of Penzance, shows a varied collection, and takes the medal for the best landscape in the section, viz., a first bronze medal for No. 861. Mr. Roscoe shows a frame of very artistic studies. Mr. Brewer contributes some very creditable work. The Rev. H. B. Hare has been awarded a second bronze medal for No. 921, being a very artistic production; there are several others, showing very great taste and skill. *An Old Salt*, by Mr. J. E. Brightman, highly commended for good manipulation; other work by the same gentleman shows great taste. The Rev. F. C. Lambert, Mr. S. Holgrove, and Mr. McCulack contribute. Mr. Henry Little sends a frame of lantern slides: instantaneous subjects, horses steepchasing, swans, &c., being the most perfect of their kind, and are of good tone; a first bronze medal has been awarded. Mr. F. C. Cembrano sends a very fine collection of interiors of the Alhambra, printed in platinum, being soft, delicate, and brilliant, and as near perfection as possible; to these have been awarded a first bronze medal. Mr. H. Murray, Mr. F. W. Lomer, and Mr. Arthur Carnell, exhibit some fairly good productions. Mr. M. E. Austin forwards some very clever and artistic genre pictures; to No. 972, *Any one at Home*, has been awarded a first bronze medal, the difficulty to be decided as to which was the best picture of this gentleman's work, all being so exceedingly fine. Mr. W. H. Hooton's works show careful study. Miss E. L. Hare is highly commended for a frame of lantern slides, and would have done more justice to the negatives had they not been printed so black and hard. C. S. Roe sends two pictures. Mr. Frank Howard contributes some very soft and delicate studies full of atmosphere. Mr. Ernest Beringer contributes one picture, *A Cool Retreat*. Mr. E. Brigleman sends a frame of lantern slides, printed evidently by a mechanical process, of various tones, which are very effective and fanciful. A set of lantern slides, by J. M. Harding, which are too heavily printed to give the best results on the screen. Mr. H. P. Taglietierro sends a photograph of a print, *A Favourite Spring*. Mr. Alfred Strielitz, of Berlin, contributes a portfolio of prints, portrait and landscape, which the Judges highly commend. Major J. D. Lysaght is represented by a frame of small sketches in Cork and Queenstown, which are little gems in their way.

PHOTOGRAPHIC APPLIANCES.

Mr. F. W. Hart, of Kingsland, London, shows several forms of his patent magnesium flash lamps, and also a good collection of pictures taken by their aid, of a very high order, some being 12 x 10 inches fully exposed, and well merit the award the Judges have given them, viz., a second silver medal. The same exhibitor also shows some very good racks for washing and draining plates. Mr. W. Scorer, of Havant, sends two cameras, one a parallel bellows body, and the other conical in form; they are rather of a complicated order, which, in the opinion of the Judges, are rather against them than otherwise. A photographic electric dark-room lamp, by Messrs. Cathcart & Peto, of London, is an exceedingly portable and useful arrangement, which the Judges highly commend.

PHOTOGRAPHY BY FLASH LIGHT.

Mr. F. W. Hart, F.C.S., delivered a lecture, with experiments, on "Magnesium and its uses," the Right Hon. Leonard Courtney, M.P., the President, occupying the chair. The lecturer remarked that eighty-one years ago Sir Humphry Davy was investigating the action of electric force, and succeeded by its aid in releasing magnesium from that old familiar medicine, Epsom salts. Bunsen in our own times was the first to improve on the electric decomposition of alkalies and earths, but his process was not a commercial success. Many minds were set to work to solve the problem, how to obtain the earth metals economically, the two most important being aluminium and magnesium, each profusely abundant in the crust of the earth. The clay under our feet points to the probability that aluminium takes precedence of all other metals for quantity. It is about five times lighter than brass, and less than double the weight of water; when untarnished it is beautifully white, almost rivaling silver, and upon being burnt gives a brilliant and smokeless flame. Some years ago Roscoe and Bunsen found that whilst the sun was about 625 times more brilliant than ignited magnesium, its power for producing photographic effects was only about 36 times as great; so that it was only necessary to increase the volume of light 56 times to rival the sun in the rapidity with which photographic results can be obtained, and Mr. Hart showed that this was not at all difficult by his cleverly devised lamps. Photographs of children at play were shown, produced at night in one-thirtieth of a second at eight feet distance from the source of light. By still further increasing the volume of light by more lamps, Mr. Hart felt fully assured that there would be no difficulty in getting full exposures in one-hundredth of a second. In photographing with the magnesium light, the principal object should be to produce breadth of lighting, so as to produce as near as possible the effect of the parallel rays of daylight. In chemical analysis magnesium is a most valuable adjunct in the detection of poisons. For military and naval signalling Mr. Hart has invented an apparatus, easily carried in a knapsack, by which a soldier can communicate, by using the Morse system of long and short flashes, either direct or, if a hill intervenes, by reflections in the sky. Magnesium is also largely used in pyrotechnic displays. In conclusion, Mr. Hart called attention to a series of very beautiful home photographs produced by means of the flash light, life-like and pleasantly free from that stiffness inseparable from having your likeness taken. Mr. Lanyon suggested that by means of the flash light photographs of workings in mines and of the interiors of the pyramids could be obtained; and he mentioned that in America it was now used in detecting crime. A policeman entering an illegal drink shop took an instantaneous flash light photograph of the scene, and it was produced in evidence. Mr. Barnett promised a series of photographs next year of miners at work underground.

ROYAL CORNWALL POLYTECHNIC ART UNION.

The drawing for the prizes took place in the Polytechnic Hall on the evening of Friday, September 13th, with the following result:—

No. 451, 11, E. Kitto. 677, 51, The Right Hon. Lord St. Levan, M.P. 539, 31, Robert Fox. 150, 21, John Borlase. 626, 11, The Right Hon. Leonard Courtney, M.P. 749, 101, Mrs. Wilson. 48, 101, Wm. Norton. 279, 71, Oscar Gutman. 264, 21, Miss Stevens. 664, 11, N. Lanyon. 5, 31, Mrs. Sharpe. 218, 11, J. Haye. 551, 11, Robert Fox. 281, 21, A. Latchmore.

The winners are allowed to select a picture to the amount of the prize in the Professional Fine Art Section, and also in the Professional Photographic Section.

BRITISH ASSOCIATION.

SECTION A.—(MATHEMATICS AND PHYSICS.)

[Opening Address by Captain W. de W. Abney, C.B., R.E., F.R.S., F.R.A.S., President of the Section.]

THE occupant of this chair has a difficult task to perform, should he attempt to address himself to all the various subjects with which this Section is supposed to deal. I find that it has very often been the custom that some one branch of science should be touched upon by the President, and I shall, as far as in me lies, follow this procedure.

This year is the jubilee of the practical introduction of photography by Daguerre and Fox Talbot, and I have thought I might venture to take up your time with a few remarks on the effect of light on matter. I am not going into the history of photography, nor to record the rivalries that have existed in regard to the various discoveries that have been made in it. A brand-new history of photography, I dare say, would be interesting, but I am not the person to write one; and I would refer those who desire information as to facts and dates to histories which already exist. In foreign histories perhaps we English suffer from speaking and writing in a language which is not understood of the foreign people; and the credit of several discoveries is sometimes allotted to nationalities who have no claim to them. Be that as it may, I do not propose to correct these errors or to make any reclamations. I leave that to those whose leisure is greater than mine.

I have often asserted, and I again assert, that there should be no stimulus.

for the study of science to be compared to photography. Step by step, as it is pursued, there will be formed a desire for a knowledge of all physical science. Physics, chemistry, optics, and mathematics are all required to enable it to be studied as it should be studied; and it has the great advantage that experimental work is the very foundation of it, and results of some kind are always visible. I perhaps am taking an optimist view of the matter, seeing there are at least 25,000 living facts against my theory, and perhaps not one per cent. of them in its favour. I mean that there are at least 25,000 persons who take the photographs, and scarcely one per cent. who know or care anything of the "why or wherefore" of the processes, so far as theory is concerned. If we call photography an applied science, it certainly has a larger number who practise it, and probably fewer theorists, than any other.

He would be a very hardy man who would claim for Niepce, Daguerre, or Fox Talbot the discovery of photographic action on matter. The knowledge that such an action existed is probably as old as the fair-skinned races of mankind, who must have recognised the fact that light, and particularly sunlight, had a tanning action on the epidermis, and the women then, as now, no doubt took their precautions against it. As to what change the body acted upon by light underwent it need scarcely be said that nothing was known, and perhaps the first scientific experiment in this direction was made rather more than a hundred years ago by Scheele, the Swedish chemist, who found that when chloride of silver was exposed to light chlorine was given off. It was not till well in the forties that any special attention was given to the action that light had on a variety of different bodies; and then Sir John Herschel, Robert Hunt, Becquerel, Draper, and some few others carried out experiments which may be termed classical. Looking at the papers which Herschel published in the *Philosophical Transactions* and elsewhere, it is not too much to say that they teem with facts which support the grand principle that without the absorption of radiation no chemical action can take place on a body; in other words, we have in them experimental proofs of the law of the conservation of energy. Hunt's work, *Researches on Light*, is still a text-book to which scientific photographers refer, and one is sometimes amazed at the amount of experimental data which is placed at our disposal. The conclusions that Hunt drew from his experiments, however, must be taken with caution in the light of our present knowledge, for they are often vitiated by the idea which he firmly held, that radiant heat, light, and chemical action, or actinism, were each of them properties, instead of the effects, of radiation. Again, we have to be careful in taking seriously the experiments carried out with light of various colours when such colours were produced by absorbing media. It must be remembered that an appeal to a moderately pure spectrum is the only appeal which can be legitimately made as to the action of the various components of radiation, and even then the results must be carefully weighed before any definite conclusion can be drawn. No photographic result can be considered as final unless the experiments be varied under all the conditions which may possibly arise. Coloured media are dangerous as enabling trustworthy conclusions to be drawn, unless the characters of such media have been thoroughly well tested and the light they transmit has been measured. An impure spectrum is even more dangerous to rely upon, since the access of white light would be sure to vitiate the results.

Perhaps one of the most puzzling phenomena to be met with in photography is the fact that the range of photographic action is spread over so large a portion of the spectrum. The same difficulty, of course, is felt in the matter of absorption, since the one is dependent on the other. Absorption by a body we are accustomed, and, indeed, obliged by the law of the conservation of energy, to consider as due to the transference of the energy of the ether wave-motion to the molecules and atoms comprising the body by increasing the vibrations of one or both.

In the case where chemical action takes place we can scarcely doubt that it is the atoms which in a great measure take up the energy of the radiation falling on them, as chemical action is dependent on the liberation of one or more atoms from the molecule, whilst, when the swings of the molecules are increased in amplitude, we have a rise in temperature of the body. I shall confine the few remarks I shall make on this subject to the case of chemical action. The molecule of a silver salt, such as bromide of silver, chemists are wont to look upon as composed of a limited and equal number of atoms to form the molecule. When we place a thin slab of this material before the slit of the spectroscopic we find a total absorption in the violet and ultra-violet of the spectrum, and a partial absorption in the blue and green, and a diminishing absorption in the yellow and red. A photographic plate containing this same salt is acted upon in exactly the same localities and in the same relative degree as where the absorption takes place. Here, then, we have an example of, it may be, the vibrations of four atoms, one of which at least is isochronous, or partially so, with the waves composing a large part of the visible spectrum. The explanation of this is somewhat obscure. A mental picture, however, may help us. If we consider that, owing to the body acted upon being a solid, the oscillations of the molecules and atoms are confined to a limited space, it probably happens that between the times in which the atoms occupy, in regard to one another, the same relative positions, the component vibrations of, say, two of the atoms vary considerably in period. An example of what I mean is found in a pendulum formed of a bob and an elastic rod. If the bob be made to vibrate in the usual manner, and at the same time the elastic rod be elongated, it is manifest that we have a pendulum of ever-varying length. At each instant of time the period of vibration would differ from that at the next instant, if the oscillations were completed. It is manifest that increased amplitude would be given to the pendulum swings by a series of well-timed blows differing very largely in period; at the same time there would be positions of the pendulum in which some one series of well-timed blows would produce the greatest effect. In a somewhat similar manner we should imagine that the ethereal waves should produce increased amplitude in the swing of the atoms between very wide limits of period, and, further, that there should be one or more positions in the spectrum when a maximum effect is produced.* I would here remark that the shape of the curves of sensitiveness, when plotted

graphically, of the different salts of silver to the spectrum have a marked resemblance to the graphically drawn curves of the three colour-sensations of the normal eye, as determined by Clerk Maxwell. May not the reason for the form of the one be equally applicable for the other? I only throw this out as evidence, not conclusive indeed, that the colour-sensitiveness of the eye is more probably due to a photographic action on the sensitive retina than to a merely mechanical action. That this is the case I need scarcely say has several times been propounded before.

The ease with which a silver salt is decomposed is largely, if not quite, dependent on the presence of some body which will take up some of the atoms which are thrown off from it. For instance, in chloride of silver we have a beautiful example of the necessity of such a body. In the ordinary atmosphere the chloride is, of course, coloured by the action of light; but if it be carefully dried and purified, and placed in a good vacuum, it will remain uncoloured for years in the strongest sunlight. In this case the absence of air and moisture is sufficient to prevent its discolouring.

If in the vacuum, however, a drop of mercury be introduced, the colouration by light is set up. We have the chlorine liberated from the silver and combining with the mercury vapour, and a minute film of calomel formed on the sides of the vessel.

Delicate experiments show that not only is this absorbent almost necessary when the action of light is so strong or so prolonged that its effect is visible, but also when the exposure or intensity is so small that the effect is invisible and only to be found by development. The reason for this absorbent is not far to seek. If, for instance, silver chloride be exposed to light *in vacuo*, although the chlorine atoms may be swung off from the original molecule, yet they may only be swung off to a neighbouring molecule which has lost one of its chlorine atoms, and an interchange of atoms merely takes place. If, however, a chlorine absorbent be present which has a greater affinity for chlorine than has the silver chloride which has lost one of its atoms, then we may consider that the chlorine atoms will be on the average more absorbed by the absorbent than by the subchloride molecules. The distribution of the swung-off atoms between the absorbent and the subchloride will doubtless be directly proportional to their respective affinities for chlorine, and so for the other salts of silver. If this be so, then it will be seen that the greater the affinity of the absorbent for the halogen the more rapid will be the decomposition of the silver salt. This, then, points to the fact that if any increase in the sensitiveness of a silver salt is desired it will probably be brought about by mixing with it some stronger halogen absorbent than has yet been done.

The question as to what is the exact product of the decomposition of a silver salt by the action of light is one which has not as yet been fully answered. For my own part, I have my strong beliefs and my disbeliefs. I fully believe the first action of light to be a very simple one, though this simple action is masked by other actions taking place, due to the surroundings in which it takes place. The elimination of one atom from a molecule of a silver salt leaves the molecule in an unsatisfactory condition, and capable of taking up some fresh atom. It is this capacity which seemingly shrouds the first action of light, since when exposure is prolonged the molecules take up atoms of oxygen from the air or from the moisture in it. Carey Lea, of Philadelphia, has within the last three years given some interesting experiments on the composition of what he calls the photochloride of silver, which is the chloride coloured by light, and Professor Hodgkinson has also taken up the matter. The conclusions the former has drawn are, to my mind, scarcely yet to be accepted. According to the latter experimentalist the action of light on silver chloride is to form an oxidised subsalt. This can hardly be the case, except under certain conditions, since a coloured compound is obtained when the silver chloride is exposed in a liquid in which there is no oxygen present.

This colouration by light of the chloride of silver naturally leads our thoughts to the subject of photography in natural colours. The question is often asked when photography in natural colours will be discovered. Photography in natural colours not only has been discovered, but pictures in natural colours have been produced. I am not alluding to the pictures produced by manual work, and which have from time to time been foisted on a credulous public as being produced by the action of light itself, much to the damage of photography and usually of the so-called inventors. Roughly speaking, the method of producing the spectrum in its natural colours is to chlorinise a silver plate, expose it to white light till it assumes a violet colour, heat it till it becomes rather ruddy, and expose it to a bright spectrum. The spectrum colours are then impressed in their natural tints. Experiment has shown that these colours are due to an oxidised product being formed at the red end of the spectrum and a reduced product at the violet end. Photography in natural colours, however, is only interesting from a scientific point of view, and, so far as I can see, can never have a commercial value. A process to be useful must be one by which reproductions are quickly made; in other words, it must be a developing and not a printing process, and it must be taken in the camera, for any printing process requires not only a bright light but also a prolonged exposure. Now it can be conceived that in a substance which absorbs all the visible spectrum the molecules can be so shaken and sifted by the different rays that eventually they sort themselves into masses which reflect the particular rays by which they are shaken; but it is almost—I might say, quite—impossible to believe that when this sifting has only been commenced, as it would be in the short exposure to which a camera picture is submitted, the substance deposited to build up the image by purely chemical means would be so obliging as to deposit in that the particular size of particle which should give to the image the colour of the nucleus on which it was depositing. I am aware that in the early days of photography we heard a good deal about curious results that had been obtained in negatives, where red-brick houses were shown as red and the blue sky as bluish. The cause of these few coincidences is not hard to explain, and would be exactly the same as when the red-brick houses were shown as bluish and the sky as red in a negative. The records of the production of the latter negatives are naturally not abundant, since they would not attract much attention. I may repeat, then, that photography in natural colours by a printing-out process—by which I mean by the action of light alone—is not only possible, but has been done, but that the production of a negative in natural colours from which prints in natural colours might be produced appears, in the present

* The effect of perfect and nearly perfect synchronism of one oscillation upon another is also to be found exemplified in my *Treatise on Photography* ("Text-book of Science Series").

state of our knowledge, to be impossible. Supposing it were not impracticable, it would be unsatisfactory, as the light with which the picture was impressed would be very different from that in which it would be viewed. Artists are fully aware of this difficulty in painting, and take their precautions against it.

The nearest approach to success in producing coloured pictures by light alone is the method of taking three negatives of the same subject through different coloured glasses, complementary to the three colour-sensations which together give to the eye the sensations of white light. The method is open to objection on account of the impure colour of the glasses used. If a device could be adopted whereby only those three parts of the spectrum could be severally used which form the colour-sensations, the method would be more perfect than it is at present. Even then perfection could not be attained, owing to a defect which is inherent in photography, and which cannot be eliminated. This defect is the imperfect representation of gradation of tone. For instance, if we have a strip graduated from what we call black to white (it must be recollected that no tone can scientifically be called black, and none white) and photograph it, we shall find that in a print from the negative the darkness which is supposed to represent a grey of equal mixtures of black and white by no means does so; the black is not as black nor the white as white as the original. The cause of this untruthfulness in photography has occupied my attention for several years, and it has been by endeavour to find out some law which will give us the density of a silver deposit on a negative corresponding with the intensity of the light acting. I am glad to say that at the beginning of this year a law disclosed itself, and I find that the transparency of a silver deposit caused by development can be put into the form of the law of error.

This law can be scarcely empiric, though at first sight it appears that the manipulations in photography are so loose that it should be so. It is this very looseness, however, which shows that the law is applicable, since in all cases I have tried it is obeyed. That there are theoretical difficulties cannot be denied, but it is believed that strictly theoretical reasoning will eventually reconcile theory with observation.

This want of truth in photography in rendering gradation, then, puts it out of the range of possibility that photography in natural colours can ever be exact, or that the three-negatives system can ever get over the difficulty.

(To be concluded.)

Our Editorial Table.

THE WATERLOO PLATE.

THE "Waterloo" is a plate of Belgian manufacture, which is issued in two classes, viz., those for water development and those for development by the usual means. In the former the plate is coated on the back with a pellicle, soluble in water, in which hydroquinone forms a leading ingredient. When an exposed plate is placed in a dish containing the requisite quantity of water the backing soon dissolves, and the image appears and comes up of good quality. This, at any rate, was the result in our hands. The ordinary plates, or those which must be developed in the usual way, possess, like the others, a real sensitiveness, and give an excellent quality of negative. Messrs. C. R. Bourn & Co., 43, Eastcheap, are the agents for its sale.

VEVERS' TRADE CATALOGUE.

THE catalogue of Mr. C. C. Vevers, Leeds, exhibits a marked increase (compared with a previous one) in capacity and the variety of articles embraced therein, with a very considerable reduction in prices, more especially of his own manufactures. It being impossible for us here to enumerate even a portion of the many good things contained in this price list, we recommend our readers to procure it for themselves.

RECENT PATENTS.

PATENT COMPLETED.

IMPROVEMENTS IN PHOTO-LITHOGRAPHIC PRINTING AND TRANSFERS BY WHICH A RESULT EQUAL TO PHOTOGRAPHIC PRINTING CAN BE OBTAINED FROM STONE.

No. 12,307. HENRY RYDER and WILLIAM HENRY RYDER, 35, Vicar-lane, Bradford.—August 24, 1889.

HALF-TONE process by two separate negatives from photograph or from picture. Our claim is by using two separate negatives from photograph or picture printed in two separate printings from stone or block.

First, a screen (or negative) is got from a lined or stippled plate after a perfect negative has been secured; then a photograph or wash drawing is adjusted and focussed to the size required in the camera; then a wet plate is prepared and placed in dark slide with screen before it, then exposed in camera, the plate being then developed. The first negative is over-exposed, giving details in darker parts of the object; the second negative is under-exposed, only bearing the lighter parts of the photograph.

Points are then taken from the negatives on prepared photo-litho-transfer paper, and inked and developed ready for transferring to stone or zinc, or printed direct to zinc in bitumen or albumen, and etched on zinc for letterpress printing as well as for lithographic printing.

What is claimed is:—Two separate negatives combined in the production of our picture by two separate and distinct printings from stone or from block prepared for letterpress printing.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 23	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 24	Great Britain (Technical)	5A, Pall Mall East.
" 24	Bolton Club	The Studio, Chancery-lane, Bolton.
" 25	Burnley	Bank Chambers, Hargreaves-street.
" 25	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 26	Barton-on-Trent	The Institute, Union-street.
" 26	Halifax Photographic Club	Mechanics' Hall.
" 26	Liverpool Amateur	St. George's-crescent North.
" 26	Oldham	The Lyceum, Union-st., Oldham.
" 26	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

SEPTEMBER 17.—Technical meeting.—Mr. Friese Greene in the chair.

The CHAIRMAN showed some photographs printed by development on gelatin-bromide emulsion spread upon sheets of white celluloid stamped into ornamental patterns with a space left plain for the portrait. There was, he pointed out, a certain unevenness in some of them that was due to irregular taking of the wood naphtha, which was necessary as a preliminary before coating.

Mr. T. BOLAS remarked that the naphtha had acted as a solvent to the camphor, and Mr. A. COWAN suggested that the naphtha should be rubbed on with a tuft instead.

Mr. J. A. HARRISON showed a photograph of a building in which the vertical lines were convergent, and a copy from it in which the distortion was corrected by having the original and the copy both slanted with respect to the optical axis of the lens.

A question was raised as to the best method of obtaining a photograph direct upon a blank basis. It was complained that glass positives were all more or less dingy, even if toned with mercury, and a member referred the question to an article that appeared some three years since, describing some experiments made in Vienna with a view to obtaining this result.

A member inquired whether a thin negative was not the best for producing a collotype.

Mr. BOLAS replied that it was so. A dense negative was very bad for the purpose.

The question of the hot *versus* the cold process of development for platinum printing was discussed, and the former method was considered by several speakers to be the better one.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 12.—Mr. E. Clifton in the chair.

A question was read:—"What is the best length of focus for a lens for a quarter-plate detective camera?"

Mr. F. KEHR considered from five and a half to six inches to be the best.

Mr. A. COWAN had an idea that a longer focus was desirable, so that it would not be necessary to go so close up to the object.

The CHAIRMAN and Mr. KEHR spoke of the necessity for adjusting focus when lenses of more than ordinary length of focus were used, and considered that the great objection to this was the difficulty of judging distances, assuming that the focussing was done by adjustment to a scale on the camera, and not by inspection of the ground glass. The Chairman, moreover, found that many got on well with detective cameras of quarter-plate size, but proved quite hopeless with a half-plate one. The short focus, and consequent absence of necessity for focussing, was doubtless an important element in the success of the Kodak camera. Some, however, failed with this instrument, from exposing on dark subjects such as were not fitted for detective work.

Mr. FRESHWATER had recently met with a gentleman who had taken nine hundred subjects on a tour with a Kodak, and he was surprised to see what a very small percentage of them turned out unsatisfactorily. They were as nice a lot as any he remembered to have seen.

The opal cards left by Mr. Friese Greene for experiments by the members of the Association were then distributed by ballot.

The subject of the comparative merits and disadvantages of different developers was then brought forward, and Mr. A. MACKIE, speaking of hydroquinone, said that he found it liable to develop very unequally.

The CHAIRMAN agreed with this view, and said that hydroquinone developed by jumps; the picture would suddenly begin to darken at one corner and go on rapidly at the finish. As to the new developing agent, eikonogen, he did not find the solution preserve the green colour that it had when freshly mixed.

Mr. W. E. DEBENHAM recommended the use for mixing of water that had been boiled and bottled, or used before getting quite cold. He found the solution keep well.

The CHAIRMAN said that the addition of hydrochloric acid to eikonogen solution changed the colour to a bright rose-pink; the further addition of soda in excess restored the green tint, and this change of colour might be repeated many times. As to the use of sulphites and meta-bisulphites with pyro solutions, he found that one part of meta-bisulphite would suffice to keep six parts of pyro.

Mr. MACKIE used sulphite of soda neutralised with meta-bisulphite of potash, for which purpose he found one part of the latter generally required for three of the former.

A question was read as to whether ferricyanide solution would keep in the light; and the opinion prevailed that in the ordinary dark room it would not undergo any practically deleterious change.

It was announced that during the coming winter season there would be lantern exhibitions on the second Thursday in the month, and that a series of papers or lectures was intended to be given on the fourth Thursdays. Visitors would be welcomed to both.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

SEPTEMBER 9.—Mr. J. Saville in the chair.

Mr. A. Le Vierge was elected a member.

Mr. H. BECKETT, in toning prints, used the ordinary acetate toning bath, but one made with borax was found to be decidedly the quicker of the two, although the resulting tones when finished were found to be equal.

Some spoilt prints exhibited by Mr. Cherry elicited discussion as to the reason of the defects; it was ultimately decided, however, that the spots apparent in them were due to toning in a *papier-mâché* dish which had been used for fixing.

Subject for next meeting, September 23, *Transferotype*; demonstration by Mr. Bishop. Visitors invited.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 12.—The President in the chair.

Messrs. W. H. Hunt, Mus. Doc., and H. B. Mellor were elected members.

Mr. C. B. Reader reported on the Knowsley excursion, which consisted of about thirty members and friends.

The President presented his prize medal, which had been awarded by the Judges to the Hon. Secretary, J. L. Mackrell.

Mr. J. A. FORREST drew the members' attention to the great facility that now presented itself by the Association having its own library, which contained many books on photography, journals, &c., and urged the members to make use of the same. He also stated that, through the kindness of one of the lady members—Mrs. M. Webb—the Association had been presented with a very large box case, which was very acceptable and valuable in the way of keeping the Association things in.

Mr. Archer exhibited a box case, about two feet six inches long, containing lens, &c., for making slides by reduction from full plate.

Mr. P. H. PHILLIPS then read his paper on the *Optical Lantern*, with illustrations, which created great interest and instruction to all present, and we shall in next issue give a summary of the paper.

A lantern exhibition took place, with slides by the following members:—Messrs. Reader, Mackrell, Faltin, Noakes, and Mrs. M. Webb.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

SEPTEMBER 12.—Mr. W. J. Harrison (Vice-President) in the chair.

A letter was read from Mr. W. F. Kimberley, offering his dark room for the convenience of members at the excursion to Kenilworth on the 21st instant.

The HON. SECRETARY, as leader of the excursion to Dovedale, reported that a large number of members and friends travelled to Ashbourne by special train, fourteen cameras were carried, and one hundred and fifty-nine exposures made; and gave notice that the pictures for competition must be sent him not later than September 27, for transmission to the Judge appointed to make the award.

The CHAIRMAN, on calling upon Mr. E. H. Jaques (Vice-President) to give his paper on *Lantern Slide Making* [see page 617], remarked, Our optical lantern dates back to the early part of this century, when Lieutenant Drummond used a lime ball made incandescent for the purpose of signalling by night across distances exceeding fifty miles. The first transparent photographic positives on glass (lantern slides) were probably made by Langenheim, in the United States, about 1851; and soon afterwards what we may term the first really successful displays with the lantern on a large scale were shown at Manchester and Liverpool by Dancer. He had great pleasure in calling on Mr. Jaques, who they all knew had great experience in this branch of photography.

The lecturer was frequently applauded by the members, who thoroughly appreciated the lucid manner in which the subject was treated and the beautiful slides subsequently shown.

DERBY PHOTOGRAPHIC SOCIETY.

SEPTEMBER 10.

The Hon. Secretary showed some bronze medals sent by Mr. Restall, of Birmingham, which were excellent in design and finish.

Mr. Scotton handed round a number of silver prints from negatives taken during the Convention, which were much admired.

A discussion was then raised by Mr. Chadwick on *Halation, its Cause, &c.*, which was warmly entered into, and many unique suggestions were thrown out as probable preventatives.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

SEPTEMBER 13.—Outdoor meeting.—A most successful excursion was arranged to Matlock, seventeen members and friends attending. Having ferried over the river, the charming scenery of the Lovers' Walk engaged the attention of the tourists, the wooded river banks lending themselves readily in assisting picturesque composition. The party thereafter visited Willesley, the seat of Mr. F. Arkwright, and were here joined by a small but prominent deputation from the Derby Photographic Society. From here the party drove to the famous High Tor, and having duly paid homage to the historic old pile, packed up and returned, having thoroughly enjoyed what may be fairly considered the trip of the season. Forty-six plates were exposed by the members.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, September 25, 1889, will be on *Bromide Paper Printing*. Saturday outing at Earlsfield.

Correspondence.

Correspondents should never write on both sides of the paper.

NATURALISTIC PHOTOGRAPHY.

To the EDITOR.

SIR,—At last we begin to see blue water. I find we are all naturalistics; at least, I confess that I am one now that I know what naturalism is. I have been wanting a definition for years. Anything like a concise definition has been wanting up to the present time, for, as Bacon says, there be those who "count it a bondage to fix a Beeleefe; Affecting Freewill in Thinking, as well as in Acting. And though the Sects of Philosophers of that Kinde be gone, yet there remaine certaine discoursing Wits, which are of the same veines, though there be not so much Bloud in them, as was in those of the Ancients." At last we are favoured with the long-felt want by Mr. Davison, who tells us, in italics, that the naturalistic creed is, *Truth, and the best of everything*. Why, that is what I am always fighting for! "The best of everything" explains, among other things, why I try to provide myself with better models than haphazard chance would fling at me, which is one of Mr. Davison's accusations against me. That, also, is why I think a picture over before taking it, instead of after. I am always in search of truth.

"For truth has such a face, and such a mien,
As to be loved needs only to be seen."

And therein is the difficulty—how to see it; for no two men ever agree as to what is truth.

But Mr. Davison goes too far when he claims that "This differentiates it from the ordinary school, which, instead of considering exclusively the actual colouring, harmonies, tone, feeling, character of a subject, imparts what is termed imagination into the work, and treats much of the colouring, drawing, and selection from a consideration of theories or conventional ideas deduced from an analysis of the works of former successful painters."

We confess that we do not study harmonies, tone, &c., *exclusively*, as seems to be the boast of the naturalistics, but we *do* study these qualities, and try, in all humility, to add imagination, and to take advantage of the experience of the past. The difference between us seems to be this. The naturalistics want "severe truth;" we want what is so admirably expressed in Gray's well-known line, which seems to put it all into a nutshell—

"Truth severe, by fairy fiction dressed."

But what has puzzled me for some time past is this: What in the world is the use of all this disputing over terms? for that is nearly all it comes to; for we all love nature, and try to follow her lead according to our more or less imperfect lights.

"Some say, compared to Benoncini,
That Mynheer Handel's but a nimny;
Others aver that he to Handel
Is scarcely fit to hold a candle.
Strange all this difference should be
'Twixt Tweedledum and Tweedledee."

Let us, then, stop disputing, and be content with putting our theories into our work. We may even go further and show our results, for "Things seen are mightier than things heard."

I must thank Mr. Davison for the graceful courtesy with which his letter is written. There is only one word in it to which I could take any exception, and that must have been a naturalistic slip, so I will no further allude to it.—I am, yours, &c.,

H. P. ROBINSON.

Tunbridge Wells, September 16, 1889.

To the EDITOR.

SIR,—It is rather hard that Mr. Robinson should take that horn of my dilemma which was manifestly intended to be inapplicable, and then to hint at want of courtesy on my part. Nothing was further from my intention than to be rude to him or call him names, and in my turn I am quite ready to believe that his slightly undignified reference to "Mr. Graham" was due to a slip or a printer's error.

But as for my other alternative, which cannot be eluded, Mr. Robinson admits that for several years past he has been perfectly familiar with Dr. Emerson's pictures. Then what on earth did he mean by his extraordinary and sudden challenge, which was accompanied by the statement that "it would be only fair, *not only to myself*, but to photographers generally, that after so much excited theory the naturalistics should show us a little of the results when reduced to practice?"

It may be interesting hereafter to discover what amount of "long-patient study in the country" will enable any one, beside a naturalistic, to discover the difference between real dairymaids and ladies masquerading, but as far as I am concerned, and more especially after

Mr. Davison's admirable letter, the controversy must here end, nor would I have troubled you with this letter except to clear myself from a charge of discourtesy.—I am, yours, &c.,
GRAHAM BALFOUR.

To the Editor.

SIR,—There seems to have been plenty written on this subject, but no definite termination arrived at.

Mr. Balfour, in his letter of August 23, alludes to numerous painters having the detail obliterated, or nearly so. We will take, for instance, Rubens's *Christ being Crucified*. What would be the effect without the detail of the left-hand lowest corner, i.e., the expression of the three faces? Again, why does Jesus Christ form the attractive object? There is in this picture a simple lesson, viz., that we can attract the spectator's eye to any part of the picture without sacrificing the details.

Again, if an artist desires to give value to any part, he will place near it an object of different texture, but he will never destroy the detail of that object. This the portrait lens does, leaving as the result a hard-lined subject against a soft background, with the objects in a hazy atmosphere and obliterated detail, as if they were miles distant, though their size tells you different. A good rectilinear, in the hands of a good artist, will enable him to produce pictures without abusing nature to such an extent as is seen nowadays.—I am, yours, &c.,
H. VICTOR PAGE.

23, Cattell-road, Birmingham.

"MOON REFLECTIONS."

To the Editor.

SIR,—One evening last week, about nine p.m., the sky presenting a most beautiful appearance of mottled clouds slowly drifting over a bright moon, I was tempted to take out my camera and have a shot. Having never by night attempted anything of the sort before, I was naturally quite in the dark as to what exposure should be given; so lighting the flagrant weed, I sauntered up and down the lawn and determined to enjoy the delightful coolness of the hour so long as my cigar lasted, and then put on the cap again. This I found by my watch to be exactly twenty minutes; and though, of course, with this lengthened exposure I could not expect to get (with no counterbalancing movement) any passable definition of the moon itself, yet I must say I was surprised to find what a distance it must have travelled in this short time, the space on the plate occupying very nearly three-quarters of an inch. At the beginning of the exposure the moon was perfectly clear, but about midway it was overclouded, and consequently does not appear in the negative, while just at the end for two or three minutes all was bright again.

Now, Sir, I must own, alas! I am extremely deficient in knowledge as to the laws which govern the planetary system, but it occurred to me, could not some useful calculations be made by means of photography as to the relative measurements and distances of certain celestial bodies? Please remember with much misconfidence I only throw out this suggestion—it has most probably been thought of by yourself and many others before, and if it has, kind Mr. Editor, I humbly apologise and beg you to pardon my ignorance.—I am, yours, &c. (if it only be),—
A MARE'S NEAT.

P.S.—I shall be happy to send you the negative, or a print from it, if you wish me to do so.

[Yes; send a print.—Ed.]

CONVERTING A DEVELOPED IMAGE.

To the Editor.

SIR,—An unfixed developed positive consists of a positive image in metallic silver on a negative image of a silver salt; if the positive image be dissolved away, the remainder of the plate can be developed as a negative. This gives a means of producing an enlarged negative at one operation and without the loss of detail involved in making an intermediate positive. With collodion the process is easy. Can any of your readers say how it can be done with a gelatino-bromide plate? Captain Abney's method with a bichromate makes the plate too slow for enlarging. Dr. Eder says "mercury nitrate;" "mercuric per-nitrate" dissolves the silver, but attacks the unaltered bromide before the whole of the silver positive is gone. I cannot find that his second method of potassium iodide and potassium bromide has any effect on the silver positive. I suspect there is a misprint. Iodine in potassium iodide removes the positive, but leaves the negative image undevelopable; I presume it converts it into silver iodide. Could the silver bromide be protected from the iodine, iodine would answer perfectly.—I am, yours, &c.,
Foreign Office, September 17, 1889.
H. FARNALL.

"NOTES FROM NEWCASTLE."

To the Editor.

SIR,—Little as it may interest your readers, a few words of comment on the ill-natured remarks of your anonymous contributor agent the Northern Counties' Photographic Association seem indispensable. That

the Society has not made an effort to entertain Captain Abney during his visit to Newcastle is certainly to be regretted; but it is rather due to a perhaps needless modesty than to any want of respect for one who has probably done more than any other living scientist to elucidate the nature of photographic action. That the Society is at present a small one is largely owing to some petty personal quarrels of past times, in which, for aught I know, your contributor may have had his part; but thanks greatly to the energy of our present Hon. Secretary, Mr. E. G. Lee, it is by no means moribund, but living and growing.

The removal of the meetings to the Mosley-street Café, where the soothing fragrance of tobacco is not forbidden, has greatly improved their social character, and many of the discussions last winter were very interesting, while the lantern demonstration was, as usual, a great success. An effort will be made this winter to still further popularise the Society, and if your contributor, instead of sneering, will come forward with his suggestions for improvement, they will receive the consideration which they merit.—I am, yours, &c.,
HENRY R. PROCTER.

Tynemouth, September 15, 1889.

THE MISAPPLICATION OF LENSES.

To the Editor.

SIR,—Photographers will be very much interested in the proceedings of the Convention, especially with the papers read before the members. At all times the subject of lenses is of vital importance to us, therefore it is a pity that Mr. Thomas R. Dallmeyer did not discuss the most important point in his paper—large direct heads and enlargements.

As young photographers, we require to know the whole truth from our superiors in language clear, direct, and practical. Teaching that falls short of this is a waste of time, consequently we claim kinship with the Cornishmen who wanted to know the reason why. Ambiguity is not conducive to progress, and we hold that Mr. Dallmeyer's teaching with regard to the use of lenses is misty, theoretical, and unadapted for every-day use, and a careful examination of Mr. Dallmeyer's paper in your issue of August 23 will prove the truth of this assertion.

As a matter of fact, he says "that a direct large head, when taken under the most favourable circumstances—that is, with a lens of long focus—is undoubtedly much more pleasing than an enlarged small image."

Now this is apart from the real question raised, namely, distortion. The pleasing results are not gained with the lens, but with the printing process; direct printing is a different thing from accurate reproduction from life or a negative. And seeing we have failed to gather anything from Mr. Dallmeyer's paper to enlighten us with regard to the use of photographic lenses, we respectfully beg to lay before the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY the practical outcome of a few years' experience and close observation. With regard to the correct reproducing power of lenses for accuracy in portraiture, there is no lens can equal the ordinary rectilinear or symmetrical, next comes the ordinary single achromatic meniscus, and lastly the portrait lens. An enlarged head from a negative taken with a rectilinear or symmetrical lens cannot be approached for fidelity of reproduction.—I am, yours, &c.,
Madduff.

LARRY O'BROOM.

Exchange Column.

* No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Wanted, 12x10 camera or other photographic apparatus in exchange for semi-racer safety bicycle.—Address, GRAYSON, Photographer, Blackburn.

Wanted, THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1890 in exchange for Marlon's Guide to Photography.—Address, J. F. McKIE, 31, Sarah-street, Newcastle-upon-Tyne.

Will exchange limp canvas camera case (new), to carry camera and three dark slides, &c., 12x10, for background (interior or exterior).—Address, W. M., 64, Brunswick-avenue, Hull.

Wanted, complete photographic outfit and sundries in exchange for Singer's straight-steering Cripple tandem tricycle, cost 40l.—Address, WILLIAMS, Milton House, Ladywell, S.E.

Wanted to exchange a banjo, seven strings, machine head, nickel-plated hoop, for half-plate camera and slides.—Address, J. J. BAYFIELD, 5, Upper Hill-street, Richmond, S.W.

Will exchange whole-plate portrait lens (Derogy) for a whole-plate or 10x8 wide-angle doublet, or a half-plate "189 Instantograph" set.—Address, C. MURRAY, 3, Nightingale-terrace, Sutton, Surrey.

A Dallmeyer's rectilinear stereoscopic lens and a "New Stereographic" rapid portrait lens; wanted, a Ross' No. 2 portable symmetrical and a 5x4 wide-angle landscape lens.—Address, Lieut.-Colonel GERRARD, Westward Ho!

I will exchange for a good quarter-plate shutter, with pneumatic release, THE BRITISH JOURNAL OF PHOTOGRAPHY for 1887 and 1888, one bound (half calf).—Address, WILLIAM THOMPSON, 2, Gay's-terrace, Blue Bell Hill, Nottingham.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

W. G.—See reply to A. J. Coles.

H. A. WALL.—*Le Moniteur, L'Amateur, and Bulletin de la Société.*

W. CORNWELL.—The Company has been wound up and all the effects sold. They only realised about 170*l.* or 180*l.*

JAMES COLE.—Wray's quick-acting detective lens is not quite six inches in focus, but is sufficiently near it to answer your purpose.

A. A.—Send us an example of the failure; your account is too vague for us to indicate the cause. Are you sure the light of your dark room is safe?

INQUIRER.—1. Isochromatic and orthochromatic are synonymous terms as popularly applied to plates.—2. Better use a pale yellow screen for landscape work.

SETH.—If you copy any portion of the photograph, even if it be only for a lantern slide, you infringe the copyright and subject yourself to the consequences.

F. B.—While not worse than several pictures we have seen taken by a well-known "Naturalistic," we ourselves consider it unnatural in its badness. See what was said by us last week.

A. J. COLES.—Any of the French and German works on photography may be procured through a foreign bookseller. Messrs. Trübner, Ludgate-hill, will supply them to order. Give the title and publisher.

C. STEWART.—If the gold will not precipitate on the addition of a solution of sulphate of iron you may rest assured that the toning bath contains none of the precious metal; it has all been used up in toning the pictures.

W. H. C.—The lens appears to be a fairly good one, but there is little wonder that you did not get good pictures with it as the back glasses were put in wrongly. They are right now. The instrument is returned by Parcels Post, as requested.

SNAP SHOT.—The information you desire cannot be given in this column. In good light a single landscape lens of six inches focus will answer well, but if the light be dull it will be better to have a rapid doublet working with an aperture of *f*-6 to *f*-8.

F. J. L.—Neutralise the acid in the solution of chloride of platinum with carbonate of soda, then acidify with nitric acid in the proportion of one minim of acid to each grain of the platinum salt. This will make a very good toning solution.

A. JAX.—Primarily the fault proceeds from the plates. Occasionally some plates will show green fog when they are under-exposed and much forced in the development. If the plates were properly backed there should be no halation. Are you sure your defect is halation?

W. C. LONGMAN.—If the colour does not "take" evenly on albumen prints, wash the surface over with a very weak solution of prepared oxgall, which is supplied by the artists' colourmen. Sometimes licking the surface of the albumen with the tongue will overcome the difficulty.

C. J. E.—When the field of the lens is round, the best general sharpness is secured by focussing an object midway between the centre and margin. If it were quite flat, a characteristic possessed by no lens which is on the market, then it would be immaterial which point is focussed.

W. R. THOMPSON inquires what is the meaning of "triple nitrate of silver."—This is a term which is sometimes applied to nitrate of silver which has been crystallised three times. It is supposed to be purer than that which has only been crystallised once, or the recrystallised, which has been crystallised twice.

J. MOUNTFORT.—The matter is very easy of explanation. The plate was very much over-exposed, so that a reversed action of light was produced, as might have been expected. One second exposure in contact printing to unobstructed bright daylight is far too much exposure, and is sure to produce the effect described, even if slow plates are used.

S. A. R. writes: "Is it customary when a studio is built on the top of a house to fit it with a lightning conductor, and, if so, should it be of iron or copper, and what thickness?"—It is not at all usual to have lightning conductors to studios; though, if the studio be very elevated and much exposed, a conductor might be a protection. It is best of copper. A stout cable, such as those employed as leads in electric lighting, will answer.

A. SIMMONDS inquires how *eau de javelle* solution, which is sometimes recommended as a hypo eliminator, is made, as he cannot obtain it in his town.—Take dry chloride of lime, two ounces; carbonate of potash, four ounces; water, forty ounces. Mix the chloride of lime with thirty ounces of the water, and dissolve the potash in the remainder; then mix them and afterwards boil and filter. The solution is then ready for use.

E. H. WHITTAKER.—Five albo-carbon burners arranged in the manner described ought to answer for illuminating a sheet of ground glass as a backing to a negative that is to be enlarged, but six would answer better, especially for a 10×8 negative. Arrange them in two horizontal rows of three each, the outside ones being nearly opposite the corners of the plate. The firms mentioned prefer daylight for enlarging, when it can be got.

J. writes: "Wishing to make a quick emulsion for opal plates, I have found formulae in the ALMANAC for 1885, page 116. The exposure of this is long to my idea against commercial plates. Would you kindly give me an idea of any good formula, if published, for plates and paper?"—The emulsion is a very good one for the purpose. If greater rapidity be desired it may be obtained by longer boiling. As a rule, however, very rapid emulsions do not yield such satisfactory results on opal as slower ones.

A. REID says he is much troubled with the silver in his washing waters. The chloride will not subside. When the cask is full he adds some salt, but the water remains milky, even after a week, unless the cover is left off, then it turns brown with the light, but still keeps turbid. He asks how is this to be remedied?—The best plan is to pour in a few ounces of hydrochloric acid and then stir vigorously for a few minutes; after this treatment the chloride usually subsides in a few hours, leaving the supernatant liquor perfectly clear.

R. MARSON asks what is a Buckle's brush for spreading silver solutions, and where it can be procured.—A Buckle's brush is simply a tuft of cotton wool in a piece of glass tube. It is made as follows:—Take a piece of glass tube—a test tube with the bottom knocked out is the best—then double a piece of twine and pass it through the tube; take a piece of cotton wool and put it in the loop of the twine, and gently pull it into the tube by the other end of the string. The brush is finished when the loose filaments of cotton have been removed.

STEAM.—The method by which "the excellent photographs of machinery" you allude to are produced is this:—The ironwork is painted of a slate colour, and is then photographed in the ordinary manner. After the negative is taken the paint is cleaned off. Unless you can have this done in your case it will be impossible to obtain from the bright metal results that will compare favourably with those mentioned. Probably, if you explain the matter to your customers, they will adopt the same system as other firms who have all their engines photographed.

RECEIVED.—Ein Frager; A. Sewell; A. Pringle; L. M.; W. Guttenberg. These in our next.

A FRENCH politician of note is credited with a clever plan for ridding himself of unwelcome and importunate visitors. A photographic apparatus stands just in front of his study door. When a stranger enters his room his "groom," by means of a simple contrivance, takes his portrait offhand. If the master of the house has no wish to receive his visitor again, this portrait is at once placed in the collection of counterfeit presentments of persons not to be admitted on any pretext whatsoever. The "groom" in his leisure moments makes himself familiar with their features, and the politician is spared a vast amount of trouble and annoyance. So the story goes. It does not, however, fall to the lot of every public character to possess a "groom" who is not only handy with the camera, but has such a memory for faces.—*Daily Telegraph.*

EIKONOGON EXPERIENCE.—Messrs. Marion & Co. write: We think your readers will be interested in a letter just received from Messrs. Fradelle & Young respecting eikonogen developer, a copy of which we annex:—"We have tried and are much pleased with the eikonogen developer, but think that the instructions sent out with it are unnecessarily complicated. We think you may possibly be interested in a slight modification of it which we use in our practice, as follows:—A ten per cent. solution of eikonogen, i.e., one ounce eikonogen, four ounces sulphate of soda, made up to ten ounces with water. A developer can be made up from this stock as required in the proportion of one ounce of stock to ten ounces of water. So powerful is this developer that we find an accelerator rarely necessary, though it can be used, apparently to any extent, by adding as required from a ten per cent. solution of common washing soda, or the developer retarded by a ten per cent. solution of bromide. This arrangement will be found to be the essence of simplicity, and the results leave nothing to be desired.—Fradelle & Young, 246, Regent-street, W."

TWO NEGATIVES MAKE ONE POSITIVE.—No moment of a man's life, it is said, is more trying than that in which he "pops the question." Doubtless the assertion is true, though we have never tested it (for we are a bachelor), yet most assuredly there are hundreds of men who, at such a ticklish time, have been completely crumpled up and unable to screw their courage to the sticking-place. Faint hearts like these naturally resort to stratagem, and one of them has called photography to his aid. He purchased a camera and made himself master of the details of the art. Then he resorted to his charmer's home, and requested the honour of taking her portrait. He took it, and retired to develop the negative and print off. Again he came and implored another sitting. She granted his prayer. Day after day the damsel anxiously waited for her likeness. At length the amateur appeared. "Where is my photo?" she exclaimed. "You already have two negatives, what more do you want?" "Darling," he stammered, "you know what two negatives make, don't you? An affirmative is what I want." And, as her fair head fell on his manly breast, she whispered, "Dearest, you shall have it: that's positive."—*Modern Society.*

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1534. VOL. XXXVI.—SEPTEMBER 27, 1889.

BLISTERS ON ALBUMENISED PRINTS.

THERE are certain photographic annoyances which, after lying dormant for a period, burst their spell of inactivity and make their existence felt almost as an epidemic.

From the complaints of numerous correspondents, we are of opinion that those which are most in "eruption" at the present time are such as are associated with albumenised prints, and that the disease assumes the form of spots on such prints after they have been finished, and blisters on them previous to the stage of finality having been reached. It is to the latter—blisters on albumenised prints—that we at present direct attention.

Blisters usually make their appearance when the prints are transferred from the fixing bath to the washing water, in which the albumen tears itself up from the paper and forms a sac. Some of these sacs are small, not greatly transcending, in dimensions the size of a pin's head; others are larger, extending to upwards of an inch in diameter. The smaller ones usually dry down ultimately, leaving their presence unknown and unfelt in the finished print. Those of large dimensions, even when pricked by a needle, as some printers do, make their existence apparent when all the operations have terminated. We have had some large blisters carefully removed from the supporting paper, and upon examining them under a microscope have found that the albumen, when separating from the paper, has done so under such pressure from below as to have carried with it some filaments of the paper.

As regards the ultimate cause of blisters: it is, we think, most intimately associated with osmotic action, both the paper, on the one side, and the albumen, on the other, being in themselves septa. On the principles involved in endosmosis and exosmosis we do not consider it necessary here to enter, but will assume them to be understood; at any rate, their effects and the laws by which they are regulated.

We have, years ago, explained the application of these principles to the blistering of paper when removed from a dense liquid, such as the hyposulphite fixing bath, to a rarer liquid—the washing water; but a recapitulation may not now be unnecessary. A highly starched plain paper is, in itself, an osmotic agent, although when much resin is present it may cease to be so. The albumen on the surface, when coagulated by nitrate of silver, also possesses the same property in an eminent degree. Now, presuming the print to have passed safely through all the previous stages of preparation until it is immersed in the dense hyposulphite solution which permeates the whole texture of the interior of the paper, it is then placed in a dish of water at a lower density, when osmotic action is at once set

up through the albuminous, or paper septum, which separate the denser liquid within the paper from the rarer one without. The consequence is that the water passes through the septum into the interior of the paper more rapidly, and in greater bulk than the saline particles of the hyposulphite can find their way out, the final result being that the albumen is pushed up from the paper by a pressure from within.

At the time when we first gave this explanation, we suggested, if not a cure, at least an amelioration of the evil of blistering by immersing the prints in several solutions of continuously lessening density before immersing them in plain water, and this we know is now being practised, especially in America, the prints undergoing an intermediate transference to a plain solution of common salt after being lifted from the fixing solution to the water.

Other cures for blistering have been suggested. One which we and others have found most excellent was published in our ALMANAC for 1878 by that clever photographer, Mr. John Stuart, of Glasgow. After lying dormant, in a sense, for more than ten years, it is now being rediscovered by others. In justice to Mr. Stuart we give an extract from his article, from which it will be perceived that the *new* cure is not so very new after all.

"I am not ashamed to say that I had very much trouble with blistering, and I think that everything stated by different writers in the JOURNAL as a remedy for this disease has had a fair trial, but without success. When almost driven to despair, blisters will as suddenly disappear of themselves, and for months, perhaps, not one will be seen. I am happy to say they have now been conquered, and that in a very simple way. I am bound to say the treatment, if anything, improves the prints. Here it is:—After toning and washing in clean water for a short time they are simply immersed in common methylated spirits of wine (not that sold as 'finish') till such time as they have a semi-transparent appearance, which will be, in fact, about three to five minutes. Now lift them out, press as much of the spirit out as possible, and then wash in a few changes of water; after that they are ready for the fixing bath. After such treatment blisters will be things of the past. Now I would say to any one troubled with these photographic plague spots—'Try, and don't doubt till you have tried.'"

At this stage we leave the matter, and say with Mr. Stuart, "Try it."

A PHOTOGRAPHIC STANDARD OF LIGHT.

THE recent French Congress on photography has brought up once again the question of a photographic standard of light, but its recommendation of the acetate of amyl lamp cannot be said in any sense to have brought us a step nearer the solution of the difficult problem.

The question is one that affects equally, though in different directions, both the scientist and the every-day photographer, and to each it presents difficulties of no ordinary character. To the man who is scientist first and photographer afterwards, so far as it suits his purpose, the task of establishing such a standard no doubt appears perfectly easy, and only requires the co-operation of all engaged in photography to secure its general adoption. To him the selection of the Violle, pentane, or amyl standard light, and its careful comparison with some photometric standard outside photography, is all that is wanted; but the scientific photographer will want to know how the accepted standard is to be compared with daylight, and how if compared satisfactorily for one sensitive material, or one haloid salt of silver, the comparison will answer for other preparations. Above all, he will be anxious to know whether the nature of the standard light is sufficiently near in character to that of daylight, that is to say, whether the spectra of the standard and of sunlight are so similar that the readings of the standard actinometer may be taken as any guide to camera exposures, especially with orthochromatic plates.

Those who have interested themselves in photometry ever so slightly are aware of the immense difficulties of a mechanical nature that surround the maintenance of a uniform light for measuring purposes, even when the utmost precaution is observed. But only those who have devoted themselves to the study of actinometry as distinct from photometry can imagine the innumerable complications that arise both from the varieties in the composition of different lights and from the varying and disproportionate sensitiveness of different materials to the different coloured rays. An instance of this is afforded in the case of the Warnerke sensitometer, which, as is well known, is of little use for purposes of comparison owing to the wide difference between the spectra of the phosphorescent tablet and of the sun. Not only is the comparison between the tablet and daylight unreliable on account of the constantly varying composition of the latter, but the relation between plates of various kinds tested by the tablet itself is not accurately determined owing to the varying sensitiveness of the different haloids to the rays of different refrangibility. As the light emitted by the phosphorescent plate is practically devoid of all rays of lower refrangibility than the blue, it is clear that, as compared with daylight, which is often in winter almost free from blue or violet rays, the Warnerke sensitometer can be no real guide, and, as a matter of fact, it is not an unusual circumstance to find the comparative relations, as regards rapidity, of two plates to be reversed when tried by the tablet and daylight respectively.

The same discrepancy of course exists more or less with all artificial lights, but, perhaps, the greatest difficulty really exists in the utter want of uniformity in daylight itself. Thus, unless we establish an arbitrary standard supposed to represent sunlight, at its best it is impossible to fix a unit of measurement even for films of known composition. To fix such an arbitrary standard is, of course, no more difficult or unreasonable than in the case of lenses where a lens of the working aperture of $f/4$ has been chosen as the unit, or the mechanical unit of power is represented by a horse capable of lifting 33,000 pounds one foot in a minute. These two last units establish data upon which other calculations can be based, but in the case of light and sensitive films we have to reckon in addition with variations in the composition of both.

If a standard of light is to be established, it seems to us, in

the present state of our knowledge, that it must be an artificial one, solar light or daylight being entirely ignored and left, much as it is now, to the judgment of the operator. In that case the light selected should be one which as nearly as possible approaches to solar light in richness in the active rays. We have no personal acquaintance with the acetate of amyl lamp, so cannot speak as to its character, but we imagine that it is proportionately richer in the rays of low refrangibility than sunlight, and if so it can scarcely be taken as the best standard, even if in point of mechanical construction the lamps can be made to ensure a uniform light without needless trouble.

But magnesium, in its composition, is very similar to solar light, being rich in the violet and blue rays and containing a due proportion of those of lower refrangibility. It is cheap, it is easy of ignition, and it seems to us that, under the same conditions as those applied to the Violle and other standards, this metal, in the form of ribbon or powder, would provide a much more convenient standard.

Some years ago, when a Sub-Committee was appointed by the Photographic Society of Great Britain to study the subject, the result of whose labours was the selection of the Warnerke standard, we believe that, in the course of their labours, they experimented with magnesium as the light to be used, taking, if we remember rightly, a reflecting surface of given size in front of which the sensitive surface to be tested and the magnesium lamp were placed at fixed distances. The exposure was to be measured either by time or by weight of metal consumed, both being tried, but for some reason this light was rejected in favour of phosphorescence, with all its defects.

But it appears to us that a better plan, and one that presents all the advantages of the acetate of amyl or pentane lamp, would be to take a lantern of given dimensions provided with a perforated screen, with an aperture giving a constant area of illuminatory surface, in front of which, at a stated distance, the tests could be made just as in the case of the acetate of amyl or other lamp. The magnesium would be burnt at two or more points at fixed distances from a reflector of suitable character, and we can see no reason why, with equal precautionary measures, a light should not be so obtained possessing the same uniformity as that obtainable with the standard proposed by the French Congress. In simplicity of construction, convenience in use, and in general accessibility to all—not unimportant points to the photographer—the magnesium lamp would, we think, be far and away superior to the acetate of amyl, which at present exists only as a *rara avis* even among scientific men.

From the light we come to the method of graduation. On this point we think there can be not the slightest doubt that in order to establish a really useful international standard, all translucent graduated screens in any form whatever must be discarded. Such, even if they can be produced mechanically in truly graduated "tints," which is doubtful, establish an arbitrary scale, which is meaningless and useless to any one not possessing the particular screen. There can be no dispute as to the superiority of some system in which the time of exposure is graduated by mechanical means, or otherwise varied. This principle was first propounded, we think, by Mr. Alexander Cowan some years ago, that gentleman having constructed an actinometer, or rather sensitometer, based on the lines of a "drop shutter" having apertures of different lengths, but bearing a definite relation to one another. This, however, without some chronometric arrangement of a costly nature, gives no absolute measurement of the time of exposure and,

again, without some mechanical attachments to give long as well as brief exposures is restricted in its application.

The system based upon the revolving disc with a graduated aperture or apertures is, however, free from these faults, and, moreover, enables a maximum exposure which, if of some length, may be timed with greater accuracy than a short one, to be subdivided into extremely minute fractions of a second, and the time required to impress a given plate with a developable image, or one of a given degree of strength, as may be decided, can be stated in definite arithmetical terms.

The next question is that of development, which presents, perhaps, as great difficulties as any yet encountered. First of all, how is the standard developer to be composed so that it will treat with equal impartiality every kind of plate? Photographers well know that the best developer for one plate may be the very worst for another; how, then, are we to treat two plates of varying character in this respect with the same standard developer? Then, again, in actual practice we do not develop *by time*, but apply judgment as to when the best result has been obtained. Are we, then, to apply a standard developer for a definite time?—in which case the test will undoubtedly be unfair to some plates and favour others—or are we to “get out as much as possible,” regardless of time? In the latter case much uncertainty must arise from the varying judgment of the operator.

Lastly, what are we to develop for? Are we to accept the first faint sign of an image as the sign of the plate's impressibility and consequently its sensitiveness? or are we to aim at a certain degree of density? In both cases so much depends upon the character of the plate, that we question whether any practical result will ever be arrived at in making sensitometer trials a test for camera exposures.

These, and many other difficulties, present themselves in the matter of the establishment of a standard light or a standard system of actinometric measurement; and there are many points in which, by individual experiment and public discussion, much may be done to clear the way before any concerted action is taken in the matter by the Congress or any other body.

Here, then, is a subject which some of our more scientific readers may take up with advantage during the winter months.

NEGLECTED PROCESSES.—CERAMIC PHOTOGRAPHY.

Is it not a little surprising that ceramic photography has received so little attention at the hands of photographers generally? For, not only is it capable of yielding results which for beauty cannot be surpassed, but as regards stability, pictures burnt with ceramic ware may be well considered *par excellence* the most permanent of all photographs. At different times doubts have been raised as to the permanence of photographs by almost every process in vogue, but, so far as we are aware, no question has ever arisen with reference to the stability of a vitrified picture.

Ceramic photography is of comparatively early date, and at various times has formed the subject of several patents, all of which, with one or two exceptions, we believe have expired. One of the first to produce really good vitrified photographs on enamel, commercially, was M. Lafon de Carmarsac, and excellent they were. Indeed, up to the present time they have not been surpassed as untouched pictures, except perhaps in size. Later on Carmarsac had a number of imitators, and enamel

photographs were produced by several photographers in this country, who, for a time, made them a speciality. At present, however, we do not imagine that vitreous photography is practised by over half a score of photographers in the whole of England, and by them only to a very limited extent.

The production of “burnt in” pictures is really a very simple matter. There are different and totally distinct methods by which they may be made, each of which is capable of producing excellent results. And what is more, none of them require any expensive plant to work them. All the apparatus necessary, beyond that to be found in every photographic establishment, is a muffle furnace for the “firing in.” Small gas muffles, though large enough for working enamels up to five or six inches, may be had for 3*l.* or 4*l.*, and they require no fixing.

One of the simplest, and for small sizes, perhaps, the most satisfactory method is what is known as the substitution process. This, briefly, consists of first making a transparent positive from a negative by the wet collodion process on a glass plate. After the picture is completed, as a transparency, the reduced silver forming the image is toned, or rather replaced entirely by another metal, which, when vitrified, will yield a picture of the colour desired. If the silver image were burnt in at this stage, as might be done, it would produce a yellow picture similar in colour to the silver flashed glass supplied for dark-room windows. Hence, to obtain a black or purple colour some other metal must be substituted for the silver. Platinum, palladium, iridium, &c., may be employed according to the particular tint desired. The first-named is the metal most generally preferred. The transparency is simply placed in the “toning bath” of a chloride of the metal until the whole of the silver has been replaced by the other metal. The chloride of silver formed in the operation is then dissolved out. This, it is manifest, if left in, would cause an unpleasant yellowness in the finished picture. After toning and fixing, the collodion film is transferred from the glass plate to the enamel tablet, and, after drying, placed in the muffle. A few minutes of moderate heat, according to the fusibility of the enamel, is all that is necessary to vitrify the image, which is afterwards glazed with a soft and easily fusible glaze.

Another method, and one practised by some, is the dusting-on process, using, of course, vitrifiable pigments, such as those employed in porcelain painting. This process possesses some advantages over the substitution one, inasmuch as with it any colour or tint of picture may be obtained at will by selecting a suitable pigment, whereas, by the substitution method, the colours available are more restricted. The weakest point in connexion with the powder process is the difficulty in obtaining enough force in the shadows, that is, in getting the bichromated film to retain a sufficient body of pigment to yield the desired vigour. The pictures can, however, be strengthened by retouching and then refiring. This treatment most workers by the powder process have found to be a necessity.

The “carbon process” has also been made available in ceramic photography, and it is, perhaps, better adapted for the production of work of large size, on a commercial scale, than either of those just referred to. In this case the tissue is made with a vitrifiable pigment, instead of the ordinary colours. At first sight it might appear that this would be a very simple method to work, as it would only be necessary to develop the picture on the enamel or porcelain plaque, and then fire it into the ware. Unfortunately, however, there is—as there is in many other apparently simple processes—a little difficulty in the way. This difficulty is that when the heat is applied the gelatine

contracts, cracks, and then frizzles up and leaves the plate, of course taking the pigment with it. There are methods by which this difficulty may be overcome, but they are either treated as a trade secret or made the subject of a patent.

There are one or two foreign firms, however, who produce vitreous photographs for the trade here, and at moderate prices, but the business in them is very limited. This may be fully accounted for by the fact that no professional photographers, so far as we are aware, make them a speciality, or put them forward as they do almost every other style of picture. Under these circumstances it is not so very surprising that ceramic photography has, at the present time, to be classed as a neglected process.

The applications of ceramic photography, apart from portraiture, to which direction it has been chiefly confined, are too numerous to be detailed here; suffice it to say that it is admirably adapted for pottery and art work generally.

COST OF SILVER NITRATE.—The alloy in standard silver being seven and a half instead of ten per cent., as suggested in our article on this subject, the value of the metal in ounce comes out almost exactly $20\frac{1}{4}$ pence, or very closely five-eighths of the market price of standard silver.

REFERRING to the footnote in our issue of the 23rd ultimo, wherein we printed two of the Convention papers contrary, as it appears, to the decision of the Council, we have to express regret that the mistake occurred. The Council, *as a body*, was not responsible for the mistake, as there was, in fact, no meeting of the Council at the time. We add this to our previous explanation at the request of the ex-President, who fears that our previous acknowledgment was not sufficiently explicit thoroughly to exonerate the Council.

INTENSIFICATION by mercury is so simple and so sure, that it is scarcely probable it will fall into disuse; but simple as it is, certain precautions have to be taken to get the best results. *En passant*, we may say that a thorough investigation of the theory of the process has never yet been made, nearly all the text-books containing erroneous statements with regard to it. Such an investigation ought to lead to valuable results, for the conditions under which mercurially-intensified negatives fade are quite unknown, some produced years ago by a certain process being in good condition, while others again, but a few months old—intensified apparently under identical circumstances—being injured beyond repair.

SOME operators ascribe great virtue to a plain solution of bichloride in water, while others consider that chloride of ammonium should be employed as an aid to solution. We need not say that much stronger solutions can be produced in the latter than in the former mode, one part in nineteen being the maximum of solubility in cold water, alcoholic and ethereal solutions containing one in seven and six respectively are not of practical value although stronger. Other operators, again, prefer the iodine compounds of mercury. Mr. Edwards's method of precipitating bichloride solution by iodide of potassium, and adding "hypo" till almost all is redissolved, is perhaps the most elegant of all methods; it is so easy to intensify locally or wholly; and the result it is not possible to distinguish from a non-intensified plate. When plain solution of mercury, followed by ammonia, is employed—and this is the oldest and commonest of all—it is very necessary to wash well between each stage, or irremediable stains are produced. There is one point requires elucidating in the action of the ammonia: we refer to the difference in colour produced (which every one must notice) according to the degree of dilution of the ammonia solution.

It is quite possible that variations in the nature of the intensified image may be produced by the state of the ammonia itself. For example, the ammonia may contain a considerable amount of car-

bonate, the action of which is not known, and it occurs to us to suggest that experiments in this direction might be made with advantage. We lately pointed out the liability of ammonia to become contaminated by absorption of carbonic acid from the air, and it has been pointed out by a writer in the *Chemical News* that the presence of this salt exercises a remarkable action on other mercuric precipitates. For example, ammonia solution, as is well known, throws down from a bichloride a white precipitate, but when it contains a certain amount of carbonate the precipitate is redissolved entirely. May not some similar variation of action be produced when the ammonia solution is poured on the mercurialised plate?

BEFORE leaving the subject of mercurial intensification, we would call attention to the fact that most negatives so intensified can be reduced in intensity if required by solution of hyposulphite of soda. One method of treatment of an over-exposed picture has been founded on this plan: the negative is to be reduced by ferricyanide, intensified with mercury, and finally brought to the exact printing strength by hypo solution.

ONE of the most remarkable feats of photography on record is the photographing the terrible explosion at Antwerp, or if not the explosion, the immense cloud of smoke produced at the moment. The current number of *La Nature* gives an illustration copied from a photograph of the huge cloud that shot up in the air, roughly in shape like an inverted Florence flask, when the explosion occurred. It has been estimated as being seventeen or eighteen hundred feet across, and, according to the journal quoted, the cloud remained motionless for about a quarter of an hour, preserving the form recorded by the photograph. It seems very remarkable that just at the instant some one should have been ready with camera and plate and quick-witted enough, notwithstanding the shock, to secure the view in time. The author of the negative is given as M. L. Van-Neck.

PRACTICAL heating by electricity has too often been looked upon as the dream of a visionary, but we read that it is now an accomplished fact, and that apparatus is being made and sold by a public company for utilising electricity for railroad-heating, house-warming, cooking, &c., so that now it may be possible for those photographers in possession of an electric installation to utilise a portion of the surplus power for heating the studio and other portions of the premises. The apparatus consists of a series of coils enclosed in cast-iron cases forming the radiating surface, and provided with points for increasing the available surface. There seems a real probability of this being a practical invention, and the inventor, Dr. Leigh Burton, has received a prize from the Franklin Institute for his invention.

LANTERN SLIDES ON GELATINE PLATES.

Now that the lantern season is rapidly approaching, we shall no doubt once more have the battle of gelatine *versus* collodion fought over again. It is not my intention to enter into the argument here, further than to say, that where collodion plates possess their undoubted advantages, gelatine is indubitably the more convenient process to employ for many, both on account of its great rapidity, as well as the fact that it is in many cases the only process with which the photographer is familiar.

Further than this, I will only say that I am not one of those who condemn gelatine plates for transparency work. On the contrary, if the right precaution be observed, I believe transparencies of the very finest quality may be obtained with little more trouble than negatives. Naturally, those who attempt to apply rapid landscape plates to a purpose for which they are wholly unfitted must expect to meet failure, just as would have been the case in the old collodion days if a man had tried to make his transparencies with a neutral bath, freshly iodised collodion, and the most energetic developer he could obtain.

I say I am of opinion that with proper precautions gelatine plates may be made to run collodion very close for quality, and still have very much the advantage in rapidity, though far inferior in that

respect to the sensitive plates of commerce. In the belief that there are still some amateurs left who, like myself, are not only not afraid, but actually prefer to do some of their own work in emulsion making, I propose to describe in detail my method of making lantern plates, premising that all I claim in the process is the systematically adapting to amateur requirements the advice and instructions given by other writers.

In the early days of gelatine plates it was the general complaint of "old hands" that the new plates would not give the same "quality" as wet collodion. With increased familiarity with the process, and improved methods both of manufacture and of development, this gradually wore off, though even at the present day it is not unusual to hear similar, though milder expressions of regret. Whether or not there be really any truth in this suspicion of inferiority of gelatine for negative work, undoubtedly there has been ample ground to complain of the quality of the transparencies turned out by its aid. I have frequently seen, though not to the same extent recently, at mixed "lantern shows" a series of slides upon gelatine plates thrown on the screen in immediate succession to a number of collodion ones, with such an effect as must have made the producer feel very small.

Many of the commercial negative plates now on the market are so nearly perfect in their mechanical and chemical qualities, that it is difficult to see in what respect they can be improved. For negative purposes the character of the image for gradation, clearness, and colour seems unsurpassable; and yet, if one of these be developed as a transparency, and compared with a similar one on collodion, there will be a strong difference in favour of the latter. The special "lantern plates" prepared commercially, so far as my experience with them goes, differ from ordinary plates only in being slower, and perhaps, though not necessarily, in consequence capable of giving a clearer image with less trouble. In at least one instance I have a strong suspicion that a wide departure is made from the ordinary "salting" of the emulsion; but, as a rule, there appears to be little variation from the every-day routine.

What is required is a plate that will give perfectly clean lights, not merely free from fog and developing stain, for that any ordinarily good plate will do, but free from opalescence or granularity of the film of gelatine itself. Next, we require fineness of deposit, that is to say, the particles of silver must be so minutely divided as to be individually unrecognisable even under powerful magnification. The image should form, indeed, a homogeneous "stain" rather than a delicate stipple or grain, and even in the deepest shadows be perfectly transparent. The next quality is the capability of giving density and gradation—the two must go together, and the last is tone or colour. Each of these I will briefly touch on separately.

First, with regard to clearness of image. In the sense referred to here as distinct from fog, it may be said to depend entirely upon the gelatine and the method of treating it at every stage. Many samples of gelatine are, as met with in commerce, utterly unsuited to our present purpose, though perhaps well adapted for negative purposes, owing to a very slight opalescent appearance not noticeable in the shadows of a negative, but seriously detracting from the brilliancy of the high lights of a lantern slide. This defect is usually due to the presence of lime in the gelatine acquired during the process of manufacture, but it is not always so. Minute particles of other foreign matter emulsified, so to say, in the gelatine will also produce a partial opacity, as for instance in the well-known Nelson's "opaque" gelatines, the names of which, however, scarcely do them justice from a photographic point of view.

Lime when present in the insoluble form is extremely difficult, if not impossible, of separation, as in converting it to a soluble condition the chances are the gelatine will be itself decomposed. When present in the soluble form, as it invariably is, partly as a constituent of gelatine itself (phosphate of lime), the lime is always liable to be precipitated by any solution capable of forming an insoluble salt and becomes practically unremoveable. The substances capable of so forming insoluble salts include caustic alkalies, carbonate, hard water, solutions containing oxalates, citrates, and many others, so that it will be seen, while it is impossible to keep entirely clear of lime in the gelatine itself, it behoves us to use every endeavour, not only not to aggravate the injury arising from that already there, but to avoid introducing more.

The first step, then, is to select a gelatine that is free from all visible traces of lime, and which shows but little signs of it when allowed to swell in a solution of caustic soda in distilled water. A sufficiently pure sample having been obtained, we must avoid introducing more lime by using only distilled water in making the emulsion, and avoiding, as far as possible, the use of tap water at any stage. If a gelatine film or emulsion in an alkaline state be washed with water containing lime, carbonate or hydrate of calcium is sure to be deposited, and in the case of an emulsion ripened with ammonia and washed in ordinary tap water, the opalescence so caused is sometimes remarkable. With a very "hard" water even the washing a film after development is sufficient to produce a visible veil.

Similarly all solutions containing citrates, oxalates, or alum (especially if the film be alkaline), should be used with the greatest caution. The citric acid and alum "clearing solution" should be replaced where necessary by that containing hydrochloric acid. The ferrous oxalate developer should be used only in conjunction with distilled water, the negatives after development being soaked for some time in distilled water rendered slightly acid with acetic acid before being passed into ordinary water, which even then should be boiled or rain. Alum should never be applied to a plate that has not been well washed after leaving the developer.

I have said nothing about the presence of foreign matter other than lime in the gelatine, because such, if present, will most probably take the form of dust or other matter, removeable by means of filtration. If this be not the case, there is little hope of doing any good with the sample of gelatine, since the process of clarification with white of egg is so troublesome, and withal so uncertain, that it is not worth resorting to. The best way of filtering is to have made a conical bag, precisely similar to the cook's "jelly bag," of two or three thicknesses of close flannel or felt, or, better, fine chamois leather; sew this on to a ring or hoop of cane, by which the bag may be suspended to the roasting jack in front of a hot fire.

To prepare the gelatine, let it soak for a few minutes in perfectly clean rain water previously boiled, filtered, and allowed to cool. When quite soft take the sheets or "leaves," one or two at a time, and carefully and thoroughly rub them upon one another with considerable friction to remove any adherent dirt; rinse well and allow to soak in distilled water until sufficiently swelled. Liquefy by heat and raise the temperature until it reaches 180° Fahr. Dip the filter bag, previously quite clean, into very hot water; wring it out quickly and hang it before the fire, pouring the hot gelatine into it, with a suitable receptacle to catch it as it passes through. No matter how thick, it will quickly pass through the filter if kept hot and fluid, for which purpose it should hang pretty close to the fire, and it must be kept revolving in order to prevent the gelatine drying on the surface of the filter, as would be the case if allowed to remain stationary. If needful the filtration may be repeated a number of times.

A stock of gelatine so clarified may be poured out on to slabs of glass rubbed with oxgall and allowed to dry for future use; or the quantity required may be operated on each occasion. The advantage of clarifying the gelatine before adding it to the other ingredients of the emulsion is that the operation can be performed so much more thoroughly, and it is perfectly easy whatever process of emulsification may be followed, as it may be cleared in solution of four or five times the concentration of the emulsion, and subsequently thinned down.

With regard to fineness of division, this is a quality now almost ignored in ordinary "rapid" plates since the sensitiveness is supposed to require a certain degree of granularity. It is true that rapidity and coarseness generally run hand in hand, but it is by no means necessary; however, for our purpose, it is satisfactory to know that fineness of division is quite easy to secure, though in conjunction with rapidity it is not so.

Coarseness of deposit—by which I mean a degree of granularity plainly visible with a magnifier—began to be the fashion when the practice of boiling in the presence of a small proportion of gelatine, or digestion with ammonia, came into fashion as rapid methods of securing high sensitiveness. In Bennett's process extreme fineness of division accompanied the utmost rapidity, and even in the "boiling process" it is possible to get a fine deposit accompanied by sensitiveness, but it requires care. Naturally the precipitation of the silver bromide in a solution of gelatine containing only two or three grains to the ounce

will be quicker, as well as coarser, than when twenty grains of gelatine are present. But as for our purpose we do not require to boil, and are not therefore likely to destroy the setting power of the gelatine in that way, we may mix up the full quantity of gelatine at once, and thus secure to the fullest its assistance in giving us a finely-divided bromide. No other conditions are needful beyond a comparatively viscous emulsion and digestion at a moderate temperature, not too prolonged, to produce the finest grained emulsion it is possible to obtain. Such an emulsion, if properly made in other respects, offers advantages quite distinct from the merely physical character of the image. It assists greatly in securing both density and gradation as well as colour-giving properties, which, by the way, are more dependent upon formulæ and development than anything else, and I shall therefore touch upon them under those heads.

C. BECKETT LLOYD.

PRACTICE AND THEORY.*

THE negative having been taken, it has to be printed. As to the process that will give the most artistic results, opinions differ, and in all probability will continue to do so till the end of time. There is, undoubtedly, in the present day a general preference for matt-surfaced prints, with which novelty and the vagaries of fashion have probably something to do; at any rate, the matt surface and cold colours are decidedly in favour. Before platinotype came into popular notice, the greater part of plain paper prints had a slaty sunken appearance, with flatness and want of detail in the shadows. These contrasted with the brilliant albumen prints were decidedly inferior. Platinotype, however, showed to the general public that strong brilliant prints could be made without a shiny surface; this gave an impetus to the production of other prints than albumen ones. Unfortunately, negatives of all kinds and qualities are required to be printed from; some very valuable ones, perhaps unable to be again obtained, but bad in quality; have to be made the best of. If we were limited to matt-surface paper for printing them upon, the results would be a sorry hash; but here the albumen process comes in, and no one experienced in the matter will deny that for all and every kind of negative there is no process extant that can approach silver printing for efficiency. Its adaptability is marvellous; quite presentable prints can be made from the poorest apology for a negative; in fact, any negative that will print at all can be made the best of in silver printing. Take the average of negatives. How many are bright and faultless compared with those of varying degrees of mediocrity? The answer must be, very few indeed; and as all other processes require a special quality of negative, silver printing is tolerably sure of a long life in spite of all detractors. In silver printing we can see what we are doing—mask, dodge, shade, stop out, tint, and a score of other things that will tend to improve the work that cannot be so conveniently done in any other process.

There have from time to time been many papers with a matt surface put into the market that would give bright shadows and good colour. About twenty-seven years ago a Mr. H. Smith introduced a paper of this kind that he called Valetta Paper, and was worked exactly like ordinary albumenised paper, and gave very good results. I believe starch, lac, and gelatine entered into its composition. I used a good deal of it about that time for book illustrations, the prints keeping very much as ordinary silver prints would do—some have faded and some not, which fault I think may be attributed to imperfect manipulation, probably insufficient fixing. Fixing seems always to be the weak point when large numbers of silver prints have to be made. The chance is some will be fixed better than others; those last fixed coming off worst. Mr. H. Cooper, of Torquay, also prepared some, giving excellently bright prints, with a matt surface; he called his Resinised Paper. The formula was, I believe, published in one of the photographic periodicals, but I cannot call to mind exactly how it was prepared; any way, the results were charming. It should not be a difficult thing to produce paper that will give all the brightness and detail of albumenised prints without the gloss of albumen, and be sensitised with silver nitrate in the same manner. I do not think exception could be taken to such prints on the score of being inartistic any more than to the illustrations in an ordinary well-printed book on good paper. Such paper would, I imagine, be more permanent than albumen paper, which, to say the best for it, is a somewhat treacherous material. It often happens that paper albumenised in the spring and early summer is inferior in quality to that prepared later on in the summer and winter. I have been given to understand the reason of this falling off in quality is owing to the albumen used being in a great measure from eggs that have been artificially preserved.

* Concluded from page 619.

The albumen, although free from offensive odour, is poor and watery in comparison with that from fresh eggs, and the paper suffers accordingly. From my own experience I should think there is every probability that the explanation is correct. On such paper the printing results are flat and poor in colour, with a considerable amount of mottling and streakiness that no treatment will overcome. The sizing of the paper is sometimes irregular, the starch and resin not being so well incorporated with the pulp as they ought to be. The paper also gets albumenised before the size in it has had time to properly harden; the consequence is blisters, for which there is no remedy but time.

Mr. E. W. Foxlee and other experienced men have found that a badly blistering sample of albumenised paper may be quite cured of the defect if it is stored away for a considerable length of time without any other treatment. It is true certain conditions of temperature and strength of baths may somewhat alleviate the trouble, but as it frequently happens the paper is mixed in the same ream, some that will blister and some that will not, the deductions to be drawn from any experiments are unsatisfactory, as there are no means of distinguishing between the different samples beforehand. Mr. W. D. Richmond, following on the lines laid down nearly a dozen years ago by Mr. J. Stuart in the ALMANAC, found that by putting the prints *direct* from the printing frames into methylated spirit no blisters would form, although they went through all the usual processes afterwards without any special precautions; but this treatment did not prevent blisters if the prints were wetted with water first. This is an easy remedy and worthy a further trial, having the advantage of not diluting the spirit, as must be the case if the prints have been previously washed or toned.

If any large quantity of paper is consumed it is most economical to sensitise it at home on as strong a silver bath as the paper will bear; even with lightly-salted papers a sixty-grain bath will not be found too strong for the best results. A strong bath facilitates the toning, and adds richness to the colour of the prints. The best strength for the majority of the paper now in the market is between sixty and seventy grains of silver nitrate to the ounce of water. A guide to the best strength for the special sample of paper in use is the rapidity with which it bronzes on exposure to the light. With a negative of an average density, the margin of the paper projecting beyond the negative should be bronzed by the time the print under the negative is about three parts done; the deepest shadows in it should show a little trace of bronze. If no bronzing takes place, it may be considered that the bath is too weak, and the prints will be deficient in vigour; if too strong, the lights will be somewhat blocked, and the colour not so good, and the paper, also, will not keep so well, soon getting yellow. At the same time, bronzing does not altogether depend on the strength of the nitrate bath, the length of time of exposure and strength of the light having much to do with it; in a very weak light the uncovered margin of a print may be bronzed before the print itself is anything like sufficiently printed.

With regard to the keeping qualities of sensitised paper, it varies greatly according to the paper and the amount of free silver left on it. Many different methods of treatment have been suggested, but with many the toning is not sufficiently taken into account. It is very easy to make a paper keep well, if that was all; but to do so to tone well is another matter—the less silver left in the paper the longer it will keep, and the more, the better it will tone. Different makes of paper vary in keeping qualities, though prepared in the same manner, but with all, air and moisture are their greatest enemies, so to preserve them adopt similar means to those recommended by the Platinotype Company for keeping their paper. In all preservative solutions compounded with citric acid, to be applied to the surface after the usual sensitising, there must be a considerable amount of free silver, for unless there is, bright prints are impossible, and we get mealy, poor results. The manner in which the paper is laid on the silver bath to sensitise varies with different printers. However, there are only two methods that can be rapidly managed without producing faults. Let it be borne in mind the longer a bath has been worked the more albumen will it contain, and the bubbles formed will be of a more persistent character. On a fresh bath bubbles will form, but a very trifling disturbance will break them; but after a time they may be moved about on the surface, and break with considerable reluctance if they happen to remain unnoticed under the paper until it begins to flatten. The persistence with which they adhere is very annoying; merely lifting up the sheet and letting it down again, or a touch with a glass rod, will not be sufficient to get rid of them; they only disappear on being wiped with a scrap of paper, or something equally efficacious. The method of laying down the paper on the bath with the least chance of defects is either to roll up the paper tightly, face outwards, on a roller, for a short time before sensitising, so that when a sheet is held up by the two upper corners the lower edge will be curled. The curled edge is

carefully brought into contact with the silver bath, and the sheet slowly and steadily let down on to it, where it remains for the requisite time. The end first let down is then picked up, and the sheet drawn slowly over a glass rod fixed at the end of the tray, in order to remove as much surface moisture as possible. It is then either hung diagonally over a half-round rod, or suspended to a suitable frame by American clips till dry. The alternative method of laying down is not to previously roll the paper, but to take the sheet by the two *opposite corners*, bend the paper face outwards, lay down the lowest *corner* on the bath first, and gently let the sheet touch the bath diagonally, not relinquishing hold of the top corner till the sheet is quite down.

The advantage of either of these methods over bending the sheet and laying down the *centre* first, so often recommended, is that bubbles invariably form at that point where the paper first comes in contact with the solution, and it is *very* much more convenient to raise the edge or corner to get rid of them than lifting the whole sheet when the bubbles are in the middle. With regard to the time of floating. Three or four minutes are generally sufficient if the paper is not too dry, and having to ensure it being in a proper hygroscopic condition, it is best laid some hours in a damp place, until it becomes flimsy; there is not only less tendency to make bubbles, but the sensitising is more even under these conditions.

A very dry paper will frequently curl up at the edges, lengthways of the sheet, almost directly it is moistened, into a comparatively tight curl, so that the silver bath is carried on to the back of the sheet to its serious detriment. A slight tendency this way may be overcome by simply breathing on the back as it lies on the solution; but excessive dryness causes a most unmanageable curl that defies any amount of breathing. The paper must be forcibly held down on the bath until the moisture penetrates the paper, when it becomes tractable. To preserve the paper after thoroughly drying lay two sheets face to face, then a sheet of paper impregnated with carbonate of soda, then two more sheets of albumenised, and so on; put the whole between two boards with a weight on the top; in this manner without an air-tight case paper will retain its good qualities for a long time. A piece of the soda paper laid on the back of the albumenised in the *printing frame* is a good precaution; the only objection is, after using it some time in damp weather, it is apt to give rise to spottiness on the prints. The remedy is obvious.

As to printing, a good *diffused* light is almost always best, and only in cases of very dense negatives should the printing operations be carried on in direct sunshine. Direct sunshine gives rise to a good many defects—scratches and imperfections of the glass show badly on the prints, the colour is generally inferior, and delicate half-tones are much impaired—the only thing to be said for it is that it is a more expeditious way of turning out a quantity of work. As to the depth of the printing, no rule can be laid down. Given a good negative, and everything in proper working order, the printing should be finished when the deepest shadows are slightly bronzed, but even this depends on the density of the negative; there should also be a slight tint on the lightest portion under any circumstances; the print must be somewhat darker than it is intended to be in the finished work, to allow for reduction in toning and fixing. The weaker and thinner the negative, the weaker the light should be to print in; the denser, the stronger light. Prints from very thin negatives can be improved by laying a piece of pale yellow glass over the printing frame during the operation.

After printing comes the trimming process, either closely so that they require no further attention in this way before mounting, or roughly trimming the waste edges in order to economise the gold in toning the final trimming taking place after they are washed and dried, which I think rather the preferable plan, as the edges are apt to get softened during the soaking they get, and the finished prints do not look so nice and smart as when the trimming is deferred until the prints are dry.

If vignettes are wanted (that eminently inartistic style according to Emerson), the more gradual the shading off the better the effect will be. *Abrupt* vignetting, showing a definite outline, is for heads and busts most objectionable; the true vignette effect is positively murdered, leaving nothing but an oval or pear-shaped patch that will spoil the most beautiful picture ever taken. There are a great variety of methods in vogue for vignetting, and very good results can be had with any of them providing they are used with discretion. A popular plan, as easy and good as any, is to cover the print and negative with a perforated cover at a little distance from the frame, the aperture being somewhat smaller than the required vignette, the distance regulating the size of the picture and print in a quiet diffused light. A strong light may be used if the aperture is covered with tracing paper. It is of very little importance which plan is adopted; the idea

is to effect a gradual softening off of the image to nothing, and either plan will meet this requirement, but like other delicate operations it must be used with brains.

Printing on matt-surface or salted paper should be rather deeper than on albumenised, and the toning carefully watched, as the gold acts much more quickly on these papers. When ready-sensitised paper is used, or any paper preserved on an acid solution after the bulk of the silver is removed by the *first* washing, about an ounce of carbonate of soda to the gallon of water should be in the second, the soda being removed by subsequent washing before the toning takes place.

As to the *best* toning bath, really there is no best—almost any, used with discrimination, will give good colours. The favourite is perhaps the old-fashioned acetate or borax bath, as being easy to use and satisfactory in all respects when warm colours are required, and the lime bath for black colours. If a toning bath is required to be kept in stock the acetate is by far the best; it is always ready for use, and will last unimpaired for a very long time. The lime bath will not keep, and requires making an hour or so before use; it gives excellent colours, and for certain work it is difficult to improve upon; it is economical of gold, and is undoubtedly a good all-round bath. After toning put the prints into salt and water for a short time before fixing. Two hyposulphite baths are better than one; add a little liquor ammonia to each; let the strength of the first be one to six, and the print kept moving about in it for a quarter of an hour. Place them in the second of a greater strength—say, one to four—for a few minutes, then thoroughly well wash, and the prints are finished. The temperature of all solutions should be kept nearly as possible at 70°.

Respecting the nitrate baths, they should be kept neutral by the occasional addition of carbonate of magnesia. In all home-sensitised paper the presence of a *considerable* quantity of free nitrate of silver is absolutely essential to brilliant results. If very weak sensitising solutions are used, or the paper washed, it is necessary to make up for the deficiency of silver by adding some other nitrate or fuming with ammonia; but at best they are inferior to the stronger baths, both in brightness and uniformity of the resulting print.

EDWARD DUNMORE.

PHOTOGRAPHING OF PREPARED CANVAS AND SIMILAR SURFACES.

To the amateur or novice there will seem to be few substances on which the photographic image can be directly printed which would present more difficulty than canvas or panels prepared for artists painting upon; but although this is by no means a new idea or thing, yet as of late years so many people have devoted themselves to the camera that the subject must be new to many of them, and even many of those who have devoted their lives to photography know little or nothing of this out-of-the-way branch of their own work, and to all such it must prove interesting. To artists, also, it may be said that there is little use for them standing aloof on the pedestal of their own dignity, as we know, and very many of themselves also do, how much and greatly indebted they are to photography for the invaluable aid it has been able to render them. Not only is this the case, but it is perfectly patent to all who choose to look that it has quite revolutionised the landscape art, not only of this country, but of Europe, with perhaps the single exception of Holland and the Low Countries.

There the artists had acquired a habit of looking at nature so truly, and representing her withal so accurately, that they hardly needed that training which makes for truth, which photography has compelled all other schools to follow or adopt. But it is not alone in the mere drawing of landscapes that this class of fellow-workers are indebted; in other and what are considered by many to be the more important divisions of figure and portrait representation, they are not only aided in many instances with the drawing and light and shade, but also to the photographer are they often obliged for the very printed design on which to work, even though originally drawn by themselves.

To such an extent has this been carried by many, that it is within the writer's knowledge that several of the most famous names in art circles are content with either copying early but carefully drawn designs by the use of our art, but go much further than that and get the same reproduced on the canvas or the panel prepared for painting, just as the photographer does with his own work on the same materials. Nor should we find fault with this adoption of the mere labour-saving power which is here given, for if the superior artist chooses to do the mere copyist's work, he is only taking up time which he might use to far higher and nobler purpose; or if, as in many cases, he entrusts this simple copying work to a younger or inferior

hand, or to some of the cleverer of the young students, who are always proud to get such work to do, but which requires the continued and constant supervision of the artist himself to prevent deviation from the truth of line or change of expression in effect all unconsciously by the student copyist, and this requires much correction from the artist.

The photographer by his strictly mechanical copyism saves all this worry and bother by rendering it absolutely, whether right or wrong, in the first instance; and not only in this direction but in many others can this help be made available, and is, in the case where an elaborate design of figures or animals, or both in combination, has been made by the artist, and there is no probability of a popular reproduction by any of the various processes, he retaining the copyright of his work by this method gets the entire design in its light and shade, and to any size made for him, in a tithe of the time and cost and with ten times the certainty of even a replica by his own hand.

This is by no means a mere speculative statement, but one that is made with the fullest knowledge and with a long experience in doing such a class of work for men who have publicly contemned photographers and their art, but who are not above accepting the hundreds of pounds which have been got for their pictures, without mentioning the fact that they were painted on photographic copies of their own work truly, but still to the extent stated aided in the mechanical reproduction by photography.

The methods for producing this class of work now in common use are more or less objectionable, and they only need to be mentioned to show their ineptitude for the purpose. Any substance which has a body, such as a collodion transfer or a carbon print, or any other in which gelatine is superimposed or attached to prepared canvas, is not only bad, but is worse than useless, as it certainly tends by its unequal rates of contraction and expansion, and by being so amenable to the action of damp, to rend and crack the oil paint, as certainly as does the covering of the finished work with varnish before it is quite dry, and this is too often done.

It may be taken as an axiom in producing photographic portraits painted afterwards in oil colours, that there should be nothing which will prevent the perfect adhesion and union of the colours of the artist's palette and that of the prepared ground, and if I am not much misinformed this is by far too much the common practice.

What, then, is wanted is to treat the prepared canvas in such a manner that it will accept the printed silver image in such a way, and be as permanent, as that which was shown to be possible with all papers or plain cloth surfaces on page 524 of this JOURNAL, and that the picture shall be as much like an inkstain as possible; but before describing the mode of procedure guilt must be pleaded for urging the use both of the ornolu and of plain salted gelatine, though in minute quantities, for this purpose, and it was not until actual proof of not only the inutility but the positively deleterious effects came under observation, that this newer and better way had to be invented. It occurred in this way. One of the oldest and most respected persons in the business called my attention to a portrait which had been finished over one of these enlargements printed as indicated, and on a cursory examination nothing was apparently the matter, but on a closer survey it was found to be in a perfect network of fine cracks, and this became more painfully visible on looking through the canvas in a bright light. I had, from having recommended the way in which it was done, a kind of fatherly interest in the matter, and naturally felt much annoyed, and would not for a time believe that it was due to the method of preparation; but a deliberate destructive examination of the picture, which was not allowed to be sent home, proved that it was the interposition of the gelatine which had produced the ruin of a valuable picture, and thus paved the way for a better method.

In beginning, it is well to be careful in the choice of the canvas, as some of the examples occasionally prove somewhat refractory under the treatment. There can be no control over its preparation exercised by the photographer, the material being prepared without reference to his uses, so that all he can do is to select the best for his purpose, and this can only be arrived at by experiment. So far as description may go, that may be tried, but it would be obviously unfair to select and name a special maker or makers while there might be others, perhaps untried, which were quite as good. Broadly speaking, that kind called half-prepared is not quite so good for this purpose, even when made by the same makers as the fully prepared, although some of the best artists prefer it from the tooth it has, enabling the full freedom of a well-laden brush in the working. The principal reason why it is not so good is that the very thin layer of priming colour allows the texture and the more prominent fibres of the cloth to project in a slightly rough manner, and thus while in preparation for being printed upon the very thin layer on the topmost points is apt to be washed bare, and thus bring into contact with the cloth

and its gelatinous coating the sensitising solutions, which is best avoided.

The same remarks apply to most of the French rough canvases, and also to the Roman. That cheap German kind which has been recently introduced should, if possible, be left severely alone—it is rubbishy. The best to use is the good fully and well-prepared cloth of the old London makers, and, with almost if not every one, it will be found, that although the price may be a few pence a-yard more, the saving of time and trouble, as well as the feeling of absolute certainty as to the result, will more than compensate for the difference. It is well, also, to be pretty fresh; old shop-keepers are apt to crack. In preparing to print, say, a head, or indeed any picture, it is better that the cloth be strained on its stretching frame and the position of figure roughly sketched in, there being no use to sensitise more than is really necessary, say, the head and shoulders, and hands, if they come in. By using either negative or transparency, the latter by preference, and projecting on the prepared canvas, the artist can at once see and place his subject where he wishes. Or, as is very often done, the artist simply sketches in the position he wishes for the principal portions which are to be printed, and leaves the rest to the photographer. This being done, prepare the canvas for printing in this way: Take in the proportions of—

Methylated spirits of wine	.....	½ ounce,
Water, which need not be distilled	.....	¾ "
Sodium chloride	.....	3 grains,
Citric acid	.....	1½ "

and with a sponge or piece of clean cotton rag rub and wash the canvas all over—back and forward—rubbing it lightly but firmly until all appearance of grease has been got quit of and the above salting solution lies quite flat all over, care, of course, being taken that the coating is equal, and that no pools or puddles are left on the cloth or panel, the surface being impervious to wetting.

The sensitising solution is—

Silver nitrate	.....	35 grains,
Distilled water	.....	1 ounce,

to which, in order to make it into ammonia nitrate of silver, add strong liquor ammonia until the brown deposit first formed is gradually dissolved away, leaving just a very few floating particles which are filtered out.

To sensitise the canvas, which should now have the subject chalked in if the sensitising is partial, but which is not needed if the picture is printed right out, proceed precisely as with the salting solution, using either a rag or sponge, either of which is much better than a Buckle's brush, and dry in the shade or dark room as rapidly as possible. When quite dry give another coating of the ammonia nitrate of silver, which it is also best to dry rapidly, and being dry is ready for exposure under the negative.

This, there being no possibility of getting such work into a printing frame, must be done in such a rough-and-ready or handy way as may suit each individual worker, but I have found the following a very useful method: Have a board prepared ready, with all the corners and angles slightly rounded off, and slightly thicker than the canvas stretcher, thus causing it to project above the general level; then place the board flat, the sensitised canvas above it, with the negative in its proper place and on which has been scratched a X at each of the upper corners, while at the lower edge any convenient strip of metal to act as a slight weight and keep things steady; a similar one may be used at the top edge while printing. The surplus sensitised surface is a pretty fair index of the exposure, but by removing the top weight and keeping the negative steady with the left hand, and raising the upper with the right, the X's will show when the printing is sufficient. The picture should be rather over than under printed.

There is no necessity for toning with gold or any other agent, and for the process of fixation make a fresh strong solution of hyposulphite of soda, probably about six ounces to the pint of water, and float it over, and when thoroughly fixed this will be made visible by the ease with which the silver image can be removed by the finger or a cloth. Now is the time to remove all superfluous silver stains, leaving only what is necessary for the artist's working upon.

The washing need be very slightly prolonged, as there is nothing to retain the hyposulphite of soda in the pores of the almost impervious paint of the ground.

If, however, at any time after the print has been finished it is found needful to remove any portion of it, or if any accident occurs during the work, such as a doubled image, or anything which spoils it as a print, the whole image may be easily removed and the canvas rendered as perfect as at first by the following method. Put into a bottle—

Spirits of turpentine	.....	3 parts.
Methylated spirits of wine	.....	1 part.

The two substances do not mix, but with a rapid shake they form an emulsion of a semi-opaque, white appearance, which, however, is not constant or persistent, as the two fluids, if left untouched, gradually separate, the lighter floating on the top of the other. This, however, does not matter for the purpose in hand. While it has the appearance of an emulsion, saturate the surface of a pad of woollen or cotton with it, and rub rapidly and lightly over the spoiled print, which will at once show symptoms of disappearing, and go right over the whole canvas, wiping with a dry cloth as it is proceeded with until the whole is removed. If the action is too energetic add a little more turpentine, and if too sluggish a few drops additional of spirits of wine.

After a final wash with water and a good rub with a dry towel the surface is again ready to begin *de novo*. It has been noticed that a failure once in a time may occur with a perfectly new canvas, but such a thing has never been seen on a second trial with the same canvas by the writer.

The same details apply to prepared panels for painting upon, or any other substance of a similar nature. Considerable care should be exercised in all the operations to prevent the damp or water getting on the back of the canvas or panel.

W. H. DAVIES.

COLOURED PHOTOGRAPHS. VIII.

In the last paper we discussed the various qualities of vermilion, pink madder, rose madder, Indian red, brown madder, cobalt blue, burnt sienna, Vandyke brown, and so concluded our most useful colours for the painting of flesh generally. We then passed on to gamboge, yellow ochre, and sepia; which leaves us now to consider lake, carmine, French ultramarine, smalt, indigo, and Prussian blue, thus completing the list of the most useful colours for painting, not only flesh, but also the necessary accessories for the production of a portrait picture. Taking the list up from where we left off, namely, sepia, we come to—

Crimson Lake.—As all things bright must fade in time, so it is with this beautiful colour. It has always been a source of deep regret to artists that the use of this colour was attended with such dreadful results in the future. It is a fine colour, but its permanency is more than in doubt; to be more correct, there is no doubt at all about it it is fugitive, and few, if any, colours more so. All colours deriving their beauty and brilliancy from their combination with cochineal must be always received as being most undependable. It is only used, as far as portraiture is concerned, in the draperies. Generally speaking, it may be considered more useful than carmine, although it lacks its extreme richness and brilliancy. It washes well, and is not so scarlet in hue as carmine. A coat of gamboge passed over it will render it slightly more durable, but then it changes its hue and produces a scarlet. Under ordinary conditions of exposure the progress of its decolorisation is slow, but if exposed to a strong light its disappearance is not only rapid, but complete. Crimson lake, although a colour universally in use with most of our water-colour painters, every endeavour should be made to dispense with it as far as is possible. This advice, although in a lesser degree, may be safely put forward as regards the use of gamboge and indigo as well.

Carmine.—A very rich, brilliant, and intense lake, and possessed of very great power in its fuller touches: its paler washes are possessed of considerable clearness. In the latter quality, however, it does not compare favourably with rose madder or pink madder, their paler washes being notable for their clearness and delicacy. It is easy to work, but has the fatal drawback of being fugitive. Indeed, we must consider this colour as one of the most fugitive when exposed to the influence of strong light. All experiments in this regard have conclusively demonstrated that the richness of this beautiful pigment is gradually, but surely, lost by exposure to the action of light. To place it under the influence of direct sunlight would be to annihilate it right away in a few weeks. It is seldom used now in landscape painting, being chiefly employed in illumination and flower painting. Like lake, it owes its beauty and richness of colour to cochineal, only more so, and, per consequence, is proportionately more fugitive.

French Ultramarine.—This colour is generally known as French blue, and may be described as an artificial imitation of the genuine ultramarine. When of the very best manufacture this French ultramarine is a very near approach to the genuine, and even has advantages over it, in as much as its washing properties are vastly superior. The very best French ultramarine will be found, as a rule, to be somewhat of a darker hue and to possess less of the azure than the genuine article. The superiority of the latter is incontestable as regards purity of colour, and this is no mean consideration, but it also possesses the

extra advantage of being immeasurably more transparent. French blue, as a pigment, is perfectly permanent, possesses, in a modest degree, the qualities and usefulness of genuine ultramarine, and may be regarded generally as a very useful substitute. The genuine ultramarine is prepared from *lapis lazuli*, a stone to be found in many parts of Asia, and is regarded as by far the most costly and celebrated pigment we possess. It is separated from this stone by a mechanical process as ingenious as it is tedious. The mineral, when thoroughly crashed, is mixed with a resinous matter so as to be formed into a thick paste. This is then skilfully washed with water in order to separate the ultramarine, the principle evidently assumed being that the resinous matter has more attraction and holding power for the particles of the stony matrix than for those of the ultramarine. There are two distinct portions of this ultramarine which separate themselves from the *lapis lazuli*. The first is by far the deepest and richest in hue, and manufactures into the genuine ultramarine. The second portion differs from this in hue, being of a bluish-grey colour, and furnishes the material to produce the pigment known as *ultramarine ash*. The genuine ultramarine, in its best manufactured form, is an exquisitely beautiful blue, by far and away the purest we possess. As a medium for the representation of sky and atmosphere it stands alone, without a rival, but, I am sorry to say, it washes very badly, a fact which is no mean consideration for an artist. As regards exposure to light, it may be considered permanently durable, but the atmosphere of modern towns, charged as it is with acids, may affect it considerably. Care should, therefore, be taken to preserve it against these evil influences. It does not mix with everything. It is seldom to be found among the colours in the box of a poor artist. It has a thorough knowledge of its natural worth, and demands its price. It may be regarded as the king of the colour box.

Smalt.—This colour is a vitrified pigment prepared from cobalt. It is a deep and somewhat purple blue, and is often used for shading other blues. It is rather difficult to work, being gritty, and consequently is more satisfactory when stippled than when washed. By artificial light it appears to be somewhat of a reddish-purple hue. It is an artificial colour, consisting, as it does, of glass coloured by oxide of cobalt until it becomes an intense blue; it is then ground until a powder of the proper hue is secured. In texture, as I said, it is gritty, and, as a natural consequence, washes badly. Exposure to light does not seem to affect it, but an impure atmosphere will cause it to become discoloured. I need not say that it would lose its beauty of colour as a consequence. Atmospheric moisture will have a like effect, as it causes a disintegration of the particles forming the pigment, which naturally must injure its beauty of hue. It is a useful colour at times for the background and draperies, but is mostly used for illumination and flower painting.

Indigo.—This colour is a vegetable pigment of a deep greenish-blue. It is a more than useful colour for backgrounds. It washes and works well. In conjunction with sepia it makes a capital retiring green for distant trees, &c. In the long, long ago this colour was called *Indian blue*, and is produced from the leaves of the *Indigofera* plant. It is much darker in tone than Prussian blue, although in hue it is somewhat similar. In depth and transparency it approaches very much towards Prussian blue, although not nearly so rich. As to the qualities of washing and general working, indigo stands well, but, if truth must be told, as a pigment it is anything but durable. It may, however, be found to stand fairly well under a moderate amount of ordinary diffused daylight. The durability of this pigment is greatly influenced by the amount of skill and care expended upon its proper manufacture. But all varieties of this colour, no matter how well produced, if exposed to the direct rays of the sun will be found to be fugitive.

Prussian Blue.—This is a very fine, intense colour. A very good shadow colour for draperies of a purple hue may be produced by a judicious mixing of this colour with lake. This colour was discovered many years ago at Berlin, hence its name "Prussian." It consists practically of ferrocyanide of iron prepared by precipitation. It possesses an immense body, transparency, and richness of colour; its deep washes are so intense as to almost appear black. Prussian blue is pervaded by a decided green tinge, and consequently is not a colour at all well adapted to painting skies and distances. One cannot call it a permanent colour, nor is one altogether justified in setting it down as fugitive. It has been known to stand very well, although exposed to ordinary daylight, but it fades to some extent if exposed in sunshine. On these points its manufacture is responsible for much. By exposure to damp Prussian blue will become discoloured, and contact with an impure atmosphere will cause it to lose its beauty of colour.

We have now more or less fully considered the various points of interest in relation to the qualities of the various colours mostly used in the painting of flesh and the ordinary accessories of a

portrait picture. I think, in the long run, it will be advisable, before proceeding with our subject, to continue our investigations as to the merits and demerits of the various colours until we have completed the list. We will then have, as it were, a dictionary of colours which will be useful for reference. I will, therefore, continue the consideration of the various colours in the following order:—Red pigments, orange, yellow, green, blue, purple, brown, citrine and olive, grey and black pigments. Of course, in doing this, we will not again touch upon those already mentioned, but direct our attention to those only of the same classes which have not as yet received our due consideration. Thus, under red pigments we will take scarlet vermillion, orange vermillion, Field's orange vermillion, pure scarlet, scarlet lake, madder, carmine, and dragon's blood, and not again touch upon vermillion, light red, Venetian red, Indian red, carmine, crimson lake, rose madder, or pink madder.

Scarlet Vermilion.—This colour differs from the ordinary plain vermillion already described, inasmuch as it is paler and more scarlet in hue. Its permanence and general qualities are quite the same.

Orange Vermilion.—This is paler still, and approaches more closely to the yellow. There is, however, more of the orange-red about it than the true orange. It is much more transparent, and washes far better than any of the other varieties. For landscape painting I think it can be safely considered as the most useful of all the vermilion we have yet considered.

Field's Orange Vermilion.—This colour will be found to have many very serious advantages over all others of its kind. All who have used any of the orange vermilion must have noticed the natural tendency which they have to separate. That is to say, there seems to be a heavier and deeper portion which sinks to the bottom of your well or saucer, and a paler or lighter portion which floats to the surface. It does not require much consideration to decide that this is a grave drawback. Field's orange vermillion, on the contrary, is a perfectly homogeneous pigment, which is obtained by a most elaborate process of levigation from the ordinary orange vermillion. It is much brighter and purer in colour than the latter, and, besides the obvious advantage of being free from the tendency to evaporate, it is also more transparent. It may therefore be considered, especially from the point of view of the landscape painter, to be the most useful of all the series.

Pure Scarlet.—This consists, chemically, of iodide of mercury, and is arrived at by precipitating a solution of mercuric chloride with one of iodide of potassium. It possesses all the body and opacity of vermillion, is immensely superior in brilliancy, but, on the other hand, immensely inferior in its permanence. There is, perhaps, no pigment so dazzling and attractive, and there is certainly none more fugitive. This is easily understood when we consider that the iodine and mercury which enter into its composition are both most volatile substances. Add to this the fact of its existing, like vermillion, in two allotropic modifications—scarlet and yellow. Indeed, this is a colour likely to change under the least provocation and from various causes. An impure atmosphere will rapidly blacken it; under almost any condition it will fade. Mix it with other metallic pigments, you utterly destroy it. A glaze of gum-arabic is supposed to add to its permanence, but only for a very short time. As a colour for landscape painting it seems altogether beyond the range of nature; the only product of nature which it can depict, as far as I can call to mind, is the flower of the geranium. For this purpose no colour can come near it; but in the ordinary way it is useless. For illumination and flower painting its attractions are quite irresistible, and that is, I think, the most good we can say of it. REDMOND BARRETT.

their formation on surfaces of normal silver. I have made these for comparison—pressing gummed paper on silver leaf, bringing to a smooth surface by gently rubbing after drying. The contrast between the pale and faded-looking effects produced on normal silver, and the lustrous and glowing hues given by the allotropic, is very striking.* One cannot help wishing that this splendid colouration could be made to do service for obtaining natural colours by photographic processes.

As to the durability of these products I cannot yet speak with positiveness. Protected from light and air they endure for several months at least. Both the bluish-green insoluble silver B, and the gold-coloured C produce these effects: the gold-coloured is the better suited of the two.

—*American Journal of Science* for September.

M. CAREY LEA.

“NOTES FROM NEWCASTLE.”

SIR,—We have had in Newcastle, I think, a surfeit of sciences and philosophy, fortunately some of us have been able to excursionise, otherwise the effect would be deplorable.

Though not a member of the body, I received invitations to the various meetings of the British Pharmaceutical Conference, and was much impressed by the manner in which the, for the most part solemn and dignified, members of the drug trade took their pleasure. At the *soirée* a fairly good show of photographs was made by Messrs. Mawson & Swan, who also, with Messrs. Brady & Martin, exhibited various electrical and other chemical apparatus. I suppose no one else was invited to contribute pictures, otherwise a much larger and more generally interesting show could have been made. At the Hexham and Rothbury excursion I met several amateurs and exchanged notes; three or four had their cameras with them, with what success I don't know. Mr. J. P. Gibson, the well-known medallist, won golden opinions from every one for his able and condensed description of the Abbey and its surroundings. Mr. Gibson also acted as one of the guides to the British Association excursionists on the following Saturday.

I don't care much for *conversazioni*, and that given by the Mayor and Corporation for the reception of the British Association at the Natural History Museum was no better than the average. The music was good, however, and I met several old London friends, so that an hour passed pleasantly. A good deal of hunting about brought me to the corridor where Mr. Muybridge gave his lecture and demonstration; accommodation had been provided for about one hundred, whereas about a thousand, apparently, were anxious to hear and see; however, two or three extra performances under better circumstances at the Central Exchange Art Gallery have fairly satisfied public curiosity.

All your readers will be pleased to hear that Captain Abney received the honorary degree of D.C.L. at Durham University during his stay.

From what I hear, at least twenty of the Associationists carried cameras, and some of them could show good work—the detective form being most popular with the rank and file. Writing about detectives, I imagine at least one hundred of the genus “Demon” to have been sold hereabouts lately—a large addition this means to the amateur department. I have seen and handled these five-shilling outfits, but never a photograph from them.

The Y. M. C. A. here, a thriving institution, has now its “Photographic Club.” The President is Mr. H. Crawford Smith. Vice-Presidents: Lieutenant-Colonel Crawford, Mr. F. R. Goddard, and Mr. James Bacon. Secretary: Mr. J. B. Duckett, of 9, St. James's-street, Newcastle. The subscription is five shillings, which includes the use of a capital dark room, hypo, dishes, developing trays, &c. Various meetings have been arranged and carried out successfully. An exhibition of work is expected to be held during the winter, and a prize will probably be offered for the best collection of slides—this looks business-like.

As a photographer I believe in *reproductions*, in this sense I append the following (from the *Newcastle Leader*), which will doubtless interest your readers:—

Scene: Street in Newcastle.

Austere philanthropist, who has just purchased a newspaper from a small boy: “How old are you, my boy?”

Boy: “Nine years, sor.”

A. P.: “What is your father?”

Boy: “Ah hevrent a fathor.”

A. P.: “What was he when he was alive?”

Boy: “Ah nivvor had a fathor.”

A. P. (with surprise): “Indeed! And what does your mother do for a living?”

Boy: “Ah nivvor had a muthor?”

A. P. (with greater surprise): “Indeed! And how did you come into the world?”

Boy: “Me aunt had a bairn tas the lodger, an' ah'm him!”

The British Associationists go in rather for frivolities at times, especially in the Anthropological Section. The Anthropometric Laboratory has been well attended, and amongst other interesting items elucidated is this, that males squeeze seventy-two pounds, and females forty-five pounds. There must be something wrong here, as I know several young photographers who could squeeze anything up to 130 pounds or so!

My remarks about the local society were certainly rather strong, but I

ON RING SYSTEMS AND OTHER CURVE SYSTEMS PRODUCED ON ALLOTROPIC SILVER BY IODINE.

ALLOTROPIC silver, in its moist and plastic state, may be brushed over paper, and gives, on drying, a continuous and brilliant coating resembling metallic leaf. When a small crystal of iodine is placed on paper that has been thus coated, a system of coloured rings of remarkable beauty is obtained. A funnel or beaker should be inverted over the paper to prevent distortion by irregular currents of air. One form of distortion, however, produced by a slight current in one direction gives interesting results. If the paper with the crystal on it is set near a closed window, the slight current which makes its way through affects the air under the glass enough to carry the iodine vapour principally in one direction, and there result oval or pear-shaped curves of great elegance and much variety, according as the air currents are stronger or weaker. Another method is to place a bell glass, not fitting too closely, over the paper, and to set it where it will be influenced by the draught created by a fire, or even a gaslight.

That iodine is capable of producing interference rings (Nobili's rings) on metallic surfaces has long been known, and Robert Hunt has described

don't think ill-natured, nor out of place. It is annoying to see a society so little alive to its own interests as this. During the last two or three weeks it has had exceptional opportunities for making its existence known to and appreciated by numerous visitors. There might have been one, at least, of the social meetings Mr. Proctor describes; and an outdoor meeting would not have been out of place; while a public demonstration of lantern slides would have been a godsend. Its members could have met and conversed and exchanged ideas with members of other societies, to their mutual advantage. For all practical purposes the Newcastle-on-Tyne and Northern Counties' Photographic Association has been dead during the last few weeks; however, let us hope for better things in the future. Any suggestions I may have to make must be "contained in our next."

D. D.

Our Editorial Table.

MASON'S "ARTIST" MOUNT.

MESSRS. GEORGE MASON & Co., Glasgow, have sent us samples of a new class of mount they are introducing. It is a grey Bristol board with India-tinted centre. It is suitable for every class of photograph, and the specimens sent us entirely bear out their claims. These comprise everything in the realm of portraiture, groups, landscapes, and engineering. There ought to be, and will be, a large demand for these useful and attractive mounts when brought under the notice of the public.

TRADE CATALOGUES.

SEVERAL of these are before us this week. The most voluminous is that of Messrs. Holmes, Sadler, & Holmes, Manchester, who, in a ponderous tome of 206 pages, show with numerous illustrations the great variety of productions that they are capable of supplying. Indeed, on looking through its pages we are at a loss to find any photographic requisite that has been omitted.

Fallowfield's *Monthly Remembrancer and Traveller*, for August and September, too, is well supplied with every-day requirements in the way of cameras, stands, developers, and the numerous things requisite in the practice of photography.

Taylor, Taylor & Hobson, of Leicester, send us the eighth edition of their catalogue, which is ever increasing in dimensions and an exposition of their growing manufacturing business, in the development of which no effort or expense seems to have been spared. Their speciality, as every one knows, is lenses.

CONVENTION GROUPS.

ONE gloomy evening, when the cessation of rain rendered it possible, the party who, during Convention week, visited Kew Observatory assembled outside the building, and before departing on their homeward journey were photographed by Mr. Thomas Scotton, of Derby. The result is before us, admirably executed, and we shall treasure it as a memento of an afternoon spent in company of a most genial party.

From Mr. Richard Keene (Derby) we have received a copy of a group taken by him at Gravesend during the excursion of the Convention to that old seaport. It is a free-and-easy group, containing most excellent likenesses of many whom we know and esteem. With Mr. Keene's group he sends us also a picturesque view of Morton Old Hall, Cheshire, showing the entrance gateway from the south-east. This, like the other, is printed in platinotype, in which this veteran artist excels.

INDEX OF PHOTOGRAPHIC EXPOSURES.

MR. A. R. WORMALD (Sutton, Surrey) sends us the new edition of his *Practical Index of Photographic Exposures*, which has now got into its fourth thousand. Its object, as stated, is to supply to the beginner in photography a ready means of knowing (without calculations, or with as little calculation as possible) the duration of exposure likely to produce a good negative with a given stop and plate.

REVOLVING SPIRIT LEVEL.

MESSRS. SHARP & HITCHMOUGH, Liverpool, send us one of their Aptus revolving spirit levels, which they have recently introduced, to be attached to the revolving back of a camera for the perfect adjustment of the horizontal; when the back is reversed the level is revolved at right angles to indicate the horizontal in the altered position.

I was desirous of having some of these curve systems reproduced in colour printing for this *Journal*, but on conferring with an experienced colour printer found that he could give no assurance of a successful result. The colours are transparent, and yet have a metallic brilliancy—a combination almost impossible to imitate in printing.

When the level is placed on the top of the camera it takes the place of an ordinary circular spirit level, it having the advantage of an easy



adjustment. The diagram shows its nature. The idea is a good one, and the level will prove useful.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,537.—"Further Improvements in the Construction of Photographic Cameras and Parts thereof." Complete specification. W. SCORER.—*Dated September 16, 1889.*

No. 14,557.—"The Manufacture of 'Dry Plates' for Photography." A. M. BROWNE.—*Dated September 16, 1889.*

No. 14,671.—"Improvements in Magic Lanterns or Stereopticons." Complete specification. Communicated by J. B. Colt. W. R. LAKE.—*Dated September 17, 1889.*

No. 14,701.—"A Glass Plate or other Transparent Substance Coated with a Non-actinic Film, and used as a Negative for Photographic and other Purposes." J. MALLOCH.—*Dated September 18, 1889.*

No. 14,823.—"A New or Improved Lifter and Support for Photographic Pictures and Films while under Manipulation." T. STANWAY.—*Dated September 20, 1889.*

No. 14,933.—"Improvements in and relating to Dark Slides or Plate Holders for Photographic Cameras." L. POWERS.—*Dated September 21, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN APPARATUS FOR THE EXHIBITION OF PHOTOGRAPHIC PICTURES, ADVERTISEMENTS, AND THE LIKE.

No. 14,089. JOHN TAYLOR LEIGHTON, 18, Montgomery-street, Edinburgh.—*August 17, 1889.*

My invention relates to improved means for the exhibition or display in succession of photographs, pictures, advertisements, and the like, which being mounted upon suitable frames, are by the rotation of a handle brought successively into view.

The improved apparatus or appliance according to my invention comprises an enclosing box or frame, divided into three compartments or divisions, the central one of which is shallower than the others, but of sufficient depth to allow of the free passage of the frames. At the top and bottom of the enclosing box are fixed, horizontally, four grooved or slotted plates, two at the back and two at the front, within which grooves move horizontally and parallel to each other four slides, each provided with a loose projecting clutch or pawl, which latter may, under some circumstances, be held in position by means of springs or equivalents. The two front and two back slides aforesaid are connected respectively to two vertical bars arranged within one of the lateral divisions or compartments above referred to. Said vertical bars have longitudinal slots formed therein, in which slots take the crank pins of two adjustable revolving arms, the rotation of which is effected by means of a knob or handle fitted upon the exterior of the enclosing case; thus, upon rotating said handle, a to-and-fro motion is imparted to the vertical bars and its attachments.

The frames above mentioned are formed of any suitable material, and provided on one or both sides, as may be desired, with clamps or grooves for holding the articles to be exhibited or exposed to view. In a convenient position on the top and bottom of the frame and front and back are formed slots, perforations, or recesses, with which engage the loose clutches or pawls fixed to the slides aforesaid. The vertical edges of said frames are bevelled in such a manner that in the forward movement of one frame it may pass in front or to the rear of the next succeeding frame.

The action of the improved apparatus, according to my invention, is as follows:—Upon rotating the knob or handle the arms aforesaid, on which are fitted the crank pins, are rotated in unison therewith, by which means, as above described, the vertical bars and horizontal slides have a reciprocating motion imparted thereto. In the forward movement the loose clutches or pawls of the back slides engage with the perforations or recesses in the back plate of the frame, impelling it forward from the centre division into the outer or third lateral division or compartment. In its return the clutches aforesaid are capable of sliding over the perforations or recesses in the back of the frame, but the clutches on the front side, now engaged with the recesses in the front of the frames, and by means of the bevelled edges, withdrawing the frame to a rearward position in the central compartment or division.

In addition to the clamps or grooves in the frames, small springs may be employed to retain the articles to be exhibited in position and prevent displacement during the to-and-fro motion above described.

The enclosing box may be of any suitable design, ornamental or otherwise, and may be provided with a magnifying lens inserted in a collar attached to the front of the box.

In cases in which the frames are intended to carry two photographs or other articles, the back of the enclosing box is provided with an opening similar to that in the front, and may similarly be provided with a magnifying lens, thus allowing double the number of articles to be exposed to view than when the front only is utilised.

IMPROVEMENTS IN THE CONSTRUCTION OF PHOTOGRAPHIC CAMERAS.
No. 12,573. WILLIAM SCORER, North-street, Havant, Hampshire. —
August 31, 1889.

My invention relates to improvements in photographic cameras, and consists of a device for the easy adjustment of the swing back and the easy closing of the camera with the focussing glass, which is protected by the lower part of the said camera.

By means of my invention, a camera is capable of being easily fixed in position, while its rigidity and the safety of the focussing glass are thereby ensured.

In carrying my invention into practice, I make a folding and sliding base, or frame, upon which is fixed the back and front of the camera carrying the bellows, this camera being either square or conical in shape.

The central part of this base, or frame, which carries a support resting upon the tripod stand, is provided either with a tongue or groove on which the outer portion slides, and which can be moved away from the lens with the back. The said tripod stand can be fixed in an ordinary manner, or provided with a toothed circular turntable actuated by a pinion. To the front part of this frame is hinged another part of sufficient width to carry the whole of the camera when closed, and provided with a suitable clamp thereunder, by means of which it is firmly fixed to the said front part, enabling the camera to be opened or closed with facility.

This second part is of suitable length and thickness to correspond exactly when open with the outer portion of the sliding frame, which is provided at its lower part with a groove, in which slides a metal piece. Upon this piece pivots the back of the camera, which can be thus extended and clamped in position, and can be made to swing backward, forward, and sideways. Upon the frame constituting the back of the camera is screwed another metal piece, and the former pivots upon the metal piece before mentioned, which slides under the frame, and is clamped in position by means of a suitable clip. The said metallic piece carrying the back of the camera can be made in one piece, or, in the case of large cameras, in two pieces, connected, when the camera is open, by a strip of metal, being secured in position by one or more milled-head screws.

The camera frame is also furnished with a screw for separating the sliding portions thereof, and is used for focussing after a rough adjustment by means of the above-mentioned sliding piece.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 1	North London	Myddelton Hall, Upper-st., Islington
" 1	Holmfirth	"
" 1	Sutton	Society's Rooms, Sutton, Surrey.
" 1	Sheffield Photo. Society	Masonic Hall.
" 1	Paisley	Paisley Museum.
" 1	Holton Club	The Studio, Chancery-lane, Bolton.
" 2	Coventry and Midland	The Dispensary, Coventry.
" 2	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 2	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 3	Bolton Photographic Society	The Baths, Bridgman-street.
" 3	Leeds	Philosophical Hall, Leeds.
" 3	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 3	Glasgow Photo. Association	Religious Institute, 177, Buchanan-st.
" 3	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 4	Sheffield Camera Club	"

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 19.—Mr. H. M. Smith in the chair.

The CHAIRMAN said that at a meeting of another Society it had been stated that if a finished bromide print that was found to be too dark were treated with oxalate developer and immersed in hypo it would be reduced. He had tried it, but without sufficient result to be sure of it, and inquired of Mr. Debenham if he could throw light upon it.

Mr. W. E. DEBENHAM supposed that it would depend upon whether the oxalate developer had become oxidised, as it would be with an old developer. In this case, no doubt, it would reduce the depth of the print.

Mr. A. HADDON agreed with this view, and added that if the oxalate were fresh and neutral, and the hypo contained silver, the print might be expected to be rather strengthened than reduced.

The CHAIRMAN said that the gentleman who made the statement with which he set out had added that a print developed with pyro would not be reduced, but only an iron-developed one.

Mr. DEBENHAM: This was a case of mistaken observation, of which there were many instances in photographic history, these mistakes being accepted as facts by subsequent writers, and stated as such in text-books.

The CHAIRMAN had an instance in his mind illustrating that remark.

A question was read:—"What is the best medium for mounting silver prints in a book so as not to cockle the leaves?"

It was replied that a medium should be used, such as gum or starch, containing as much alcohol as possible, and that the print should be dried before being covered with the medium.

Mr. ARCHER CLARKE said that it was best to starch the prints and let them dry; fresh starch might then be applied, and if quickly laid down the cockling would be but slight.

The CHAIRMAN mentioned that Mr. Zaehnsdorf had said that he always pasted paper on the back of a mounted photograph, so that there should be a tension to counteract that which arose from the contraction of the print in drying.

Mr. F. A. BRIDGE said that he curled prints backwards for a time to cure the curl.

Mr. DERENHAM said that the remedy was only good for a time, and that the print would eventually curl inwards.

Another question was read, asking for a reliable formula for preserving sensitised paper.

Mr. P. EVERITT recommended floating the back of the paper on a bath of citric acid solution at a strength of nine ounces to the gallon.

Mr. DEBENHAM inquired whether paper so prepared toned well.

Mr. EVERITT replied that it did very well.

Mr. DEBENHAM remarked that of the acids he tried the only one which preserved the paper without interfering with the tone was perchloric. This might be added direct to the sensitising solution.

Mr. CLARKE recommended storing the paper between sheets of blotting paper that had been imbued with soda.

Mr. HADDON said that in some cases sensitised paper yellowed more quickly between blotting paper than without it. That was due to a small quantity of hyposulphite of soda left in the paper by the manufacturer.

Another question was asked as to the best method of mounting prints on boards having an India-tint lithographed centre, the member inquiring having found a strong tendency in the prints to come up after drying.

Mr. BRIDGE said that if the tint were sponged over with water it would afterwards take the starch paste properly.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 17.—Mr. J. Traill Taylor (President) in the chair.

The Hon. Secretary showed some 8x6 platinum type prints of views in the Isle of Wight.

Mr. G. J. Clarke showed some silver prints, and Mr. W. Bishop some hand-camera views.

The CHAIRMAN referred to an alleged new cure for blistering of albumenised paper, the method being to immerse the print in alcohol; this was published by Mr. Stuart, of Glasgow, in an article in *THE BRITISH JOURNAL OF PHOTOGRAPHIC ALMANAC* in 1878. The cure consists, after toning and washing in water, in immersing the prints for a short time in methylated spirits of wine till such time as they have a semi-transparent appearance, or about five minutes, then press most of the spirit out and wash again in water.

Mr. H. M. SMITH did not think it necessary to immerse in neat spirit, and suggested the addition of spirit to the toning or fixing bath, in the same way as it might be added to the developer for bromide prints.

Mr. A. MACKIE said that at a meeting of the Photographic Club it was agreed that the size left the paper, and not the albumen the size.

The CHAIRMAN said that he had examined the inside of a blister under a microscope, and found filaments of paper attached to it, proving that the size had left the paper.

Mr. MACKIE said that if there were a tendency in the paper to blister, it would be brought on by a sudden change in the temperature or density of the solutions.

The CHAIRMAN stated that a sudden change in the density had a great deal to do with blistering, and in America it was usual to place the prints in salt and water after the hypo bath, to make a gradual change in the density.

Mr. CLARKE had used a very weak solution of acetic acid before fixing.

The CHAIRMAN said there was an objection to the use of acetic acid, as, unless it was washed entirely out before fixing, sulphur toning would result.

Mr. MACKIE did not think that the same theory held good in the case of blistering on bromide paper.

Mr. BISHOP considered that there was a closer relation between the processes than was generally supposed, and thought the methylated spirit would harden the size of albumenised paper in the same way as the gelatine film of bromide paper, and prevent its tearing away from the paper.

Mr. SMITH said that, albumen being soluble in ammonia, he considered the use of ammonia in the fixing bath would soften the albumen film and favour blistering; he had known cases in which paper had blistered when ammonia was used that had not blistered without it.

The CHAIRMAN stated that the heavier the coating of albumen the worse the blisters would be should the paper have any tendency in that direction.

The next meeting will be on Tuesday, October 1, when the Hon. Secretary will read a paper on *The Relation between Exposure and Development and Subsequent Improvement of Negatives*. Visitors are invited.

PEOPLE'S PALACE PHOTOGRAPHIC CLUB.

SEPTEMBER 20.—Second annual meeting.—Mr. W. Lindell in the chair.

The SECRETARY read the Committee's report, which showed that there were forty-two members on the register. The winter's programme had been contributed to by papers and demonstrations. By the Secretary, on *The Carbon Process*; Mr. Edwards, on *The Platinotype Process*; Mr. Farmer, on *Modes of Development*; Mr. Livingston, on *Intensification and Intensifiers*; Mr. Downing, on *Flash Light Photography*; Mr. Hastings, on *The Work of Photographic Societies*; Mr. Gamble, on *The Preparation and Use of Isochromatic Plates*; Mr. Hawkins, on *The Wet Plate Process*; and Mr. R. Beckett, on *The Measuring of Lenses*. A social meeting and two public lectures had been given.

At the Workmen's Exhibition, held at the Palace, of the five first-class certificates awarded four were carried off by members of the Club—Messrs. Barrett, S. J. Beckett, Edwards, and Hawkins.

At the City Guilds Examination, of the thirteen students that passed ten were also members of the Club.

The report then stated that the Trustees of the Palace had decided to suspend for twelve months the Institute portion of the Palace and also the Clubs formed in connexion therewith, and that they should be dissolved as from September 30 instant. The Trustees, however, would be prepared to consider any application to form new clubs from students in connexion with the technical schools. Having regard to the progress made and flourishing condition of the Club, the Committee regretted any circumstances that rendered the disturb-

ance of the Club necessary, but trusted that arrangements would be made by which no present member would, in the event of their not joining the Photographic Club be refused membership in the new Club.

The SECRETARY, in moving the adoption of the report, explained fully the arrangements decided upon by the Trustees, and recommended the meeting to adjourn until October 3, when the Club could, *pro forma*, dissolve, and immediately afterwards reform, when the officers could be elected and the Club be re-established.

This course was agreed to.

The Auditors' statement was read, and showed a balance of 2*l.* 1*s.* 4*d.* in hand.

BATH PHOTOGRAPHIC SOCIETY.

THE last of the regular excursions of the season took place on the 21st instant at Glastonbury Abbey.

By noon many exposures had been made upon portions of St. Joseph's Chapel, the Abbey walls, crypt, &c., such as were favourably lit, but the wind blew too strong to do justice to heavy foliage. Accordingly it was decided to visit Wells, some six miles distant. Here the sun was shining brightly, and some work was done in the quaint old market-place, then in the full swing of a market day, its rapid streams of water running each side of the street, probably for centuries, as an overflow from a powerful spring in the Bishop's Palace grounds, and reminding one of abroad, at Lima for instance, where water passes along a wide channel in the middle of the streets to the outskirts.

The west front of Wells Cathedral is, on a sunny afternoon, one of the most satisfactory subjects of the kind which can be photographed. This and several other portions of the exterior received attention, especially the cloisters, Vicar's Close, and moat. No work could be done inside owing to service being conducted at the time. About half-past five we bid adieu to this cathedral city, reaching Bath about two hours later.

Correspondence.

Correspondents should never write on both sides of the paper.

ISOCROMATIC PHOTOGRAPHS.

To the Editor.

SIR,—Mr. Bothamley, in his paper on *Orthochromatic Photography with Gelatine Plates*, which appears in the *BRITISH JOURNAL OF PHOTOGRAPHY*, August 30, page 571, says, "Ives's method consists of flooding the plate with an alcoholic solution of the dye (containing one grain in four ounces), allowing the alcohol to evaporate, and then washing with water. It is not easy to see why this method should give better results than simply immersing the plates in an aqueous solution of the dye. Photometric experiments confirm this supposition. They also confirm Ives's statement that if the plate is treated with the strong alcoholic solution and not washed, no sensitiveness to the less refrangible rays is obtained, doubtless because the alcoholic solution does not really penetrate the film. I was unable to get satisfactory results with cyanine in this way."

Mr. Bothamley's conclusion, although discrediting one of my statements of a certain and demonstrable fact, is undoubtedly the result of a conscientious trial of the method. It is, therefore, fortunate that I am now able to give the probable reason for Mr. Bothamley's failure, and to state the conditions of success so plainly that he will be able to repeat the experiment successfully. These conditions, as I now understand them, are as follows:—First, that dyes be used which are either insoluble or not freely soluble in water; second, that the sensitive plates be of a suitable character ("seed" plates and some others are suitable), and that they be fresh from the factory.

After making, possibly, forty splendid negatives by this method with cyanine, I opened a box of plates of a different size, which had been some months on a shelf in my dark room, and with these plates got, by the same method, only weak, foggy, worthless negatives, although the plates worked all right for ordinary photography. Further experiments showed that my method was decidedly better than Schuman's more complicated bath method on some plates when they were fresh from the factory, but not so good as Schuman's when they were old, and not better than Schuman's with some makes of plates, even when they were fresh. The fact remains that the best results I ever got with cyanine were by my own method, and that the relative colour sensitiveness was far greater than had ever been reported from the use of cyanine on such rapid plates.

I believe I have already called attention to the fact that cyanide and chlorophyll, when applied in the manner I have recommended, appear to remain entirely upon the surface of the film, even when the plate is soaked in water. It seems to me that the water acts only upon the dye to render it light-sensitive, and that this "sensitised" dye, when further altered by exposure to light, forms a nucleus for development, in the

manner suggested by Captain Abney (*BRITISH JOURNAL OF PHOTOGRAPHY*, 1888, pages 196, 215). In fact, I believe we have here a proof that Captain Abney's theory of the action of colour-sensitisers is correct, but that his demonstration was incomplete, and the method he recommended was unsuccessful because he did not recognise the necessity of treating the dye with water to make it light-sensitive.

That the failure of cyanine and chlorophyll to make plates colour-sensitive without wetting is not due merely to their failure to penetrate the film, as assumed by Mr. Bothamley, is proved by the fact (to which I long ago called attention) that they act in the same way upon collodion plates, which must also be wetted after applying the alcoholic solution.—I am, yours, &c.,

FRED. E. IVES.

Philadelphia, September 11, 1889.

CONTINUATING ACTION OF LIGHT.

To the Editor.

SIR,—There are some slight typographical errors in the article under this heading, a few of which please let me correct. The second word in the last line of the first paragraph is a travesty. The word "fraction" in the next paragraph should be in the plural, while the comma after "is," line 17, paragraph 3, mars the meaning of the sentence. The punctuation mark after "exposure," line 9, paragraph 4, should be deleted, and "as" read for "are." For these and the rest I, no doubt, am to blame.

The continuing theory was, I find, advanced by a writer in the *ALMANAC* about ten years ago, and was promptly doubted by so considerable an authority as Dr. Eder.—I am, yours, &c.,

THOMAS BEDDING.

MISAPPLICATION OF PHOTOGRAPHIC LENSES.

To the Editor.

SIR,—I regret that your correspondent, Mr. Larry O'Broom, has not understood my paper. The ambiguity he finds with regard to my opinion on large direct heads as against enlargements from small ones may be due to the fact that I took it for granted that every photographer was well conversant with the bearing of the law of conjugate foci on the subject. As a matter of fact, however, your correspondent does not quote me fully, his quotation being from the following sentence:—"I do not propose to discuss here the *pros* and *cons* of direct large heads as against enlargements, for there are many other reasons coming in which, at the expense of theoretical benefit, have proved that the direct large head, when taken under the most favourable circumstances, that is, with a lens of long focus, is undoubtedly much more pleasing than an enlarged small image." To endeavour to make this clearer to your correspondent, I simply repeat what I then said with reference to the accompanying diagrams.

Fig. 1.

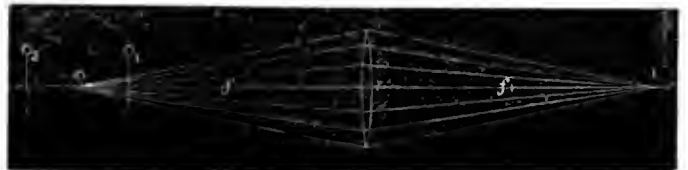


Fig. 2.



In Fig. 1, if the object O and the image I are arranged at double the focal length of the lens on opposite sides of its optical centre, they are of the same size. Any object O¹ or O² nearer to or farther from the object O, will necessarily give an enlarged or reduced image respectively; and in taking a given life-sized head, if the eye be focussed for, the nose must be enlarged, and the ear or background reduced in scale. Now, if a long-focus lens be employed to do this work, any difference in the planes other than those focussed for becomes less and less apparent as regards truth in the resulting image. The longer the focal length of the lens, the less and less apparent becomes the liability of untrue rendering. In Fig. 2 the rays meet the lens practically parallel, and if a small lens, such as a *carte* lens, be employed in focussing a sitter at such a distance that the rays are practically parallel—i.e., the difference between the extreme conjugate points included is insignificant in comparison to the distance of the sitter from the lens—a theoretically truer image in drawing is the result, and if this be enlarged to the same size as a direct large head it is theoretically truer in drawing. As to the question of distortion,

a rapid rectilinear or any non-distorting lens—including some forms of portrait lenses—gives the truest drawing. The Petzval form of portrait lens is next, and the ordinary single achromatic meniscus last. I concur with your correspondent that an enlarged head from a negative taken with a rectilinear lens is to be recommended for fidelity of reproduction; but my own opinion is that enlargements have a kind of "flat" appearance that does not appear in a properly taken direct large head. Your correspondent informs your readers "the pleasing results (in direct large heads) are not gained with the lens, but with the printing process." This may have something to do with the subject, but it is quite out of the question to ignore the performance of the lenses in the question.—I am, yours, &c.,

THOS. R. DALLMEYER.

25, Newman-street, W., September 25, 1889.

To the Editor.

SIR,—In last week's JOURNAL I see a letter from Mr. Larry O'Broom anent the above subject. I have read it over twice, and it still appears to me quite misty. I really cannot see why he should say that "the pleasing results are not gained with the lens, but with the printing process." Surely the kind of result *should* be due to the lens used in producing the image, whether this be from a projected small image, as when enlarging, or whether it be a direct large image, i.e., an image produced in the camera by means of a lens whose focal length is not less than twice the length of image required. I have gone through the various papers read at the Convention, and consider those by Mr. Dallmeyer and Mr. Traill Taylor to be the most practical on the subject that have appeared for some time; and I am sure that if the professional photographer made it a rule to work according to Mr. Dallmeyer's ideas, he would produce his large pictures more natural than he does now. There are a few professionals alive to the great advantage gained by using long-focus lenses of both single and double form when they wish to produce large heads, &c., but the present rule is to use the *carte*, cabinet, and other lenses for pictures that would be infinitely better were lenses of greater focal length used. With regard to *distortion* by lenses, I, some years ago, when gelatine plates first came into use, made the following experiments on the stereotyped model of former days, viz., the plaster bust recommended by our dear old Jabez Hughes, and other writers, for the collodion worker.

From this bust negatives were made by means of lenses of the following types:—Rapid rectilinear, portrait, single landscape, portable symmetrical, and, lastly, the lens from the finder of an astronomical telescope. All were of the same focus within a fraction of an inch—that is to say, the same size of image was produced with each lens without altering the distance between it and the bust. Transparencies were made—by contact—from the negatives, and these were projected upon the usual screen by means of the limelight, but no difference whatever could be seen in their outline. The picture produced with the finder objective was as perfect as the one made with the rapid rectilinear, the result being no doubt due to using long-focus lenses, and at a sufficient distance from the model to practically bring the focus down to nearly that for parallel rays. Had I used lenses of greatly different foci, and made the images agree in size by altering the distance between camera and model, I believe that I should have discovered distortion in the picture made with the shortest-focus lens, because of the exaggerated perspective produced.

It is some time since the practical W. K. Burton recommended for large portraiture single lenses of long focus. Such lenses, however, were made, and have been obtainable now for several seasons. Still, the pity is that photographers do not avail themselves of such excellent tools; the simple fact is, the majority of them do not give themselves the trouble to read and understand such practical papers as those given at the late Convention.—I am, yours, &c.,

J. T. CHAPMAN.

Manchester, September 23, 1889.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—Mr. Robinson makes merry with quip and quotation over what he terms my "definition" of naturalism as "truth and the best of everything," and he confesses himself a naturalistic under this description. This astonishes me, for later in his letter there is yet another quotation to affirm that what he wants is truth with some fiction or imagination added.

Now in the rage for definitions I should like to ask Mr. Robinson for his definition of imagination or "fairy fiction," just to see how far from *untruth*, as far as our art is concerned, this would turn out to be. No two men agree as to what is truth in the abstract, but a very general consensus of agreed opinion will be found to exist as to many things being *untruths*. Amongst these *untruths* must certainly be included the results of combination printing as practised by Mr. Robinson, wherein the character, quality, and tone of the foregrounds will be found to be out of harmony and truth with the backgrounds, wherein also, in many cases, the artificiality of the models reminds one of the stage rather than of the country. Mr. Robinson, with some boldness, defends the practice of photographing ladies trained to carry out his ideas, and dressed up as rustic maidens or fisher lasses, as being better than trusting to haphazard

chance for models. But it is no question here of chance, because the artist who takes such pains as Mr. Robinson does, would naturally carefully select his model to the manner born for any special subject. A very short study of photographic pictures, comparing those containing figures dressed for the occasion in unaccustomed garb and posed in unaccustomed actions, with others in which figures native and natural to the surroundings and subject they are depicted in, are taken, will convince any one on this point. Lady models are not in place in such subjects, and no skill can make them so. It may be more comfortable to work in this way, and easier to attain a certain end; but, unfortunately, "truth and the best of everything" will not admit this practice in the way it has been followed.

Mr. Robinson objects to my claim as to what it is which differentiates the ordinary from the naturalistic school, but he practically admits the claim in his next paragraph. He joins issue only on the word "exclusively," and boasts of adding imagination. Now this to me means absolutely nothing. Surely the poetry and pathos, and all that makes nature most beautiful to the seeing eye, is *in nature* as she appears to us all, and has to be drawn from it by the artist who is trained to the powers of expression, not added from without. Where the imagination comes in, in such daring combination printing as Mr. Robinson is famed for, is beyond me to see. Let any one look at *The Angelus* or *The Sower* for a lesson.

I echo Mr. Robinson's desire to stop disputing over terms, but there is something more than mere terms involved where it is a question between, on the one hand, combination printing, over emphasis of so-called composition laws in minutiae (such as rules about wedge-shaped lights and shadows, and balancing lines in detail), attempts at historical subjects, and artificial models, and, on the other hand, severe regard for everything natural and true in tone, costume, action, and expression.

It may readily be admitted that the aim and desire are the same in both cases, but the divergence is as to methods and principles admissible and likely to lead nearest to the desired result.—I am, yours &c.,

GEORGE DAVISON.

MISLEADING FORMULÆ.—EIKONOGEN.

To the Editor.

SIR,—I am a lover and user of ten per cent. solutions, and on the advent of the new developing agent, eikonogen, obtained from a leading dealer here an original tin of it. I attempted to make a solution of my pet strength, but quite failed to get a stronger solution than about three per cent. On seeing in your issue of last week that Messrs. Fradelle & Young state that they make a ten per cent. solution, I have tried once more, and failed as before. On going to the dealer about it, he tells me that I might as well attempt to put a quart of ale into a pint pot as to try to make a solution according to Messrs. Marion's advertisement. Who is right?—I am, yours, &c.,

JAMES GARDNER.

Manchester.

[Our correspondent will not succeed in making a *plain* ten per cent. solution, but if the proportion of sulphite of soda given in the formula issued by the makers be just dissolved, it is possible the desired quantity of eikonogen will be taken up, as its solubility is greatly increased in the presence of the sulphite.—ED.]

CAUTION—EIKONOGEN.

To the Editor.

SIR,—I may be allowed to caution all those using Thomas's hydroquinone developer not to do so in a metal tray, as the caustic potash necessary to that developer acts fatally upon the gilding or plating of the tray, and on cleaning it or rubbing it the brass surface is quite exposed. Can any one suggest an easy way of rendering this surface innocuous, either by replating or otherwise? The developer in question, which is a very excellent one, has no action upon vulcanite or porcelain.—I am, yours, &c.,

ETHEL CONSTANCE MAY.

A USE FOR GELATINO-CITRO-CHLORIDE PAPER.

To the Editor.

SIR,—I ask for space to describe what is, so far as I know, a new use for the paper mentioned above. It is, briefly, for the reproduction, either on the same scale, or on a scale either larger or smaller, of negatives.

Such reproduction is generally done, at least in this country, by the taking of a transparency from the original negative, and the production from that of a second negative. This process is troublesome, and never, in my experience, gives a second negative quite equal to the original, even if the transparency be in carbon. I do not say that it is possible to get a reproduced negative quite equal in gradation to the original, but I have no hesitation in saying that I get better negatives by copying gelatino-citro-chloride prints that have been stripped from glass than by making them from transparencies.

The copying of prints that have been stripped from glass is very easy on account of the complete absence of grain. It is only necessary to so place the print and the camera that no reflection from the surface of the former is to be seen when looking from the position of the latter.

Negatives are very liable to destruction in this country from climatic influences, and I find it quite worth while, in the case of any negative that I specially value, to make, at the beginning, a print on gelatino-citro-chloride paper, and to store this, in case of accident to the negative.

It might be thought that the tone of the print would much influence the result in copying, but I find that it does so to but a small extent. On the whole, I prefer a brownish tone.

It is often recommended that a transparency should be made from any negative that is specially valued, in case of accident to the latter. It is at least quite as useful, and much easier, to make a print on gelatino-citro-chloride paper.

I have written throughout of gelatino-citro-chloride paper, but I imagine that a burnished print on any other kind of paper would serve equally well.—I am, yours, &c.,

K. OGAWA.

Tokio, Japan.

THE CORNWALL EXHIBITION.

To the Editor.

SIR,—It says a good deal for the work of an amateur that it should deceive the eye and judgment of the skilled representatives of the foremost photographic journals in the world; but so it has been in the case of one of the exhibits at the Royal Cornwall Polytechnic Society's Exhibition, 1889, noticed in the JOURNAL for September 20, where the lantern slide studies of Mr. F. Briglemen are quite coolly put down as being "printed evidently by a mechanical process of various tones, which are very effective and fanciful." As it so happens, I had the privilege of examining that "frame of lantern slides" before they were sent away, and since that time have carefully examined others from the same worker's hand, as well as the negatives from which they were taken, and, to clear up that little mistake once and for all, must state that the gentleman alluded to is an amateur of the studious and practical type, with little time to spare from his professional duties, and that those slides are prepared and printed by himself, without his having even the knowledge of how to print, or get them printed, mechanically. The dozen of slides sent were made by the following processes:—Gelatino-albumen (Chapman's), which were the only commercial plates used; the others were by gelatine citro-chloride, gelatine bromide, and carbon, all prepared by the exhibitor.

The different tones and colours of the silver prints are got entirely by exposure, development, toning, and fixing, these operations being so varied as to get the different effects of sun or moonlight, the greeny-blue of the latter (although quite untrue to nature) being that by which we are wont to represent nature in paintings. If there is any doubt about the untruth of moonlight colour, just take a look at trees or foliage during a full moon on a cloudless night, at, say, twenty yards distance, when it will be seen that the most colour-sensitive eye will fail to detect even a vestige of colour. All nature is seen then as "darkness dimly lit."

In the two or three carbon slides, the thickness of the material may have led to the mistake of supposing them mechanical, but closer observation will show that they are highly artistic, both in selection of subject and production of print from the untouched negatives. It may be noted that prints from several of these and others obtained for Mr. B. a special medal at the Crystal Palace Exhibition in the spring of the present year.

In this connexion it might be suggested that lantern slides should not be looked at only as prints, but be judged by their appearance on the screen, the same lenses and light being used.—I am, yours, &c.,

Edinburgh, September 24.

ARTHUR SEAT.

STANDARD MEASUREMENTS FOR PHOTOGRAPHIC LENS FITTINGS.

To the Editor.

SIR,—I had no opportunity of explaining to you at the Convention my course of action in the matter of those standards for lenses. You were absent when I moved the return of the report, and it occurs to me that you might misunderstand me. There is already much deplorable misunderstanding connected with the whole concern, and so I write you.

My simple reason for moving that Mr. Wollaston's report be not adopted was that I believed it to be no report of any work done by the Convention Committee, which I understood had never met; and that in its incompleteness and grossly bad expression, it was altogether disgraceful to the Convention, and impotent.

As you know, I and my firm do heartily support the general adoption of the series of screws and the system of apertures recommended in the report. But I felt, and do now feel, most strongly, that if the work of our Convention in the matter is to command that high respect, which it should merit, and which the thing itself demands, we must do the work in some far better way.

I myself do know the correct specification of the standard screws, for instance; but I do not think you could find six other men who do. And you cannot understand it from the report. So also in other matters: the whole thing is to my mind extremely feeble and impotent. I do not care personally that our opticians themselves have not been consulted. If

the work had been done at all well, I would not care who did it. But I do feel annoyed that the one who professed such enthusiasm at Birmingham should have so damned it himself.

This is one view of the matter—a most important view—which is most imperfectly considered. No optician is likely of his own generous will to abandon his old screw fittings. It means an enormous loss of plant and stock.

Whatever system may ultimately become common will be established by public demand chiefly. Public demand is the only thing possible for his conversion, or for any general agreement.

And you, good sir, with your vast powers, have it more in your hands than any of us to make the healthy public demand.—I am, yours, &c.,

State-street Works, Leicester, September 15, 1889. WILLIAM TAYLOR.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Eight new porcelain dishes, 19x16 and downwards; wanted, whole-plate lens in exchange.—Address, H. T. AULT, 15, Wharfe-street, Newcastle, Staffordshire.

I will exchange enlarging lantern, four-inch condenser, for 12x10 portable camera with one or more double backs.—Address, ARTIST, 75, Dale-street, Batley Carr.

Will exchange Brown's patent whole-plate combination camera with two double slides for lantern and slides.—Address, G. A. ROBINSON, East Bank House, Hawick, N.B.

I will exchange a cabinet No. 3 portrait lens with Iris diaphragms, by Beck, for first-class studio furniture or a whole-plate outdoor outfit.—Address, W. DAKIN, 1, High-street, Sheffield.

A genuine Beeston Humber Crippler tricycle, light roadster, suitable for either sex, offered in exchange for light 15x12 or larger camera and lens.—Address, PHOTO, Museum Parade, Matlock Bath.

Wanted, a single landscape lens by Ross, four inches diameter and twenty inches focus, in exchange for tanks, &c., for carbon printing, a whole-plate patent Globe lens, seven inches focus, and Wilson's Quarter Century in Photography.—Address, H. C. J., 7, Tadema-road, Chelsea, S.W.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

J. Bell, Frome.—Photograph of Memorial Cross, St. John's Churchyard, Frome.
Photograph of North Porch, St. John-the-Baptist Church, Frome.

B. B.—Wash for half an hour.

A. B. C.—The publisher does not know.

M. A. H.—Both hot and cold bath are utilised for the purpose.

R. J. SHERMAN.—Dissolve pure or non-vulcanised rubber in benzol.

RUSSELL STEELE, M.D.—Any lens having a focus of from twenty to thirty inches will do.

J. GOTTHARD.—Try a hydroquinone developer, such as that lately recommended by Mr. J. W. Swan.

C. C. W.—The arrangement described will afford sufficient light of a good quality for copying.

W. H. McENTER.—There are two German weeklies—*Deutsche Photographen-Zeitung* and *Photographisches Wochenblatt*.

H. W. J.—As you say, one patent appears to be an infringement of the other, consequently that last taken out will be invalid.

J. WIDDER.—Judging by the specimens, there is merit enough in the process to render it one that would be taken up by lithographers.

EIKONOGEN.—It is at present on its trial; a little time will suffice in having its alleged advantages established, or otherwise. We have not yet received the pyroxyline.

F. H. K.—England Brothers, 6, St. James-square, Notting-hill, W., are the publishers. For other works, see "Editorial Table" notices in this JOURNAL during the present and past few years.

A. A. A.—The reply you received was certainly very stupid. It was probably written by a clerk who was totally ignorant of the practical part of the subject with which he was dealing. Write personally to the manager.

W. HERBERT asks where he can purchase some blood albumen, as he cannot obtain it at any of the photographic warehouses.—It may be had from most drysalers. Skilbeck Brothers, Upper Thames-street, we know supply it.

WINTER PHOTOGRAPHY.—If the electric light is not available, the best substitute in portraiture is magnesium. This may be used either as the flash light or by burning the ribbon. The limelight is not sufficiently actinic for taking portraits.

ANTHONY BEALES.—We are not acquainted with either of the lenses named, but their respective rapidities will easily be ascertained by comparing full aperture with focus. That which has the shorter focus is the quicker working, both having equal apertures.

EIN FRAGER inquires: "What is the best method of putting the names of views, &c., upon the negatives? are they printed or written with a pen?"—The best and most usual way is to write the names with a sable pencil charged with a black varnish, such as "Bates's black."

P. C. B. DANIELLS.—The outlines of the albumen process will be found on page 470 of the current volume. Full working details have been given several times in back volumes, also in the ALMANACS. We cannot in this column spare the space to give the practical details of processes.

R. SHIRLEY.—The best and cheapest method of reproducing the manuscripts will be by photo-lithography. We can offer no opinion as to whether their publication would be likely to prove a commercial success; all will depend upon whether the sporting fraternity take sufficient interest in such matters.

T. NORTHERN asks: "Will you please inform me if there is any way of restoring a negative over-intensified with mercury to its previous condition?"—Immerse the negative in a solution of the bichloride of mercury until the image becomes whitened, then stop the operation as soon as the image becomes thin enough.

A. S. says: "I have had the misfortune to break a glass positive I had to copy. Can you give me an address of a photographer who makes glass positives?"—There are several photographers in the neighbourhood of the Westminster Bridge-road who take glass positives. Most itinerant photographers work the positive process almost exclusively.

K.—We cannot congratulate you on the work; all the portraits are flat and map-like. This is due to using far too much front and top light. Try the effect of stopping out all the front light and softening the top light; then illumine with the side light. The form and proportions of the studio are very good. The fault is not in the studio, but in your method of working it.

YORKS inquires where he can obtain brown paper in very large sheets, like that upon which some of the backgrounds are painted. The largest sheets kept by stationers, he says, are much too small for his purpose.—Our correspondent should apply to the upholsterers; they keep brown paper in continuous lengths, and about five feet wide. It is sold under the name of "carpet paper."

BROMIDE writes: "Will you kindly let me know the qualifications necessary for employment under Government as a photographer?"—We presume the only qualifications necessary are the requisite abilities to do the work required. The Government, however, employ very few, if any, civilians as photographers, most of the work being done by the military—chiefly by the Royal Engineers.

W. JAMES.—In photographing groups of dahlias, you will gain a considerable advantage from the employment of orthochromatised plates and a yellow screen. You cannot do better than prepare the plates according to the formula given by Mr. Bothamley, as you suggest. Use as little light as possible in the dark room during the preparation and early stage of development of the plates.

L. M. says: "I should like to know what is the experience of your readers with regard to Carbutt films. I took about eight dozen abroad with me this summer, and most of them I found stuck to the paper placed between them, and in many cases the paper between them was crumpled or doubled up. When stuck together I pulled pieces off the film. Considering the price charged, I think they ought to be sent out in a better condition."

C. WOOLSTON says he has some writing to copy, but he cannot succeed. It is written in a blue ink on a very yellow-tinted paper, and, he adds, the difficulty is in obtaining sufficient contrast between the writing and the paper, no matter by what process he intensifies the negative.—This is a case where orthochromatic photography will prove of special value. Our correspondent should use an orthochromatic plate, and expose through a tolerably strong yellow screen; he will then obtain a satisfactory result, without doubt.

ARGENT BROMIDE writes: "By mistake, in the dark, I took a bottle containing ammonia bromide instead of the nitrate of silver bottle and dropped a small quantity into the sensitising bath (for floating paper) before I discovered my mistake. Can you help me out of my difficulty or suggest the best plan to adopt with the bath?"—No harm has been done; the bath has only been weakened by some of the nitrate being converted into bromide of silver. This must be filtered out and the bath made up to its original strength.

INQUIRER writes as follows: "I shall be glad if you can give me advice in your 'Answers to Correspondents' in regard to an Eastman film negative I have. The negative, when washed, was placed on a piece of glass, film down, and on drying did not peel off as usual. I should like to remove it from the glass altogether, or, failing that, to strip the paper from the back. Failing either of these plans, what would be the best way of making a reproduction?"—If the negative be on stripping film, our correspondent has proceeded wrongly. The glass should have been collodionised before the negative was placed upon it; then the application of hot water would have removed the paper. If the film is so firmly adherent it is possible that hot water may still cause the paper to come off; if this does not succeed the best way will be to reproduce the negative by transmitted light in the camera.

N. C. COOK.—The cause of the indistinctness is due to a movement of the camera during the exposure. Probably the stand lacks stability. This is the fault with many of the exceptionally light and portable stands.

Z. A.—You will not be able to successfully etch a copper plate through an exposed gelatine film with nitric acid. The acid would destroy the film. For this reason a solution of the perchloride of iron must be used.

RECEIVED.—W. Scover; and others. In our next.

PHOTOGRAPHIC CLUB.—At the next meeting, Wednesday, October 2, the subject for discussion will be, *Backgrounds and Appliances for Home Portraiture*.

THE Jones patent smoke consumer, or "Fumu Dejector," is said to be useful in manufacturing towns in keeping the atmosphere clear from smoke. Everything that tends to abate the smoke nuisance will be cordially welcomed by photographers.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—Competition Prints and Lantern Slides. All pictures and lantern slides to be addressed to the Hon. Secretary, and deposited at 3, Lord-street, not later than two o'clock on Thursday, 28th November, after which time none can be received. The rooms will be closed to members on that date from half-past two until half-past five p.m.

Illustrations, Mr. Francis George Heath's magazine of amusement, art, literature, and science, commences its fifth volume in October with a new pictorial cover, and its forthcoming issues will include illustrated papers, embracing drawings of the month, reproductions of the National Gallery pictures, pretty places, art studies, eminent artists, pen and pencil portraits of celebrities, Tyrolean winter resorts, &c. Simpkins, Marshall, Hamilton, Kent, & Co., are the publishers.

PICTURES BY PHOTOGRAPHY.—An exhibition of photographic pictures by Mr. H. P. Robinson, of Tunbridge Wells, will be opened at the Camera Club, 21, Bedford-street, W.C., on Friday, October 4. Mr. Robinson's landscape photographs are well known in the country, and this exhibition will include a representative collection of his work. There is at the present time a considerable stir amongst photographers to claim for their art pictorial possibilities which have been very generally denied it. This series of exhibitions serves to bring forward examples of the best that has been done by the camera. The pictures are open to inspection by visitors interested on presentation of card.

"WHAT have you in that covered basket?" severely asked the watchman, in "Plutarch," of the slave. "It was covered," pertly replied Doalos, "in order that you might not see what was in it." Detective Parsons, being in Aldersgate-street, saw a person carrying a parcel, and looking about in what, to the detective mind, seemed a suspicious manner. "What have you in that parcel?" demanded the officer. The person declined to say, but subsequently explained that it was only some old lead. The contents of the parcel were examined by a jeweller, who pronounced it to be silver, weighing 7½ ounces, worth 3s. 6d. an ounce; and the person was charged with the unlawful possession thereof. But behold the untrustworthiness of circumstantial evidence! When the accused came up on remand at Guildhall his brother-in-law deposed that the silver was his own property, being the residue of nitrate of silver used in baths for sensitising photographic paper, of which article he was a manufacturer, and that he had given the silver to his connexion by marriage to sell for him. So the innocence of the accused being established he was discharged. —*Telegraph*.

ANIMALS IN MOTION.—We learn that the lectures and demonstrations by Mr. Eadweard Muybridge have been greatly appreciated in Newcastle-on-Tyne both by the members of the British Association there assembled and by the people generally. The *Chronicle* says that much interest has been created in Mr. Muybridge's extraordinary manifestations with his Zoopraxiscope, which has been well described as a magic lantern run mad. Mr. Muybridge's first appearance in Newcastle at the Mayor's *conversazione* on Thursday last week did him little justice, as he could not be heard in the corridor to which he was relegated, nor could the wonderful pictures that he throws upon the screen be properly seen. In the Art Gallery, however, seeing and hearing were accomplished without the slightest difficulty, and the audience were delighted and astonished at the marvellous demonstrations of animal locomotion that were brought before them. Animals walked, cantered, galloped, and leaped over hurdles in a perfectly natural manner. All sorts of beasts and birds were illustrated in various stages of locomotion, and, finally, man appeared on the scene, and reproductions were given of the *genus homo* walking, running, leaping, tumbling, and performing all sorts of extraordinary antics in a manner that was absolutely lifelike. The entertainment was instructive and unique, and there can be little doubt that Mr. Muybridge has got hold of an idea that should have an important influence on art in the future. He has since repeated his lecture in the Art Gallery.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1535. VOL. XXXVI.—OCTOBER 4, 1889.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THE present Exhibition of Photographic work is one of which this Society may very justly be proud, inasmuch as it gives unquestionable evidence of progress in art study; and we cannot but think that the general opinion will be that this year's display of photographic productions will most undoubtedly raise the art capabilities of this scientific method of producing pictorial results. It is a very singular fact, that just in proportion to the progress made on the side of science, so the artistic possibilities also seem to be increased; this, to a very great extent, may undoubtedly be attributed to the freedom from that anxiety and subsequent mental worry which attended the usage of the comparatively old wet process, for the mental quiet and absence of consideration for possible failure in this respect after, in many instances, so much thought and care had been bestowed on the preparation of a picture (more especially where living objects were studied) must leave the operator perfectly free to give full scope to his actual capabilities.

Therefore, we acknowledge with strong emphasis the debt which we owe to science for the present pictorial and most gratifying result of photographic investigations.

Perhaps the most noticeable advance is in the character of the portrait exhibits, which show a decided tendency to the avoidance of those rather outrageous accessories which, not so long ago, seemed to be the accepted stock-in-trade of so many otherwise good workers. A study of those exhibits in portraiture which have totally eliminated accessories, having only plain backgrounds, will reveal this fact which so many of the highest portrait painters have always adopted; thus the attention of the beholder is at once fixed upon the real subject matter, viz., the head and face, and in many of the large direct photographs in the present Exhibition this result will be readily acknowledged.

There are but few exhibits of pictorial subjects where figures have formed the leading study. This, which is the greatest of artistic capabilities, demands a very high appreciation of form and constructive skill, both in detail and in their relation to accessories; therefore, much praise must be given to those exhibits which show that by photography this highest of pictorial results can be realised.

One of the scientific aspects of this Exhibition arises from the very large number of platinotype prints which this year are in evidence of the capability of this process, not only to record delicate detail, but also to eliminate so much of those intense dark masses which attended its first introduction, and thus this wonderful union of science and art is steadily progressing towards perfection, and consequent higher position in pictorial results.

Not so much progress can be recorded of another scientific

matter, viz., the absolutely true rendering of colour by photography, and by that is implied the actual measurement by one colour of the entire scale and relation of many colours in their true advancement and valuation when translated into white and dark.

This matter at present is somewhat like an infant, no doubt progressing most satisfactory, but requiring time to develop into maturity.

One very curious matter is most prominent in this year's display, and that is the almost universal usage of plain oak frames, and, in many instances, large white mounts. It has been frequently remarked that this is a retrograde movement, which gives to the pictures an appearance of being simply a collection of engravings. The hitherto cold black tone of the platinum work seems to have suggested this mode of framing, whereas a gold frame in contact with the photograph, without question, not only suggests the idea of *original* work, but also gives more value to the enclosed matter. A careful study of those pictures which are in gold frames undoubtedly reveals this fact, and it is a great pity that this mode of framing could not be enforced in some way. Two things would be gained by so doing—one being a most powerful help to the photograph itself, the other an avoidance of those masses of light which so distract the sight and lower the tone and pictorial effect of the exhibit. A walk round the Exhibition, to realise the full effect of this depression of the photograph by its surroundings, should most certainly lead to a different method of framing. In some instances a darker toned mount has been used, which at once increases the artistic value of the photograph.

Despite this drawback the Exhibition is exceedingly interesting, and marks an onward movement both in the scientific and artistic aspects, the greatest of which is the marvellous outcome which photography now reveals, viz., that besides being a thing of beauty, it is becoming possible that it may also be a joy for ever.

There are some excellent specimens of photo-engraving processes, which appear to make greater progress every year.

There can be no question but that the re-introduction of medals on the part of the Photographic Society has resulted in a large amount of very excellent work being sent in, although there is the absence of many well-known exhibitors; and hence it seems to have been considered necessary to display as much as the Gallery can contain, so that a full and most assuredly an attractive Exhibition is the result.

This year's Exhibition will, then, well repay the thoughtful attention of those who wish to profit by the advancement made in science, and also to study the realisation of art possibilities which photography hold out.

The Jurors this year were Messrs. W. Bedford, Valentine Blanchard, George Davison, William England, Joseph Gale, H. P. Robinson, and J. Traill Taylor. They awarded the medals as follows:—Lyddell Sawyer (84, *Dangerous Company*); B. Gay Wilkinson (99 and 101, *Shrimping and Prawning*); A. Schmitz (129 and 638, *Cologne Cathedral and Staircase in Royal Castle, Cologne*); F. M. Sutcliffe (136-7-8, *Fish Stall, Saturday Afternoon, and Dinner-time*); Green Brothers (178, *Head of Derwentwater*); Ralph W. Robinson (413, *et seq.*, *Sir J. E. Millais*, and other home portraits of artists); Harry Tolley (447, *Carting Hay*); Robert Faulkner (480, *Professor Blackie*); Typo-Etching Company (494, *Sleepy Hollow*); Auto-type Company (498, *Christians fleeing from Persecution*). In the Apparatus Division, to Swinden & Earps (666, *Detective Hand Camera*); and for Transparencies, to F. P. Cembrano (678).

The pictures by H. P. Robinson, J. Gale, and G. Davison, who were Judges, were not entered for competition.

We shall next week begin the detailed notices of both the pictures and the apparatus.

HOME-MADE CHLORIDE OF GOLD.

We have discussed the question of the manufacture of nitrate of silver and shown that for the average photographer to attempt to make this salt, even counting labour as costing nothing, and ignoring possible breakages and the cost of utensils, not to speak of the purchase of nitric acid, is something less satisfactory than the traditional "change for a shilling." We have now to inquire how the matter stands with regard to chloride of gold. On this point we have not to do with the theoretical proportion of gold in a hypothetically pure gold salt. We have to find out what the product as placed upon the market is, and to calculate from the data so obtained. There is here no trouble at all; the best brands of chloride of gold have, without exception, we believe, a printed label stating the amount of metallic gold contained in a given quantity of chloride—whether so-called "chloride of gold" or "chloride of gold and sodium," &c., is immaterial, as we have practically to do with the precious metal alone.

"This tube is guaranteed to contain seven grains of metallic gold," we usually read on the fifteen-grain tubes: if the salt is purchased in bulk the reference is still generally to the proportion in fifteen grains. It will, therefore, for the purpose of our remarks, be advisable to deal with this amount, the fifteen-grain tubes being familiar to every one. Eighty-five shillings being the value per ounce of unalloyed gold, we get $85s. \times \frac{7}{15} = 39s. 8d.$, the value of the gold in an ounce of commercial chloride of the brands alluded to, or $39s. 8d. \times \frac{1.5}{4.50} = 1s. 2\frac{1}{2}d.$, the value of the metal in a fifteen-grain tube.

Our readers may now judge for themselves whether, at the price they pay for this necessary chemical, they would find any economy in what we may term home-made chloride. As a matter of fact, it may be estimated that, buying the gold salt in bulk, it would have to be bought in large quantities to get it at such a price as to stand the purchaser less than twenty-five per cent. increase upon the value of the contained gold. Put in another way, a pound's worth of metal dissolved made into chloride would be charged at a minimum of twenty-five shillings.

If the photographer desired to produce the salt in the form of clean crystals anyway resembling the commercial article, it may at once be said that unless quantities far beyond the

ounce or two likely to be dealt with were to be used there would be loss, as the time involved would be considerable, and the production of clean crystals is so difficult except in bulk.

In the case of this salt, however, the crystalline form is less necessary and less called for than with nitrate of silver. Most photographers keep it in solution, and when they purchase a fresh supply dissolve it in a given proportion for stock, and measure rather than weigh their quantities. It is easy enough to dissolve a metal and keep the solution, and therefore it is not nearly so uncommon for photographers to make their gold solution as it is their silver nitrate crystals. When this is done it is usual to take coin of the realm—sovereigns rather than half sovereigns—dissolve in *aqua regia*, and use without further preparation; or to precipitate the gold, so as to eliminate the copper, and re-dissolve. This latter operation involves very considerable time, and a certain risk of loss, as precipitated gold takes a considerable time to entirely fall to the bottom of the precipitating jar, and any hurry would result in the fine, precious particles being lost.

If, however, the solution, just as it is made from the coins, be employed, the saving is quite appreciable, and there are many who employ such solution and consider it quite equal to that made from the commercial salt. There is the objection that a considerable amount of chemical foreign to the salt is introduced in neutralising the highly acid product obtained in this manner; but we are not aware that it has been found to have any detrimental effect. It has been stated that the chloride of copper is injurious to the tone of the print; but when the solution is neutralised with carbonate of lime the quantity of that salt will not be found great.

In conclusion, we may say that home-made chloride of gold, from the dissolution of sovereigns, is useful and economical; but otherwise the manufacture is more satisfactorily relegated to the laboratory of the practical chemist.

NUKTIGONIA—what a nice name to be sure! But what is it, and what does it mean? Simply this, that according to the "Anti-Dark-Room Photographic Company, New York," a certain something has the property, when mixed with the developer, of enabling plates to be developed in open daylight. Even such an authority as Napoleon Sarony, of New York City, is found to say that "the great want for amateur photographers has been supplied by the Anti-Dark-Room Photographic Company, and it is most ingenious and simple. We are not informed as to the nature of this new addition to our resources, but remembering that we have exposed a plate undergoing development in ferrous oxalate (which is of a deep red colour) to light while the developing action was going on, and this without impairing the quality of the resulting negative, we are led to inquire if "Nuktigonia" be not a red dye which has no deleterious effect upon the developer when added thereto.

WHEN the platinotype and the bromide paper processes were, commercially, in their infancy, not a few surmised and gave vent to their impressions that the cold colour of the pictures and their dead surface would be an insuperable bar to their success. It will be remembered that at that period we strongly and steadily advocated the adoption of the cold tones and matt surface for the better kind of pictures, and prognosticated that eventually platinotype and bromide paper would supersede silver printing for the higher class of work. In this opinion, we may add, we stood pretty much alone. How far our prognostications have been verified each succeeding Exhibition has amply demonstrated. The present one, however, far exceeds every previous one in the number of photographs of the engraving-like character. Indeed, many of the examples, mounted on India paper and plate-marked, are scarcely to be distinguished from veritable engravings.

Furthermore, some of them have decidedly more force and vigour than some of the photographic engravings shown. The garish, red-toned prints on albumen paper, so much in vogue at Exhibitions a few years back, now appear to be conspicuous by their absence.

A CORRESPONDENT, an amateur photographer, writes complaining of the scant courtesy he received from many professionals to whom he applied for the loan of a dark room wherein to change his plates, or to develop a test negative occasionally, during his holiday tour. He says in the majority of instances he was refused, although he offered to pay something for the accommodation. Various excuses were made, such as—it would interfere with business, sitters were expected, the rooms were engaged, &c., notwithstanding that in many cases there were no sitters to be seen. This is not the only letter of a similar character that we have received during the past few weeks. At first sight it does appear to be somewhat churlish to refuse the use of a dark room for the brief time necessary to change half a dozen plates. But a little consideration will show that this small accommodation even may, in a busy establishment, entail considerable inconvenience during business hours. On mentioning the subject to some provincial photographers, now in London for the Exhibition, they one and all declared that the visits of amateurs were little less than a nuisance during the busy season. The mere changing of a few plates, which need occupy but a few minutes, usually entailed the loss of an hour or two in gossiping; the amateur must see over the place, put a number of questions on all manner of photographic matters, to say nothing of the many suggestions made, all of which have to be treated with courtesy. One gentleman said he recently gave the use of his developing room and chemicals to an amateur to develop a couple of trial negatives, and although he had sitters waiting, it was over an hour and a half before he could gain access to it again. When he did, he found it in such a state that it was impossible to work until all the benches had been cleaned down. The solutions, he said, "had been spilt and splashed about everywhere, dishes left dirty, and hypo was all over the place." This gentleman declared that another amateur should never have the use of his dark room. If amateurs, when they are accommodated, would always bear in mind, and act accordingly, that in a photographic business time is money, they would, as a rule, have no cause to complain of want of hospitality on the part of their professional brethren.

We have frequently referred to the exceedingly low price at which carbon prints on opal glass—the "porcelains" sold at the fancy stationers—are produced. One would have thought that these pictures were cheap enough in all reason with this method of production, but evidently it is not the case. We recently saw in a shop window some silver prints on albumenised paper of the scrap genus, mounted on opal glass. Although, we imagine, they had not long been made, they had faded badly. The evil appeared to be brought about by the mountant used to stick them on to the glass. This, in some instances, had given way with the heat of the window, and the paper was peeling off. In the same window were to be seen some chromo-lithographs, also mounted on opal, after the style of coloured carbon pictures. The race after cheapness is now very keen, but up to the present time carbon holds its own, so far as cheapness, combined with general effectiveness, is concerned.

PHOTOGRAPHERS at holiday resorts often complain that the varnished lithographs, in imitation of photographs, sadly interfere with the sale of their views of local scenery. Usually these lithographs are sold in long strips bound up in a cover. A few days ago, however, we were shown some of the cabinet size mounted on thick chocolate colour mounts, with gilt and bevelled edges. These pictures, for the most part, will be purchased by the public under the impression that they are veritable photographs. It is scarcely necessary to mention that they were of foreign production, although they bore no indication of the fact. Here, again, is evidence that the Trade Marks Act is not being complied with.

In exhibiting specimens in showcases too little attention is frequently paid to the glass of the frames. The tint of this may, and often does,

materially alter the tone of the pictures, and sometimes has a marked influence for the worse on the appearance of coloured work. How often it happens that the tone of a print appears perfect itself, but when it is framed, by reason of the colour in the glass, it is sadly disappointing!

THERE is another point in connexion with the exhibition of pictures which is frequently overlooked, namely, the light in which they are shown, or which may occasionally fall upon them. This was well exemplified a short time back, and in the following way:—Several very fine bromide enlargements were exhibited in a shop window, and one day, when the light was feeble, it was noticed that they all appeared to be in places of a decided yellow tint, just such a tint as was highly suggestive of sulphuration in the fixing. The pictures were on the point of being removed, when it was noticed that the yellowness was caused by the light from some pale, stained glass above the shop window proper. A few sheets of brown paper laid upon the top of the window-case at once restored the pictures to their pristine whiteness. In a bright light the pale tint of the stained glass was overpowered by the strong light coming direct through the window, but not so when the light was feeble. In the windows of some reception rooms tinted glass is introduced for decorative purposes. When this is the case considerable care should be exercised in the hanging of the pictures, otherwise, in coloured work especially, they may be materially deteriorated in effect by the tinted light which may happen to fall upon them at different times of the day.

WITH much gratification we learn that the high honour of the Order of St. Stanislaus has been conferred by His Majesty the Emperor of Russia upon Mr. Leon Warnerke for his "useful activity and special researches and improvements in the art of photography in Russia." Those who in this country know Mr. Warnerke, and are acquainted with his researches, will not fail to be struck by the justice with which this award has been made.

PHOTOGRAPHIC AWARDS AT THE PARIS EXHIBITION.

THE English awards are now published. In the classification, photography has not found a place among works of art, but is relegated to the Industrial Section.

Upon examining Class 12, "Photographs and Photographic Apparatus," we find that the following are the recipients of the honours:—

In Photographs the list stands as follows:—W. J. Byrne, *Bronze*; Jas. Burnside, *Bronze*; Frith & Co., *Silver*; J. P. Gibson, *Silver*; F. Hollyer, *Silver*; James Lafayette, *Silver*; H. S. Mendelsohn, *Silver*; J. B. Scott, *Bronze*; F. M. Sutcliffe, *Silver*; John Thomson, *Gold*; H. Vanderweyde, *Gold*; Walery (Count Ostrorog), *Gold*; Werner & Son, *Silver*; West & Son, *Silver*; York & Son, *Bronze*.

In the Photographic Apparatus Section the medals are awarded to—J. H. Dallmeyer, *Gold*; Ross & Co., *Gold*; Sands & Hunter, *Silver*; J. F. Shew & Co., *Silver*; and Watson & Sons, *Gold*.

DEER STALKING WITH A CAMERA.

THIS, at first sight, seems a strange subject for a non-sporting paper, but I will endeavour to show that it may be one that will interest some of the many photographers who glance over these lines.

Science has developed two methods of shooting—one which destroys the object shot at; the other which permanently secures the object, either as a thing of beauty for ever, or the reverse, to the confusion of the shootist.

The second method will interest photographers more than the first, and it is to be understood that this method of shooting—which perpetuates, not destroys—is the one adopted in this short account.

As deer stalking with a camera is a somewhat new development, it is to be hoped that a few of my brother photographers will take advantage of my experience and try their hands at obtaining pictures of these most graceful animals during this and next month.

Highland deer are hardly fit subjects, for obvious reasons, so we must content ourselves with stalking tame deer in our public parks.

This method will be found as interesting in its way as the more expensive, and it is quite as necessary to be very wary in our approaches to this game.

Walking through Richmond Park last autumn I passed close to a large herd of red deer, which was under the management of a most magnificent stag. This old fellow was so occupied in keeping his herd together that I went quite close to him, well within range; standing alone, with a small oak in the background, he made a study worthy of Landseer, particularly when he laid his great head back and bellowed to some of the wayward herd. I was in a splendid position, light correct, distance good: all things combined to produce a rare picture, but, alas! I had no camera.

This year, again, another splendid chance occurred. Walking through the park with my dog, a Russian wolf-hound, perambulating ahead I caught sight of a solitary red doe, walking with head erect and stepping as if on stilts: it came towards us with such apparent uneasiness that, remembering that the deer had only lately been suffering from rabies, I felt a little uneasy also. She continued to approach until within three yards, when we all came to a standstill and mutually admired each other. I had by this time discovered that the dog was the object of this unusual display of interest on the part of the doe, who every now and then lowered her head in a threatening manner towards him; so I called him to heel and thought it wise to proceed slowly on my way, as the doe made no sign of moving off to a safer distance. As soon as we started the doe started and followed close behind. Suddenly, when not thinking of her, I heard a rush behind, and the dog took to his heels, followed by the doe uncomfortably close. After they had careered round in a large circle I managed to call the dog to heel again, and we proceeded rather more rapidly than before, leaving the doe looking anxiously after us. This doe, I found, had lately deposited its fawn in some bracken close by, and so resented our too near approach to its lair. Thus, as my camera was reposing at home, I lost a second splendid opportunity of shooting a deer standing alone.

Next day I went on what I guessed would be a wild goose chase—no, a tame deer hunt—and passed the same spot with my camera and dog, but no deer were in sight. Returning home I came across a herd of red deer, and determined to try and stalk them with the help of the dog.

In the ordinary way it would be of no use to approach a herd of deer boldly, for they would be off long before a sufficiently near position to shoot had been reached, but during the "fence months" they have a special interest in dogs and are not so timid. The months most suitable for this kind of work are May, June, September, and October.

I ought, perhaps, to say that my camera used for this work is quarter-plate, and of the detective kind, with a lense of five inches focus. It is possible to get shots at deer with a very long-focus lens in an ordinary camera and focussing cloth, but the depth of focus is not sufficiently great to obtain the best results, and stopping down is not permissible to any extent with a rapid shutter.

My method of procedure was as follows:—I and the dog approached slowly; if they showed any sign of retiring we stopped, and I became deeply interested in my black box: my movement interested them, and they stood still and stared. When they became settled we again slowly approached, stopping as before when necessary. Having by this means come almost within range, I altered my tactics, and having set my camera for action, and focussed for ten yards, I tucked it under my arm, and telling the dog to "lay down," moved slowly away from him, keeping the same distance from the deer. When I had gone some steps, the deer, watching intently, began to walk towards the dog with hostile intentions. When they were close to him I called him, and, telling him to lie down again, walked a few paces, approaching the deer imperceptibly. They then made for the dog again, and by this means we gradually came within range, then, allowing them to compose themselves into a picturesque group, the trigger was pulled, and the deed of darkness done—for was not the "black art" employed? If a second shot should be required, with a change of position, the deer stalker should move slowly away from the ground he has been working over, and allow the deer to approach the places where the dog has been lying. This they will do before he gets out range, and begin sniffing around and looking inquisitively at the dog, who is innocently lying at your feet, snapping at the flies, and not even bestowing a thought on his would-be assailants.

A most important point to be observed in thus stalking deer, is to be slow and deliberate in all movements. A sudden move will probably cause a stampede in the opposite direction required, and then it will be as well to find another herd to operate on, for by the time they have finished their run all interest in you and your proceedings will have evaporated, and you may try in vain to get within

range again. Don't be in too much hurry: surely a really good picture is worth an hour's patient work.

To possessors of tricycles there remains yet another way of stalking deer, available any time of the year; and although much still remains for care and skill, it is, perhaps, the easier method *when* the deer are found. In parks the deer have become quite accustomed to traffic along the roads, and take but little notice of passing vehicles, even though they themselves are almost on the road. Often when riding round Richmond Park, without my camera, I have come across most picturesque groups quite close to the road, some even being upon it. If the tricycle is brought slowly to a standstill near such a group, they will look up, but show no intention of moving off, and being well within range—if not almost too close—they can be secured without any trouble.

A little account of an attempt in this line will illustrate the mode of action.

One day in August I rode into the park with my camera fixed behind the tricycle, and passed those places I considered the best; however, the deer were browsing anywhere but near the roads, and after having gone some considerable distance I was almost giving up for the day, when, in the far distance, I just distinguished an object on the edge of the road which looked uncommonly like a deer, so putting on speed, lest it should be gone before I reached the spot, I soon neared it; as it had moved several times during my approach, I was pretty sure of my game, but I was soon disillusionised—it was only a man and woman seated with their backs towards me! On my way home, however, I was more successful; this time I made no mistake, several fine stags were slowly crossing the road near some hawthorn trees some distance ahead. I stopped, took my camera from behind the tricycle, mounted with it under my arm, and rode quickly towards them. On nearing them, I slackened speed and approached very slowly, and finally came to a standstill in a good position and pulled the trigger. If care is used, one may turn round after riding on a little way and come back for another shot. No attempt must be made to dismount and walk by, as they will move directly on hearing footsteps; the shot must be taken while seated.

There are some disadvantages attending this method; for instance, one is entirely dependent upon good fortune for coming across a group by the roadside, and if one does meet with several sufficiently near, the light may be in the wrong direction; in this case it is best to keep back and wait a little while until they cross the road, which they are almost sure to do.

A hint as to the time of exposure may be of value to those who know the speed of their shutters. If taking a single deer, a speed of one-tenth of a second is safe if the operator waits until it stands still. For groups it is best not to use less than one-twenty-fifth of a second, as some are sure to move their heads.

The best times for the tricycle are in the morning or evening on ordinary week-days; it is of little use on holidays.

Permission to photograph in the Royal parks and gardens may be obtained from the Chief Commissioner of Public Works and Buildings, 12, Whitehall-place, W.

W. P. ADAMS.

COLOURED PHOTOGRAPHS.

IX.

In our last paper we carried our investigations of the reds as far as the pure scarlet, leaving us still—scarlet lake, madder carmine, and dragon's blood to complete our list of these pigments. We will therefore start with—

Scarlet Lake.—This colour is nothing more or less than a close combination of crimson lake with pale vermillion. It is this latter colour which imparts to it its scarlet hue. As I before said, crimson lake is anything but permanent, scarlet lake is even less so. Being so defective as regards its permanence, it should naturally be but sparingly used.

Madder Carmine.—This beautiful colour is a lake, which is prepared by precipitating the colouring matter extracted from the madder root in combination with alumina. As in the case of the carmine of the cochineal family, so with the carmine of the madder; it is the strongest and most powerful of a series of lakes. If we compare madder carmine with the cochineal carmine to determine its claims to a good reputation for permanence, the verdict will be very favourable to the former. Indeed, if judged solely by the latter, it may be considered an absolutely permanent colour. Authorities that have experimented with a view of settling this point are almost entirely of opinion that, submitted to the test of the ordinary diffused light of day, madder carmine is an absolutely permanent pigment. For all this, as I suggested, there are doubts; some having found that ex-

posure for a lengthened period to the influence of direct sunlight had caused it to fade slightly. Its value to a water-colour artist is principally for its deeper tinges. Madder carmine in its lighter or paler washes cannot compare with those of rose madder, which is noted for its delicacy and beauty of hue under these conditions.

Dragon's Blood.—I do not think this colour worthy of much consideration, as it is a dangerous one to use, since it will fade by exposure to the ordinary light of day. The genuine dragon's blood is a kind of resin to be found in the East Indies. It is of a warm and rather dull red hue, but may be considered as an altogether ineligible pigment, owing to its thorough lack of permanence. This, of course, refers to the genuine article, but there is an imitation colour now in the market which does duty for it. It is semi-permanent, and under the test of strong light fades, or, perhaps, it may be as correct to say, changes to a burnt sienna colour. To architects, however, it is a most useful colour, and I think we lose nothing if we leave its use altogether to them.

With this, I think we may safely leave the reds and pass on to the various colours which come under the denomination of orange pigments. Under this heading come cadmium orange, chrome orange, Mar's orange, and neutral orange. Of course, burnt sienna comes under this category, but we need not discuss it here, as we have given it ample consideration before.

Cadmium Orange.—This colour may be altogether considered as a very recent addition to the artist's colour box. I believe it has not been known for much more than a quarter of a century. It is a variety of sulphide of cadmium. It is a very lustrous and brilliant pigment, and has more than taken the place of the old "chrome orange" of years ago. There is nothing to wonder at in this, as, besides being considerably more permanent, it is also a much more mellow and beautiful colour. It is moderately transparent, and for gorgeous sunsets it may be considered simply invaluable.

Under the ordinary conditions as to exposure to light, cadmium orange may be looked upon as being perfectly permanent. I do not mean, however, to say that it will stand being exposed to strong sunlight for a considerable space of time and remain unchanged, for I well know that under these most trying conditions it becomes somewhat browner in hue. Damp has no evil influence over it, nor has impure atmosphere. Considered as a whole, it is one of the most valuable colours we possess, remarkable as it is both for its brilliance and permanence. As I said before, for gorgeous sunsets it is invaluable to the water-colour artist, to illuminators also cadmium orange has been a much valued acquisition.

Chrome Orange.—This colour consists of basic chromate of lead. Great power and brilliancy are the natural qualities of all the chromates of lead, and chrome orange is no exception to this rule. But these chromates of lead have their drawbacks, and very serious ones. There is always a certain harshness of colour, backed up by a considerable want of permanence. But this is not all: they possess a tendency to oxidise any delicate organic pigments with which they may come in contact. As a natural consequence of its lead base, chrome orange is liable to become considerably discoloured by exposure to an impure atmosphere. It is not a colour, happily, which is indispensable to an artist, since for most purposes it is effectually superseded by the steady and reliable cadmium orange.

Mar's Orange.—This colour consists essentially of sesquioxide of iron, artificially prepared, producing a subdued orange pigment. It is possessed of great purity and clearness of colour, and is to a very great extent transparent. For bright sunny tints its use, in pale washes, will be found most effective, and may be considered extremely permanent. It is a laid-down theory that Mar's orange is rather likely to injure the evanescent colours, as, for example, crimson lake or indigo; we would, therefore, be wise in avoiding as much as possible such combinations as might endanger the value of our works.

Neutral Orange.—This colour is simply a mixture of cadmium yellow and Venetian red. As a first wash, to soften the extreme brilliancy and harshness of the white paper, it will prove most effective and useful. We can rely upon its permanence. This combination was much used some years ago by Mr. Penley in his well-known water-colour drawings, and I believe it was owing to him that it was made into a pigment for the convenience of artists and designated neutral orange.

This, I think, will complete the list of orange pigments most in use, and bring us to the study of a long and beautiful line of colours—the yellows. In this category we will find—*aureolin*, deep cadmium yellow, pale cadmium yellow, deep chrome yellow, pale chrome yellow, lemon yellow, Kings' yellow, Naples yellow, Mar's yellow, Roman ochre, brown ochre, yellow carmine, Italian pink, yellow lake, and gallatone. Of course, raw sienna, yellow ochre, gamboge, and Indian yellow are

also to be found under this heading, but as we have met them before we will not require to consider their qualities.

Aureolin.—This pigment, although but a recent addition to the artist's colour box, has asserted itself and taken a high position. It consists of a double nitrite of cobalt and potassium. In theory, the stability of this pigment is put down as somewhat doubtful, but practice and experience have shown it to possess considerable permanence. It is a very beautiful colour, most delicate and transparent; many consider it to be, in point of hue, the purest of all our yellows. Aureolin mixes with the utmost safety with most of the colours. It has, however, been found to have an injurious influence upon indigo, thereby giving us the idea that it should be used with great caution in combination with the delicate organic pigments. Of course, its chemical composition leads us to easily understand that it may exert an oxidising or destructive action; this necessarily being a double danger should be fully considered when we are using it. In its paler washes I consider aureolin very beautiful, and will not fade to any appreciable extent when subjected to lengthened exposure to bright light—even sunlight. If only exposed to ordinary daylight, I feel almost sure it is as permanent as any colour we possess.

Deep Cadmium Yellow.—This pigment is a lustrous, warm, orange yellow; it is not very transparent, yet is marvellously clear and bright. I believe it to be the richest and most powerful yellow known. It consists of sulphide of cadmium, and is consequently unaffected by any impure atmosphere. It is quite possible that, if exposed for a considerable length of time to direct sunlight, it may become somewhat browner in hue, but in the ordinary daylight it is perfectly permanent. I think we will be safe in giving deep cadmium a foremost place among our most permanent colours.

Pale Cadmium Yellow.—Of this colour there are two varieties to be had—one being a rather full yellow, while the other is more lemon in hue. The former is on a par with deep cadmium yellow as regards permanence, while the latter will sooner or later fade almost completely away under the influence of ordinary daylight. I should think the manufacture of this latter pigment would have much to do with its degree of stability, but in the long run it must fade.

Deep Chrome Yellow.—This pigment is formed of a chromate of lead, to a greater or less degree basic, prepared by precipitation. It is a very brilliant yellow, but possessing, as do all the chromes, a peculiarly harsh and disagreeable quality of colour. It dulls considerably after exposure to sunlight, and in an impure atmosphere becomes black. We must be very careful as to the other pigments with which we mix this deep chrome yellow, or else the results may be most destructive. The mixture of chrome yellow with some of the blues is notoriously destructive, as, for example, Antwerp blue, Prussian, and indigo. It has a tendency as well to oxidise other substances, and great care should be taken not to mix chrome yellow with any organic pigment.

Pale Chrome Yellow.—This colour consists of neutral chromate of lead. In its various properties it is altogether similar to the deep chrome yellow. It is still less permanent, and exposure to ordinary daylight will turn it to a greenish hue. It is more usually used in combination with the various blues than the deep chrome, and necessarily our remarks about the latter apply with redoubled force.

Lemon Yellow.—There are two "lemon yellows" in the market. The genuine and permanent one is a peculiar preparation of chromate of barium. It is a beautiful semi-opaque lemon, inclining somewhat to primrose, and possessed of great purity and clearness of colour, although anything but remarkable for its intensity. The second preparation known under this name is far richer in colour, and consists of chromate of strontium. It is a very beautiful pigment, but not at all suitable for a water colour, being but slightly soluble in water—a more or less fatal drawback to a chromate. As a natural consequence it rapidly becomes green, and really should not be used under any pretext. The genuine (that prepared from chromate of barium) washes, and works easily and pleasantly. Even this, if badly prepared, will turn greenish in the course of time. I believe Field's process for producing this yellow is considered to be the best.

Kings' Yellow.—This colour is sometimes known as *Orpiment*, and is an artificially prepared sesquisulphide of arsenic. It is a bright yellow pigment, ranging about midway between aureolin and lemon yellow in hue, but is possessed of so many bad qualities that very few artists, if any, use it to-day. It soon bleaches by exposure to daylight, and is a deadly poison—a matter for consideration for those who put their brushes unduly to their mouths.

Naples Yellow.—This pigment, in the old days, used to be a compound of the oxides of lead and antimony, but is nowadays a compound product, being prepared from cadmium yellow and Chinese white. This pigment very closely resembles the original in colour,

but possesses the great advantage of being perfectly durable. It is of a pleasing pale, somewhat warm straw colour, and is opaque.

Mar's Yellow.—This pigment, like Mar's orange, is an artificial preparation of oxide of iron. It may be said to resemble the yellow varieties of ochre, but is much more transparent as well as being purer, richer, and brighter in colour. It is perfectly safe as to durability, but there are doubts as to its effects when mixed with any of the more delicate organic colours. We should think well, therefore, before we use it in any such combination. There are many who paint away and never give these matters the least consideration, and others, later on, wonder what is the matter with their pictures when they see the inevitable change working. REDMOND BARRETT.

HINTS ON THE MANAGEMENT OF THE LANTERN.

[Extract from Communication to the Birkenhead Photographic Association.]

Let us suppose that a biunial or double lantern of the ordinary construction, with the blow-through form of jet, is to be used. We may also assume that a cylinder of oxygen gas with regulator has been provided, and that we have sufficient tubing to convey a supply of hydrogen from a convenient gas bracket.

Having placed the lantern on a suitable stand, as nearly on a level with the centre of the screen as possible, with condensers and objectives carefully cleaned and in position, and the jets arranged on their supports in the lantern and properly connected with the various outlets of the dissolver, proceed to attach the hydrogen tubing to its corresponding nozzle on the dissolver, turn on the gas, and light both jets to a flame of about an inch in length. Now take your limes from the case in which they are kept and place them on the pin provided for the purpose in front of the flame. Close the door of the lantern to keep in the heat, and in a short time the limes will be thoroughly hot and all moisture will be driven from the inside of the lantern and lenses. In the meantime, adjust the oxygen regulator to the cylinder (having fixed the latter in an upright position), and connect the regulator with the oxygen nozzle of the dissolver by a sufficient length of good rubber tubing. Gently turn on the tap at the cylinder until the bag or bellows of regulator is filled, and then turn off the oxygen again. Open the oxygen tap of one of the jets to empty the regulator. If no explosion follows, you may conclude that the gas in the cylinder is not an explosive mixture and may be used with safety. Now turn on the oxygen again, opening the valve gently as before. If turned on quickly the sudden rush of gas from the cylinder will probably burst the regulator and do other injury. Proceed to light up each lantern in turn to centre and adjust the position of the light. This is done as follows:—Move the lighted jet up and down on its supporting rod and to one side or the other, as may be found necessary, until a flare of light appears in the centre of the disc on the screen. Clamp the jet in this position and slide the tray upon which it is fixed forward until the flare opens out to a clear and evenly illuminated disc. Now focus the lens by means of a picture placed in the stage of the lantern. Having done this for each lantern, light both up simultaneously and cause the two discs to coincide on the screen by means of the adjusting screws provided for the purpose in the lantern fronts. See that the by-taps on the dissolver are so regulated that when the gas is shut off from either lantern by the dissolver a small flame of hydrogen is kept burning and just tinged by a slight supply of oxygen.

On arriving at this stage you are now ready to perform your part of the evening's performance as lantern operator, and what will be most wanted on your part during the remainder of the evening is an unlimited supply of coolness and presence of mind, with a general watchfulness over the whole apparatus.

P. H. PHILLIPS.

REPORT ON THE PHOTOGRAPHIC CONVENTION OF GREAT BRITAIN, ST. JAMES'S HALL, LONDON.

August 19th to 24th, 1889.

BY THE DELEGATES OF THE PHOTOGRAPHIC CLUB—ADOLPHE M. LEVY, JOHN NESBIT.

GENTLEMEN,—The opening ceremony took place on August 19th, when a fairly large gathering assembled to hear the President's address, and also to inspect the collection of pictures and apparatus exhibited. We think it is only fair to say something in praise of those gentlemen who superintended the arrangement of the exhibits. Though the time at their disposal was extremely short, everything was put in order in due time, and it is highly creditable to state that the Exhibition was opened punctually without the usual accompaniment of packing cases and litter which generally attend such ceremonies. Among those to whom credit is due, are several members of our Club.

The presidential address consisted of a very complete and exhaustive history of photography from the time of Daguerre up to the present day. Mr. A. Pringle's authority on photographic matters is sufficient guarantee for the soundness of his discourse; this has, besides, been published in the technical papers, and will, we are sure, be read with much interest by all.

At the close of the address the members present examined the exhibits, which were fairly numerous and representative. We must state, however, that in the Apparatus Department there did not appear to be any novelty. However, a detective camera, designed by the Platinotype Company and exhibited by Messrs. Noakes, attracted a great deal of attention, one of the main features being the special method of changing plates. We think, however, that this instrument, which appears to have many commendable qualities, would be rendered more serviceable by the introduction of finders, ensuring the proper centring of the subject on the plate.

One of our members, Mr. Getz, showed a new form of tripod, which, to our mind, is most certainly in advance, so far as handiness and steadiness are concerned, of anything that has been so far put on the market.

Some objects of historical interest, consisting of very fine Daguerreotypes and negatives on waxed paper, taken by the respective authors of those processes, were exhibited by Mr. Friese Greene. Other members also showed old-form cameras, and, in particular, one of the pantoscopic type, provided with a "water lens."

During the sittings of the Convention a number of papers were read, or taken as read. These papers constitute, of course, by far the more important part of the business transacted, and we propose to devote some time to summarising them, as also the discussions to which they gave rise.

The Convention of 1889 did not bring forth the announcement of any new discovery in the realm of photographic processes. The papers brought forward were, however, very interesting, and speak highly for the amount of thought and experimentation which have been brought to bear on the subject.

The number of investigators who are devoting their time to the development and improvement of photography is daily increasing, and there cannot be any doubt that all this research will lead to considerable progress. We think, however, that there is cause for regret that so little is done towards elucidating the principles upon which photography, as a science, is based. It must be clear to all that an accurate knowledge of the true reactions undergone by the silver haloids, when subjected to the influence of light, would be an invaluable guide to all those who are endeavouring to perfect the processes now in use, or to devise new ones.

It is, however, satisfactory to find that some attention is being given to the instrumental means used in photography. We allude here to the lens question, on which the papers read by Messrs. Traill Taylor and T. R. Dallmeyer afford valuable information. Mr. Traill Taylor concerns himself mainly with the lenses to be used in hand cameras of the so-called "detective" form.

Besides describing various forms of lenses which may be utilised in this class of camera, Mr. Taylor points out the great advantages which may be derived from the use of a portrait combination. Many street views and scenes of every-day life, which cannot be obtained with an aperture of $f/8$ through lack of light, in narrow courts and alleys, can be secured with a lens working at $f/4$. Mr. Taylor says that he has obtained entirely satisfactory results with a portrait lens, but he, unfortunately, does not mention whether the instrument is of the usual type, or one of the new portrait combinations constructed on the symmetrical principle. Mr. Taylor informed his audience that very good results had been obtained with hand cameras by the use of a single lens of the meniscus form, the exposures being, however, much prolonged.

Some discussion took place with reference to the most favourable length of focus for detective work, and the balance of opinion was in favour of relatively long-focus lenses.

In our opinion, the use of portrait lenses in hand cameras would necessitate some modification in the general construction of the camera. Large apertures are accompanied by considerably less depth of focus, and a great deal more precision in focussing is consequently indispensable. It does not seem possible to set the focus by judgment with a portrait lens, the slightest deviation rendering the picture useless, through insufficient sharpness. It would, therefore, be advisable to introduce a modification by means of which the picture could be sharply focussed before exposure.

The large diameter of the lenses increases the difficulty in obtaining a suitable shutter, and this point also will require attention.

Mr. T. R. Dallmeyer's paper is entitled, *False rendering of Photographic Images by the Misapplication of Lenses*. This paper dealt mainly with the false perspective induced both in portraiture and in landscape work by the use of lenses of too short a focus. It also dwelled on the most suitable angle of view to be included in the plate.

A very important point was touched upon. In a well-known book recently published the author recommends that in a landscape the principal object itself should be slightly thrown out of focus, in order to secure a better artistic effect.

Mr. Dallmeyer points out, that whereas putting a lens out of focus tends to the destruction of structure, a softening of the picture may be obtained by the introduction of a small amount of spherical aberration. At the same time, a perfectly sharp picture is not always deficient in softness, a great deal being dependent on lighting and atmospheric conditions.

It is almost to be regretted that Mr. Dallmeyer did not develop further his remarks with reference to wide-angle lenses. The abuse of these has led to the production of many pictures which are painfully distorted in

perspective. There is no doubt that many interiors, for example, are so arranged that none but the very shortest focus wide-angle lenses can deal with them. It is a question whether, at an artistic point of view, as well as for the good name of photography, such pictures, however interesting, had not better be left alone.

In the discussion on this paper most of the speakers agreed with Mr. Dallmeyer. There appeared, however, to be some misunderstanding between him and Mr. Beck, when the latter pointed out that in taking large direct heads, the subject and the plate being at equal distances from the optical centre of the lens, a short-focus and a long-focus lens would have the same depth of focus practically. Mr. Dallmeyer replied that with a long-focus lens the result would be better. Mr. Beck had never doubted that the result would be due, not to increased depth of focus, but to better perspective.

A paper by Mr. Dunmore was taken as read, the author not being present. This is to be regretted, as the subject—i.e., *The Determination of the Relative Rapidity of Gelatine Plates*—is a much vexed question, and some valuable discussion might have been elicited. We think that Mr. Dunmore's paper might be advantageously discussed at one of the meetings of our Club.

Mr. A. Haddon read a paper on *Desensitising and Resensitising Albumenised Paper*. The experiments recorded by the author are extremely interesting, inasmuch that they show that albumenised paper which has been once sensitised cannot be entirely deprived of its sensitiveness, at least by any of the reagents he has tried. The discussion on this paper did not bring forth any new facts, and several speakers seemed to agree with the author that the title of his paper was not happily chosen.

The audience did not seem to grasp the object of the investigation carried out by Mr. Haddon, and the discussion strayed in consequence from the paper itself to a general discussion on the effects of various treatments of sensitised paper in its printing qualities. The principal fact elucidated by this paper seems to be that a certain proportion of free nitrate of silver is requisite to obtain first-class results.

A very important discussion took place on the "Report of the Committee upon Lens Standards" being read. This report was deemed inefficient, and was referred back to the Committee. Some gross errors were pointed out, and several speakers commented severely on the way in which the Committee had performed its mission.

The advisability of having a series of standard flanges to be used by all opticians was warmly approved of, but at the same time it was pointed out that whatever system was to be arrived at, the co-operation of the principal lens makers would be essential to success.

With reference to stops, general satisfaction appeared to be given by the system actually in use. A member, however, thought that the subdivisions of focal length had better have for unit a decimal number. Efforts were being made in many directions to secure the adoption of the decimal system, and if a change was to be made in lens fittings, it might be as well to make the parts on that system.

It was resolved to appoint a Committee, in which should be included the principal opticians. This Committee would endeavour to arrive at a solution of the question, equally satisfactory to the interests of the opticians and to that of the photographic public.

Professor Bothamley read an exhaustive paper on *Orthochromatic Photography on Gelatine Plates*. This paper may be taken as an embodiment of all that has been done up to date with reference to the tone-rendering of values by photographic negatives. The only process not mentioned is the chlorophyll method, originated by Ives, and with which the author does not appear to have experimented.

The very great bearing which the development of orthochromatic processes must have on the future of photography enhances very materially the importance of Mr. Bothamley's investigation, and we think it advisable to sum up here the conclusions to which he has arrived.

Three points, says the author, require quantitative investigation, viz:—

The necessity for, or advantage of, a preliminary bath of alkali.

The influence of alcohol in the sensitising bath.

The necessity for, or advantage of, washing after treatment with the dye.

These three operations have been held to be essential by some authors.

Mr. Bothamley investigates the action of each treatment by the effect it has on the sensitiveness of the plate, measured by a sensitometer under well-determined conditions of illumination and development.

The conclusions drawn from the sensitometer numbers obtained are as follows:—

The preliminary bath of alkali may be omitted.

Alcohol up to ten per cent. has no influence, and may be dispensed with when the dye is soluble in water. In larger proportions it produces a decrease in sensitiveness.

With a concentration of the dye up to 1 : 5000, the after washing of the plate is quite unnecessary.

Mr. Bothamley states that density is more easily obtained with orthochromatic than with ordinary plates, and recommends a developer containing much less pyro than usual. The examples of orthochromatic photography exhibited side by side with photographs of the same subjects on ordinary plates were certainly not very conclusive as a rule, the difference shown not being as great as might have been expected. Some of the pictures on ordinary plates would have most certainly been better had a weaker developer been used, or local development resorted to. In commenting on the results he has obtained, Mr. Bothamley remarks that

insufficient exposure with ordinary plates is often the cause of inferior results with reference to values. This is a hint which is of some importance in these days of so-called instantaneous shutters. The next point of importance treated by Mr. Bothamley is the use of the yellow screen. It has been claimed by makers of isochromatic plates that this adjunct could be dispensed with. Mr. Bothamley shows, however, that the gain obtained over ordinary plates is but slight, and that to arrive at really good results a yellow screen of greater or lesser colour intensity, as the case may be, is indispensable. The selection of a screen of proper colour, suitable to the subject to be photographed, constitutes the main difficulty of orthochromatic photography. Too great depth of tint gives as bad results, with reference to values, as ordinary plates. This is very probably the reason why so many pictures taken on isochromatic plates fail to show any appreciable advantage over ordinary plates. No rule can be given for the choice of coloured screen. This, like the length of exposure and many other data in photography, can only be arrived at by prolonged experience.

It is interesting to notice the figures given by Mr. Bothamley with reference to the action of dye solutions on various makes of plates. There is a considerable difference as to sensitiveness, some makes being much more affected than others.

Rhodamine gives a considerable decrease in the sensitometer number, as compared with erythrosine. All this seems to show that orthochromatic methods are still very imperfect, and that a great deal remains to be done before they arrive at that stage of development, when they will undoubtedly replace entirely the commercial gelatine bromide plate.

Three papers were taken as read:—

Past and Present, by W. M. Ashman.

For Talbot—His Early Experiments, by Friese Greene.

Photo-mechanical Printing Methods, by T. Bolas.

The two first papers are purely of historical interest. Mr. Bolas's paper is very exhaustive, and will, without doubt, be read with much interest by those who work at engraving processes in conjunction with photography.

Every evening lantern-slide exhibitions were given, and slides of great beauty were shown. Pre-eminent among these displays was Mr. E. Muybridge's lecture on animal locomotion, profusely illustrated by the optical lantern, and also by an instrument specially constructed for the purpose, and called the zoopraxiscope.

Mr. Muybridge's researches throw much light on the subject of animal locomotion, and show how little has hitherto been known about this subject. The works of some of the most esteemed painters are proved to be faulty in this respect, and it is much to the credit of photography to have been the means of rectifying grievous errors in the delineation of animals in motion.

Some slides were exhibited showing the apparatus used. Forty-eight cameras were set up in series of twenty-four and two twelves, so that simultaneous views were obtained of the same subject from three points of view. The most interesting part of the appliances is the arrangement which effects the exposure. The apparatus is electro-magnetic, and so designed that variable speeds of rotation can be given to it. As the drum revolves, it releases consecutively the shutters of the lenses, and it will be readily understood that if the speed of the drum is proportional to the rate of motion of the animal under experimentation, it will be possible to take a series of pictures representing the various phases of one and the same stride, as the animal passes along the course in front of the main battery of twenty-four cameras. The electric current can, of course, be applied at the most suitable moment, at will.

A series of lantern slides obtained from the negatives of consecutive phases being placed in the zoopraxiscope and thrown on the screen, the animal is seen in movement in a most realistic manner.

It is to be hoped that Mr. Muybridge will, if he has not already done so, embody in a book the result of his observations. His experiments were all made with portrait combinations, and this brings us back to the statements made in Mr. Traill Taylor's paper with reference to the use of lenses of this class for instantaneous work. A feature of Mr. Muybridge's apparatus is that the shutters are on a stand entirely independent from the cameras themselves, thus avoiding any chance of vibration being communicated to the apparatus. These shutters are of the drop type, and in this case a considerable height of fall is provided before the aperture actually passes in front of the lens.

The results obtained by Mr. Muybridge, will, no doubt, encourage other experimenters to devote some attention to this branch of photography. The difficulties are certainly very great, and the apparatus requisite very considerable and consequently expensive.

We regret not to be able to give any account of the various excursions, which, we believe, were very successful. A dinner and smoking concert took place on the 23rd. This was well attended, but we must refer you to those who were present, as we could not attend ourselves. We will conclude this report by an account of what passed at the General Meeting held at the Society of Arts on August 21, and at the Council Meeting on August 24.

Mr. Andrew Pringle, President, in the chair. The attendance was thin, the weather being most unfavourable. After reading and signing the minutes of the previous meetings, the first matter on the agenda was discussed. This was the selection of a locality for next year's meeting. An informal invitation having been received last year from Chester, it

was agreed that the meeting be held next year in that town. The co-operation of the Liverpool and Manchester Photographic Societies was to be obtained. Chester has many advantages, there being a great deal of subjects for photography.

The members of the General Committee were then elected. Some discussion took place with reference to the advisability of augmenting the subscription of members of the Convention. It was proposed that in future the subscription should be 10s. instead of 5s., but many speakers appeared to think this increase disadvantageous, so it was finally decided that the subscription should remain fixed at 5s.

At the same time, those who contemplated joining the Convention next year were requested to send in their subscription at once, so that the Secretary should be able to have something on which to base his estimates. It was also decided that the date of this year's meeting being most unfavourable, future Conventions should be held at an earlier date, either at the end of June or the beginning of July.

PHOTOGRAPHY AT THE PARIS EXHIBITION.

If by placing the Exhibition of Photographic Negatives and Apparatus on the first floor of the "Palac' des Arts Liberaux" it was intended to screen those exhibits from contact with the crowd—which certainly sometimes is the reverse of considerate—the attempt has proved a signal success. We have satisfied ourselves, much to our regret, that the public is very shy of climbing up the stairs which lead to Class XII., although there is a constant crush in the ground-floor galleries running all around the building.

This want of visitors is all the more unaccountable when it is remembered that almost every one, nowadays, "goes in" for photography, and consequently takes an interest in every detail relating thereto. In all probability, many among the millions of people that have come to see the Exhibition went home greatly disappointed at not having been able to find the department of photography. And yet there are a great many pretty things to be seen in that succession of gorgeously got-up salons, where the most celebrated photographers of Paris and other large cities have very tastefully displayed the finest specimens of their work, the results of constant labour and of uninterrupted endeavours to approach perfection.

The times are past when hirsute photographers used to afford ready food for the satire of Gavarni, De Daumier, and Cham. That species of photographer has long since departed from our midst, along with Musset's and Murger's students and *grisettes*. The present photographer is not unfrequently an accomplished scientist; he must be in every instance skilled in chemistry. Acetates, acids, bromides, chlorides, iodides, nitrates, and sulphates, are things he has to manipulate constantly. He makes new discoveries every day, invents improved methods, and thus gradually gets the start of his fellow-workers, until he is in his turn superseded.

Photography is an art that cannot remain stationary; those who practise it have no right ever to say to themselves, "Let us stop here, we need go no further." The Jury of Rewards must have been rather at a loss when they had to classify the exhibiting photographers. There are about a dozen rival firms who seem to have achieved an equal degree of success. Which of those portraits, so astonishingly lifelike, or of those landscapes, so neat and so minute in detail, are, in preference to the others, entitled to the prize? M. Carnot's portraits are of course numerous, so are also the likenesses of other French public characters. The exhibitors were evidently anxious to behave with civility.

As photography was becoming more and more popular, it became necessary to facilitate the exercise of it. The idea of carrying about heavy apparatus for hours together was likely to discourage many amateurs; besides, the position of a man erecting his "travelling stand" and camera in the middle of some road or village is generally not quite free from ridicule.

Instantaneous processes, doing away with the necessity of long focussing, have enabled small hand apparatus to be constructed, which hold no more space in one's pocket than a note-book, and are ready to work at any moment, owing to the fixed focus of the objective. These portable apparatus have now been brought to a degree of perfection which enables instantaneous photographs to be taken while travelling by express train. And last, not least, they offer facilities for perfidiously photographing people in spite of themselves.

Very interesting negatives have also been obtained by instantaneous methods, showing the successive phases of movements. Thus, a detachment of soldiers may be seen marching at quick time: it has been taken in one-fiftieth of a second, and the negative shows every man of the company with one leg up. In the same way the various attitudes of children playing at leap-frog and other outdoor games are grasped in an instant.

M. Albert Londe, Director of the Photographic Department of Dr. Charcot's clinique at the Salpêtrière, exhibits a whole series of negatives showing the effects of faradisation upon the muscles of the patients' faces, while they are in a state of catalepsy. This is an interesting collection to examine, which testifies to the immense services photography is called upon to render to science.

The scientific application of this art is, in fact, extending in many more directions. Astronomers, balloonists, &c., are thereby enabled to record

data which hitherto had remained unnoticeable, and to reproduce instantaneous phenomena of which not even a trace could be discovered before. Geography and topography, again, are in a great measure benefited by the improvements made in the art of photography.

The results that have been obtained for the last few years by searching and enterprising photographers are very important. Photographs can now be taken indistinctly upon paper, glass, wood, cloth, and enamel. In this connexion one of the exhibitors showed us direct photographs upon wood and upon leather, without any film, being applicable in the cabinet-making, upholstering, and bookbinding industries, as well as for a great many other purposes.

Photochromy, too, has made considerable progress; however, in this respect the way is still open to inventors. It is not credible in effect that, considering the infinite resources placed at the disposal of photographers by electricity, they should fail before long to obtain images in the natural colours and shades of the objects reproduced. Painters will most likely be rather disgusted when that time comes, and will talk a good deal about the profanation of fine art!

Photography is not over half a century old, and yet is not the progress wonderful that has been made since the times of Daguerrotype? It has, no doubt, more pleasant surprises in store for us, especially if it should be taken in hand by a gentleman of the Edison type.

—*Petit Journal*, Paris, September 18, 1889.

OPINIONS OF THE LONDON DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

[*The Times*.]

THE season of winter exhibitions is already upon us, and first in the series comes that of the Photographic Society of Great Britain, the private view of which was held on Saturday, in their rooms in Pall-mall East. It is almost superfluous to say that every form of photographic art, whether as regards subject or process, is adequately represented, with the exception possibly of objects in rapid motion, such as express trains, and limbs of human beings, or animals in active exercise. A very cursory inspection of the pictures enables the visitor to realise the immense strides which photography has taken during the last quarter of a century; how great have been the contributions of chemistry, how much skill and artistic feeling in the composition of the pictures and the treatment of subjects have been brought to bear upon the application of what at one time appeared to be a merely mechanical process. Even the element of colour, the absence of which is usually held to be a primary defect in photography, is to some extent, and especially by the later processes, brought into play. One of the first things which strikes one is the great superiority as regards the tone and softness, distance, and light and shade of the application of the bromide, platinotype, carbon, and other recent processes over the earlier silver methods. The modern prepared papers, such as the Pizzighelli, bromide, Obernetter, chloride, Blanchard's paper, and others, also contribute largely to the excellence of the specimens shown on these walls. In many cases effects are produced very similar to those of the old mezzotints. Especially successful are the different applications of platinum, "hot," "cold," and "warm," of which examples are frequent in this Exhibition. Of course the great majority of the pictures are by the hands of our fellow-countrymen, or are the work of British Companies or Associations, such as the Autotype Company, which is fertile both in excellence and in numbers, the Sciopicon Company, whose exhibits possess exceptional value, and the Typo-Engraving Company; but there are also many foreign examples, especially American and German. It is very satisfactory to be able to say that British photography distinctly carries off the palm. Excellent as undoubtedly many of the German works are, there are to be noted in them a greater hardness and less delicacy in the matter of distance and outline than in their English rivals. In estimating the quality of a really artistic photograph, it is, of course, difficult to analyse how much of the product is due to the original mechanical operation, and how much to "composition" and manipulation subsequent to the original action of light and the other physical agencies. But, just as the painter must "mix his paints with brains," as was said on a memorable occasion, so in every kind of photograph, even in the simplest portraiture, there is ample scope for brains, for delicacy of perception, and for nice artistic touch. There is, in truth, an idealism possible in photography as in painting; and, as these walls testify, it is not beyond its range adequately to present to view, not only the outward lineaments, but the inner man with his thoughts, emotions, and desires. Nor can a complete conception be attained of the dignity of the photographic art without realising the immense contributions which it has levied and is levying on the science of chemistry. Celluloid films, the subtle composition of carbon, chloride, and bromide papers, the use of platinum at different temperatures, the marvellous sensitiveness of gelatine, the revelations of the microscope, and the infinite operations which are employed to give permanence to evanescent products, furnish ample evidence of the countless demands which photography makes upon the highest activities of the human brain.

Turning to the pictures themselves, one finds that the greatest success has been achieved precisely where success might be thought most difficult—viz., in landscape and subject pictures. One remarks especially how

admirably snow always comes out—though this is due, perhaps, as much to the character of the object as to the skill of the artist. A more difficult feat is the representation of yachting. The yachting pictures are uniformly excellent. The chief contributors in this department are Messrs. G. West & Son, who devote themselves almost exclusively to this class of subjects. Mr. Harry Symonds also contributes excellent "Yachting Scenes." What many will be disposed to consider the most charming object in the Gallery is a picture by Mr. H. P. Robinson, marked "Not for competition," *Merry Fisher Maidens*, a scene on the beach, if we mistake not, at Hastings—beautiful in composition, colour, and softness of outline. Good illustrations of the different methods of platinotype are afforded by Mr. George Davison's four pictures, *Albury Heath* (hot), *Oster Gathersers* and *Low Water at Wickenhoe* (sepias), and a *Breezy Corner* (warm). An excellent snow effect is realised in Mr. Truman Wood's *Mont Blanc from the Summit of Mont Buet* (Eastman stripping film), and in Mr. G. Renwick's *Frost Studies*. Mr. J. Gale contributes very satisfactory specimens in platinotype—*Village News*, and *The Monks' Walk at Chenies*, and two others. Mr. Lyddell Sawyer sends a beautiful riverside scene, *Dangerous Company*, which has been awarded a medal. It is the old story of a man with a maid—a rural scene, with boat, and river, and trees, and human forms, represented with great delicacy and truth. Messrs. Werner & Son have a fine portrait of *The Last of the Desmonds*, an old man with long white beard and picturesque cloak. Mr. B. Gay Wilkinson, jun., gains a medal for capital platinotypes, *Shrimping and Praising*, and contributes other meritorious works. In representations of buildings, Herr Anselm Schmitz has been awarded a medal for large and striking pictures of Cologne Cathedral, and of a staircase in the Royal Castle of Brühl, Cologne; and Mr. W. J. Stillman gives excellent autotype enlargements of the Temple of Concord at Girgenti, and the interior of a temple at Segesta, Sicily—admirable illustrations of the extreme truthfulness of photography. Mr. Frank M. Sutcliffe sends a considerable number of works of high merit, mostly on Blanchard's platinum paper. In respect of three of them, *Saturday Afternoon*, *Fish Stall*, and *Dinner-time*, he has received the medal of the Society. A beautiful scene, *The Evening Hour, Whitby*, in which the water and reflections in it are shown with singular delicacy, contributed by the Autotype Society, is also taken from a negative by this artist. Mr. W. Dillworth Howard sends soft and finished views on the Italian lakes; if we are not in error, from the Lago Maggiore and Lago di Orta. Mr. Van der Weyde's *Adoration of a Doll*, an enlargement in red chalk in three panels, is more conspicuous than pleasing, and the colouring is decidedly too pronounced. Messrs. Green Brothers have well earned their medal for their lake scenes—*Buttermere*, *Thirlmere*, *Head of Derwentwater*, and *Langdale Pikes*—which are all executed on bromide paper. Colonel W. L. Noverre's *Penance Harbour*, on specially prepared rough drawing paper, is also worthy of notice. Mr. S. Bourne exhibits a series of admirably finished country scenes, on Pizzighelli paper, from Cromer, Nottinghamshire, and North Wales. Mr. D. H. Macfarlane also sends good work of Norwegian and Highland scenes; and Mr. W. J. Byrne sends two excellent genre photographs: *The Town Artist—Experience*, and *The Village Artist—Youth*. *Sleepy Hollow*, from a photographure from nature, by Messrs. A. & C. Dawson, contributed by the Typo-Etching Company, is one of the best rural scenes in the Exhibition, and well merits the medal which it has gained.

Ludlow Castle, by the Autotype Company, from a negative supplied by W. Bedford, is an excellent representation of foliage; and *Home Studies*, by Mr. Henry Stevens, and *Sweet Spring-time*, by Mr. Ralph W. Robinson, of domestic scenes. Of reproductions of famous pictures, that of the Autotype Company, for which a medal is awarded, an autogravure of Mr. Holman Hunt's *Early Christian Missionaries fleeing from Persecution* is especially worthy of commendation for the finish and accuracy of detail and outline. The same Company furnish admirable representations of the same artist's pictures, *A Tuscan Girl*, scenes from the *Two Gentlemen of Verona*, and *Rienzi vowing vengeance for the Death of his Brother*. The Goupilgravure of Sir P. Leighton's *Daphnephoria*, exhibited by Messrs. Bousod, Valadon, & Co., is hung rather too high to make careful inspection possible. Messrs. Bousod, Valadon, & Co. also send an admirable Goupilgravure printed in colours from a single plate, which makes one desire to see other specimens of similar coloured work, and an exceedingly charming river scene entitled *L'Appel au Passer*. Two pictures by Mrs. Edward Penton well merit attention for two reasons. They are called *A Cornish Fisherman* and *A Newlyn Fishwife*. The first reason is the excellence of the works themselves in composition and colour, and the other refers to a matter too little heeded by artists. The frames are made of broad pieces of plain wood, which harmonise admirably with the tone of the works themselves, and afford a pleasing contrast to the usual vast area of white mounting and ugly or uninteresting frames, which are apt to detract so much from the effect of most of the pictures.

Of the portraits, the highest standard is unquestionably reached by Mr. Fred. Hollyer, who has been equally fortunate in the choice of artists and of subjects. The subjects are Mr. Watt's portraits of Cardinal Manning and Mr. Matthew Arnold, and the same artist's pictures, *The Happy Warrior* and *Good Luck to your Fishing*, and Mr. Rossetti's *Beata Beatrix*. The idealistic and spiritual character of these paintings are reproduced in the photographs to an extent which one would

scarcely have believed to be attainable. Mr. Robert Faulkner gains a medal for his striking portrait of Professor Stuart Blackie. Mr. Ralph W. Robinson also receives a medal for an excellent series of photographs of Royal Academicians and Associates, mostly in their working attire, of which the most remarkable are those of Mr. Watts, Mr. Storey, and Mr. Waterhouse. Mr. F. H. Evans, whose distinction lies chiefly in another field, as will shortly appear, contributes some excellent platinotype "At Home Portraits." Admirable "At Home Photographs" of the German Emperor, taken at Osborne on August 5, 1889, by Mr. W. J. Byrne, and of Prince Edward of Saxe-Weimar, by Messrs. Werner & Son, also appear. We could, however, well have spared the large and somewhat aggressive photograph by Messrs. Elliot & Son of Mrs. Alice Shaw (*La Belle Siffluse*). A special word of praise in speaking of portraits is due to the really excellent photographs of children—the most difficult of subjects—sent by Mr. K. Faulkner.

No work in the Gallery, however, deserves more attention than the admirable specimens of photo-micrography, sometimes miscalled micro-photography, exhibited by Mr. F. H. Evans. The result is achieved by means of a spot lens, and the work shows with incredible subtlety of detail the cirri of barnacles, the jaws of a spider, the parasite of a queen-bee, and other infinitesimal objects in a manner which can only be compared—and the comparison is inadequate—to the finest Venetian or Brussels point-lace. Infinite possibilities are thus opened out of usefulness on the part of photography to biological science, undreamt of in the earlier stages of the art. The specimens of the Woodbury process exhibited by the Sciopticon Company are also deserving of minute attention, by means of which the original impressions, printed in ordinary ink or in a pigment instead of by the usual chemical means, and subjected to a pressure of seventy tons, gain a permanence otherwise unattainable. The lantern transparencies, for which Mr. F. B. Combrano, jun., has a medal awarded him, are also most beautiful and interesting. A large collection of the most recent photographic apparatus is also exhibited, chiefly the work of Messrs. J. F. Shew & Co.

On Saturday evening, Mr. James Glaisher, F.R.S., the President, and the Council of the Society entertained a numerous company at a *soirée*.

[Daily News.]

THE private view of the Photographic Society's Exhibition was held on Saturday at the Old Water-Colour Society's Rooms in Pall-Mall. It will be remembered how a few years ago the favour with which dry plates were received revolutionised the art of photography and practically did away with the old wet process. The feature of the present season is an equally marked triumph of platinum over gold and silver in the finished picture. Everywhere the platinotype, as it is called, meets the eye, and the cool, grey tones, with their reposeful effect, enhance the pleasantness of the compositions, no less than their superior permanence increases the value. The general effect of the Gallery is that of a black-and-white exhibition, with no unfinished sketches. Picturesqueness and a rapid impressionist effect are obtained in many of the works, whose variety in size, from the statuesque to the microscopic, enables the hangers to dress the walls effectively, and does away with the depressing monotony of minuteness, which is the bane of an ordinary collection of photographs. The first-class exhibits keep their place, but marked improvement will be noticed amongst those of secondary importance. The ranks are closing up. Among the portraits, what is most striking is the frequent evidence of technical difficulties surmounted. The mere extension of size is not the chief of these. Naturalness, and a look of daily life and ease have been signally obtained in the series of Academicians at the foot of the room—Peter Graham, Marks, and MacWitter, the best—by Mr. Robinson, of Leamington, whilst Mr. W. J. Byrne's fifteen portraits of ladies in Court dress are remarkable, not only for the faithful rendering of pleasant high-bred English faces, but for the skilful differentiation of the delicate contrasts offered by the tones and surfaces of white arms, white dresses, white leathers, white flowers, and white veils. The landscapes, however, predominate. In many the artist's happiness in choice of subject and selection of the right moment has enabled photography to vie with composition. Mr. Lyd Sawyer's series (No. 53, &c.) of river subjects supply admirable illustration of this peculiar excellence. No. 54 would delight Mr. Wyllie and the admirers of his work. The views of Grasmere (Nos. 178 and 179, from the camera of Mr. J. A. Green, a medallist, by the way) are remarkable for the combination of broad aerial effects in mountainous backgrounds and crisp emphasis of reeds and branches nearer the eye. Close by are three masterly sea pieces (No. 180) on a rough, grained, water-colour paper, which gives them the effect of uniting the free touch of water colour to the truth of science. Above these a triptych at the head of the room shows once for all that children may be represented in photography fully the size of life without any appearance of heaviness or exaggeration. The sensational element is not omitted; on the contrary, it has been caught on the wing. The series in frames No. 319-320, representing a balloon filling, rising, floating away, and then discharging its parachutist into space, are records of an exciting moment and thoroughly up to date. But some of the most agreeable impressions are left by the simplest subjects—by such little bits of pure landscape as Nos. 285 and 286—the first, the edge of a pool with a clump of rushes in the front and a streak of broad light over the water, and the weedage skirting the clumps of trees, all under a grey sky; or No. 598, a

marvellous little group of Italian peasant children brimming over with fun and laughter, in the strong Southern sunshine.

[Daily Telegraph.]

THE steady advance of the photographic art—for art indeed it has come to be—is shown by the excellent collection of high-class work now on view at the Galleries at 5A, Pall-Mall East. Year after year we have had occasion to note the progress made under the auspices of the Photographic Society of Great Britain, and the 600 photographs now on view can honestly be said to "beat the record." There is continued evidence of the desire to make real pictures, and not mere mechanical records of fact; and the laws of composition, the nice sense of relative balance of tone-values, as artists put it—and, what is perhaps of chiefest import, a strong dramatic feeling—are shown in the best things of this fascinating collection. Among the novelties there are some delicate opaline portraits by Mr. Friese Greene, who has carried this subtle process to perfection, and whose mounting is thoroughly artistic and wonderfully clear work on the new celluloid material; every line as firm as if cut by Albert Dürer himself, and, as a contrast, soft, impressionist work caught through a pin-hole, without the intervention of a lens; and such studies of racing yachts and moving life as are sent by Messrs. G. West. Mr. Friese Greene's opal photographs carry the work of invention in reducing the time of taking a picture a step further; they dispense with the necessity of toning, and thus a photograph can be completed in less than an hour. The series of artistic "Celebrities at Home" contributed by Mr. R. W. Robinson, are of chief importance among the portraits, and in this line Mr. Abel Jervis, Mr. Robert Faulkner, and Messrs. Byrne, hold high places. Mr. Fred Hollyer is the authorised interpreter of the works of Watts and Rossetti, and his studies are faithful and sympathetic. Mr. Van der Weyde contributes the chief work, a humorous triptych, called the *Adoration of a Doll*, an enlargement in red chalk, with a quaint parody of medievalism about it that is pleasant and innocent. Mr. S. Bourne's glimpses at country life, Mr. Davison's series in Essex, and Mr. Frank Sutcliffe's studies of fisher-folk are all of high merit, and a word must be said for the good work shown by lady photographers, amongst whom Miss Florence Harvey takes high rank. Photographs are not exactly things that demand detailed criticism, and when reference has been made to the happy choice of a subject in which the artistic element shows itself, and the beauty of the result in which the workman-like element comes out, there is no more to be said. These qualities are certainly shown in successful combination on these walls, and here comes in the practical lesson to be taken in earnest by the growing army of amateur photographers who trot about the world with their "detective cameras," snatching at a smile or a sunset as suits their caprice. To buy a portable camera, to "shoot" an effect, then to send your negative to one man to develop, to another to print, to a third to mount and frame, and then to call the result "my photograph," is but a foolish child's game. The true photographer is in his own way as "thorough" as the conscientious etcher, and completes every process himself. This is the lesson that the amiable amateur should take to heart as he makes an affectionate study of these masterpieces of scene pictures. The Society held their annual *coursaazione* on Saturday evening when the President, Mr. James Glaisher, F.R.S., and the Hon. Secretary, Captain A. M. Mantell, received a goodly company of those interested in the attractive art.

BRITISH ASSOCIATION.*

SECTION A.—(MATHEMATICS AND PHYSICS.)

[Opening Address by Captain W. de W. Abney, C.B., R.E., F.R.S., F.R.A.S., President of the Section.]

ONE of the reproaches that in early days was cast at photography was its inability to render colour in its proper monochromatic luminosity. Thus, whilst a dark blue was rendered as white in a print—that is, gave a dense deposit in a negative—bright yellow was rendered as black in a print, or nearly so—that is, as transparent, or nearly transparent, glass in the negative. To the eye the yellow might be far more luminous than the blue, but the luminosity was in the photograph reversed. I need scarcely say that the reason of this want of truth in the photograph is due to the want of sensitiveness of the ordinarily used silver salts to the least refrangible end of the spectrum. Some fifteen years ago, Dr. H. W. Vogel announced the fact that when silver salts were stained with certain dyes they became sensitive to the colour of the spectrum which the dyes absorbed. This at once opened up possibilities, which, however, were not at once realised, owing, perhaps, to the length of exposure required when the collodion process was employed. Shortly after the gelatine process was perfected, the same dyes were applied to plates prepared by this method, which, although they contained the same silver salts as the old collodion process, yet, *per se*, were very much more sensitive. A new era then dawned for what has been termed isochromatic and orthochromatic photography. The dyes principally used are those belonging to the eosine group and cyanine—not the ordinary cyanine dye of commerce, but that discovered by Greville Williams. For a dye to be of use in this manner it may be taken as an axiom—first propounded by the speaker, it is believed—that it must be fugitive, or that it must be capable of forming a silver compound. The more stable a dye is the less effective it is. If we take as an example cyanine, we find that it absorbs in the orange and slightly in the red. If paper or collodion stained with this colouring matter be exposed to the action of the spectrum, it will be found

that the dye bleaches in exactly the same part of the spectrum as that in which it absorbs—following, indeed, the universal law I have already alluded to. If a film containing a silver salt be dyed with the same, it will be found that whilst the spectrum acts on it in the usual manner—viz., darkening it in the blue, violet, and ultra-violet—the colour is discharged where the dye absorbs, showing that in one part of the spectrum it is the silver salt which is sensitive, and that in the other it is the colouring matter. If such a plate, after exposure to the spectrum, be developed, it will be found that at both parts a deposit of silver takes place; and further, when the experiment is carefully conducted, if a plate with merely cyanine-coloured collodion be exposed to the spectrum and bleached in the orange, and after removal to the dark room another film containing a silver salt be applied and then a developer, a deposit of silver will take place where the bleaching has occurred. This points to the fact that the molecules of a fugitive dye, when altered by light, are unsatisfied, and are ready to take up an atom or atoms of silver, and other molecules of silver will deposit on such nuclei by an action which has various names in physical science, but which I do not care to mention. This is the theory which I have always advocated, viz., that the dye, by its reduction, acts as a nucleus on which a deposit of silver can take place. It met with opposition, a rival theory, which makes the dye an "optical sensitiser"—an expression which is capable of a meaning which I conceive contrary to physical laws—being run against it. The objection to what I may call the nucleus theory is less vigorous than it has been, and its diminution is due, perhaps, to the more perfect understanding of the meaning of each other by those engaged in the controversy. To my mind, the action of light on fugitive dyes is one of the most interesting in the whole realm of photography, as eventually it must teach us something as to the structure of molecules, and add to the methods by which their coarseness may be ascertained. Be the theory what it may, however, a definite result has been attained, and it is now possible to obtain a fair representation of the luminosity of colours by means of dyed films. At present the employment of coloured screens in front of the lens, or on the lens itself, is almost an essential in the method when daylight is employed, but not till some day is discovered which shall make a film equally sensitive for the same luminosity to the whole visible spectrum will it be possible to make orthochromatic photography as perfect as it can be made. The very fact that no photograph of even a black-and-white gradation will render the latter correctly must of necessity render any process imperfect, and hence in the above sentence I have used the expression "as perfect as it can be made."

The delineation of the spectrum is one of the chief scientific applications to which photography has been put. From very early days the violet and ultra-violet end of the spectrum have been favourite objects for the photographic plate. To secure the yellow and red of the spectrum was, however, till of late years, a matter of apparently insurmountable difficulty; whilst a knowledge of that part of the spectrum which lies below the red was only to be gained by its heating effect. The introduction of the gelatine process enabled the green portion of the spectrum to impress itself on the sensitive surface; whilst the addition of various dyes, as before mentioned, allowed the yellow, the orange, and a portion of the red rays to become photographic rays. Some eight years ago it was my own good fortune to make the dark infra-red rays impress themselves on a plate. This last has been too much a speciality of my own although full explanations have been given of the methods employed. By preparing a bromide of silver salt in a peculiar manner one is able so to modify the molecular arrangement of the atoms that they answer to the swings of those waves which give rise to these radiations. By employing this salt of silver in a film of collodion or gelatine the invisible part of the spectrum can be photographed and the images of bodies which are heated to less than red heat may be caused to impress themselves upon the sensitive plate. The greatest wave-length of the spectrum to which this salt is sensitive so far is 22,000 μ , or five times the length of the visible spectrum. The exposure for such a wave-length is very prolonged, but down to a wave-length of 12,000 it is comparatively short, though not so short as that required for the blue rays to impress themselves on a collodion plate. The colour of the sensitive salt is a green-blue by transmitted light; it has yet to be determined whether this colour is all due to the coarseness of the particles or to the absorption by the molecules. The fact that a film can be prepared which by transmitted light is yellow, and which may be indicative of colour due to fine particles, together with an absorption of the red and orange, points to the green colour being probably due to absorption by the molecules. We have thus in photography a means of recording phenomena in the spectrum from the ultra-violet to a very large wave-length in the infra-red—a power which physicists may some day turn to account. It would, for instance, be a research worth pursuing to photograph the heavens on a plate prepared with such a salt, and search for stars which are nearly dead or newly born, for in both cases the temperature at which they are may be such as to render them below red heat, and therefore invisible to the eye in the telescope. It would be a supplementary work to that being carried out by the brothers Henry, Common, Roberts, Gill, and others, who are busy securing photographic charts of the heavens in a manner which is beyond praise.

There is one other recent advance which has been made in scientific photography to which I may be permitted to allude, viz., that from being merely a qualitative recorder of the action of light it can now be used for quantitative measurement. I am not now alluding to photographic actinometers, such as have been brought to such a state of perfection by Roscoe; but what I allude to is the measurement and interpretation of the density of deposit in a negative. By making exposures of different lengths to a standard light, or to different known intensities of light, on the same plate on which a negative has to be taken, the photographic values of the light acting to produce the densities on the different parts of the developed image can be readily found. Indeed, by making only two different exposures to the same light, or two exposures to two different intensities of light, and applying the law of density of deposit in regard to them, a curve is readily made from which the intensities of light necessary to give the different densities of deposit in the image impressed on the same plate can be read off. The application of such scales of density to astronomical photographs, for example, cannot but be of the highest interest, and will render the records so made many times more valuable than they have hitherto been. I am informed that the United States astronomers have already

* Concluded from page 625.

adopted the use of such scales which for the last three years I have advocated, and it may be expected that we shall have results from such scaled photographs which will give us information which would before have been scarcely hoped for.

One word as to a problem which we may say is as yet only qualitatively and not quantitatively solved. I refer to the interchangeability of length of exposure for intensity of light. Put it in this way. Suppose that with a strong light, L, a short exposure, E, be given, a chemical change, C, is obtained: will the same change, C, be obtained if the time is only an *n*th of the light, L, but a times the exposure? Now this is a very important point, more particularly when the body acted upon is fairly stable, as, for instance, some of the water-colour pigments, which are known to fade in sunshine, but might not be supposed to do so in the light of an ordinary room, even with prolonged exposure. Many experiments have been made at South Kensington as regards this, more especially with the salts of silver, and it is found that, for any ordinary light, intensity and exposure are interchangeable, but that when the intensity of light is very feeble, say the one-one-millionth of ordinary daylight, the exposure has to be rather more prolonged than it should be, supposing the exact interchangeability always held good; but it has never been found that a light was so feeble that no action could take place. Of course it must be borne in mind that the stability of the substance acted upon may have some effect; but the same results were obtained with matter which is vastly more stable than the ordinary silver salts. It may be said, in truth, that almost all matter which is not elemental is, in time and to some degree, acted upon by light.

I should like to have said something regarding the action of light on the iron and chromium salts, and so introduced the subject of platinotype and carbon printing, the former of which is creating a revolution in the production of artistic prints. I have, however, refrained from so doing, as I felt that the President of Section A should not be mistaken as the President of Section B. Photogravure and the kindred processes were also inviting subjects on which to dwell, more especially as at least one of them is based on the use of the same material as that on which the first camera picture was taken by Niepce. Again, a dread of trenching on the domains of art restrains me.

Indeed, it would have been almost impossible, and certainly impolitic, in the time which an address should occupy, to have entered into the many branches of science and art which photography covers. I have tried to confine myself to some few advances that have been made in its theory and practice.

The discovery of the action of light on silver salts is one of the marvels of this century, and it is difficult to overrate the bearing it has had on the progress of science, more especially physical science. The discovery of telegraphy took place in the present reign, and two years later photography was practically introduced; and no two discoveries have had a more marked influence on mankind. Telegraphy, however, has had an advantage over photography in the scientific progress that it has made, in that electrical currents are subject to exact measurement, and that empiricism has no place with it. Photography, on the other hand, has laboured under the disadvantage that, though it is subject to measurement, the factors of exactitude have been hitherto absent. In photography we have to deal with molecules the equilibrium of whose components is more or less indifferent according to the process used; again, the light employed is such a varying factor that it is difficult to compare results. Perhaps more than any other disadvantage it labours under is that due to quackery of the worst description at the hands of some of its followers, who not only are self-asserting, but often ignorant of the very first principles of scientific investigation. Photography deserves to have followers of the highest scientific calibre; and if only some few more real physicists and chemists could be induced to unbend their minds and study the theory of an applied science which they often use for record or for pleasure, we might hope for some greater advance than has hitherto been possible.

Photography has been called the handmaid of art; I venture to think it is even more so the handmaid of science, and each step taken in perfecting it will render it more worthy of such a title.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 7	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 8	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
" 8	Derby	Society's Rooms, 3, Derwent-street.
" 8	Bradford.	55, North Parade.
" 8	Manchester Amateur	Manchester Athenæum.
" 8	Bolton Club	The Studio, Chancery-lane, Bolton.
" 8	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 10	Birkenhead	Free Public Library, Hamilton-st.
" 10	Cheltenham	
" 10	Manchester Photo. Society	36, George-street.
" 10	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 11	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 26.—Mr. Freshwater in the chair.

Mr. H. D. ATKINSON inquired whether there was known to be any fading away of an undeveloped image upon very rapid plates. He had recently, during a journey, exposed several plates, and whilst those of ordinary rapidity developed properly, those of the extra rapid kind only gave a faint, ghostly image.

Mr. ARCHER CLARKE said that the ordinary plates of one of the commercial makers proved to be more rapid than those marked as extra rapid. If that was the make in question the probability was that the faintness of the image was merely due to under-exposure.

Mr. F. A. BRIDGE said that there was no chance of the image having faded. Mr. ATKINSON replied that plates of the same sample worked properly before going away.

Mr. Hastings showed a print from a negative taken with a shutter asserted to work in the one-two-hundredth part of a second. The negative was taken from a railway carriage whilst travelling at the rate of sixty miles an hour, and only on close examination was any want of sharpness noticeable.

In the course of a short discussion on orthochromatic plates, Mr. A. HADDON said that he had noticed that in some subjects in which there was reflection from water the orthochromatic plate yielded the better result by far.

Mr. C. H. COOKE inquired whether any member had found a greasy spot towards the edge of platinotype paper. He had done so, and attributed it to the greasy compound used in the tins for making the joints air-tight.

The CHAIRMAN would like to know the real cause of the blistering of some dry plates. He had recently opened a packet which gave him a good deal of trouble in that way. It was a make that took long in fixing.

Mr. CLARKE recommended a weaker fixing bath.

Mr. P. EVERETT inquired whether a statement by Mr. George Smith, that two plates, one of which had received three times the exposure of the other, could not possibly be developed to be at all alike, was in accordance with the experience of the members.

The opinion was generally expressed that negatives with these diversities of exposure could be developed so as to produce prints which could not be distinguished from each other, although the colour and appearance of the negatives might be different.

Mr. EVERITT having spoken of the slow printing character of yellow negatives,

Mr. W. E. DEBENHAM said that, if the shadows were clear, he could not see why a negative which owed its printing density to a yellowish colour of a thin deposit should print more slowly than one which owed its density to a thicker deposit of a grey or neutral colour.

In confirmation of this view, Mr. COOKE said that he had a negative almost gamboze in colour which printed quickly.

Mr. ATKINSON had also a negative that was of very non-actinic colour, having been intensified with mercury and Schlippe's salt, which printed quickly; and Mr. BRIDGE had a similar experience with a yellow mercury-intensified negative.

Mr. HADDON could find no reason for slow printing in yellow negatives, provided the yellow colour was confined to the deposit, and was not a general stain all over the film.

This view was contested by Mr. EVERETT, but was generally accepted by the members.

A question was read:—"If a plate has received the correct exposure, is there any advantage in developing with a brush?"

Mr. J. J. BRIGNSHAW said that there might be. If the plate had been exposed on a subject having such violent contrasts that, with the best exposure as a whole, there were parts over or under-exposed, brush development might be employed with advantage.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

SEPTEMBER 23.—Mr. E. T. Hiscock in the chair.

Mr. A. Le Viege exhibited prints, also a Chronolux shutter by Messrs. Lancaster & Son.

Mr. S. T. Chang exhibited one of Shew's Eclipse detective cameras.

The CHAIRMAN then called upon Mr. Bishop to demonstrate the transferotype process.

Mr. BISHOP: The advantages claimed for this process are, that it allows of an image being developed in the ordinary manner, after which it may be transferred to any surface thought desirable; it is also one of the easiest and quickest methods of making a reversed negative for mechanical processes; window transparencies may be made cheaper than by any other method; and it is also claimed for it that it is useful for making lantern slides. The *sine qua non* of a lantern slide is that it shall be absolutely clear in the high lights. It is here that this process fails, for, as you will notice in the specimen before you, the gelatine is covered by a fine granularity or reticulation. The Eastman Company say that this is of no consequence, as it does not show when projected upon the screen, but it *does*. Among the different things to which the image may be suitably transferred are opal, plaques, tiles, lamp shades, ground glass, panels, vases, &c. The paper is made by being first coated with a soft, soluble gelatine which, when dry, is then coated with the sensitive emulsion, which becomes insoluble when dry. After exposure to light, which is about the same as for bromide paper (that which I have here for development having had one second to weak daylight late in the evening), it is developed with the ordinary oxalate of iron developer; it is then put into a bath of acetic acid and water (strength: one part acid, two hundred and forty parts water); after which it is fixed, washed, and then squeezed into contact with the surface to which it is intended to fix it; it is then blotted and placed on one side to dry for half an hour, when it is ready for stripping, which is done by pouring hot water on it, which, soaking through the paper, dissolves the soluble substratum of gelatine and allows the paper to come away, leaving the film attached to the surface of the article, when all that remains to finish it is to wash off the partly dissolved gelatine still adhering to it. For this I prefer a large camel's-hair brush (known as a water-colour wash brush), as being less likely to leave any pieces behind. The lecturer then proceeded to illustrate his remarks by developing a print, after which he transferred about half a dozen of different sizes—some to opal, others to ground glass.

The question was asked as to the reason for letting the print dry for half an hour on the surface of the glass before stripping.

Mr. BISHOP replied that if stripped before that time there was a probability of the film leaving the support, which he illustrated by stripping one which he had a few minutes before squeezed into contact, the result being that the picture frilled slightly at the edges.

It having been remarked that this process gave reversed results, Mr. BISHOP said that this might be overcome in several ways. First, those who used film negatives would find no difficulty whatever, as they could be used from either

side; or if the stripping films were used for negatives these would be reversed, and so give the resulting print in the proper position: another method, of which several examples were shown, was by copying the negative in the camera, glass towards the lens. Mr. Bishop also mentioned that he and Mr. Jackson, of the Eastman Company, had carried on several experiments with the hope of being able to effect the double transfer, and although they had been partly successful, the results were not good enough to recommend the method. Another way which he had tried himself, and which he illustrated, was to place the developed print in the hot water without squeezing to anything, and so float the image off without support, when it might be turned and placed in position on whatever article it might be desired to fix it; if, however, this method was used it was necessary to print very much darker, as a quarter-plate print would expand until it covered a half-plate, thus causing the print to be much lighter when finished.

Mr. FITHER: Can the tone obtained be modified in any way?

Mr. BISHOP: Mr. Jackson had used pyro and soda in some experiments, by varying the proportions of which he found it possible to alter the tone.

The SECRETARY: Would it not be possible to proceed in the usual way, and when finished change the tone by the various methods of intensification?

Mr. BISHOP: Of course they would be just as amenable to any after treatment as other processes were.

At the next meeting Mr. S. Herbert Fry will give a demonstration of *Enlarging*.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

SEPTEMBER 6.—The President (Mr. F. W. Edwards) in the chair.

Seven members were elected and one proposed.

Further contributions of lantern slides were made by Messrs. Dowling, Gardner, and Kelly.

A large number of prints and negatives were handed round for inspection, amongst them some fine 24×18 platinumotypes by the President.

Next meeting, on Friday, October 5, at 76, Peckham-rye; paper on *Lens's*, by the President.

BATH PHOTOGRAPHIC SOCIETY.

SEPTEMBER 25.—Mr. Austin J. King in the chair.

Messrs. J. Arnold, H. H. Ricketts, and E. S. Southwell were elected members.

The HON. SECRETARY announced the receipt of thirty-five copies of *The Principle of a Lens Action* (Taylor, Taylor, & Hobson), thirty-six copies of the *Photographic Review* (Bolas), a package of *Practical Hints and Calendar* (Tylar), a tin case of eikonogen (Marion & Co.), and samples of dry powder developer (Oldham), for the use of the Society.

Mr. BRAHAM then addressed the meeting on *The Work of the Paris Congress*. He stated that Mr. Friese Greene and himself, the delegates appointed by the Society, were heartily received by the Congress. The remarks in some quarters that a high subscription was demanded, was untrue; they were not asked to pay anything. He looked upon this Congress as the commencement of an important era in photographic history—the beginning of a more scientific manner of working. Little was actually settled, yet that little was fraught with good. The first question dealt with was the unit of light. Hitherto much depended on chance; correct exposure was pretty much accidental; the sooner a definite measurement was substituted the better for everybody. Several proposals were before the Congress, two of which were referred to a committee, namely, an amyl-acetate lamp fitted with a spiral of platinum wire, and a given amount of electric current. Upon the question of focal length, one-tenth the principal focus was determined upon as the unit. The Whitworth thread was accepted. It is formed by an angular section having an angle of 55° . Mr. Whitworth found by experiment that that angle held best to the metal. The ready attachment of lenses to cameras was a thing which often bothered photographers. The most ingenious plan submitted to the Congress was merely a zinc plate with a hole cut for the lens tube to pass into, and a nut screwed on the lens from behind to fix into the camera. This he thought the best plan. Plates measuring 18×24 c.c. were considered the best size for reducing to other sizes economically. Upon the question of expression in formulae, Mr. Braham said that some of the members regarded the English as too stubborn to adopt the metric system; but he explained to them that all educated English would only be too glad to have the system adopted. Two propositions were mooted for safe transit of plates through the Customs—one the attachment of a special label, and the other examination in a suitable room in the presence of the owner. A number of difficulties might arise in either case. There was a good deal of discussion, and he hoped it would have a beneficial effect upon the general transit of goods from one country to another.

The CHAIRMAN thanked Mr. Braham as a delegate as well as for the interesting account of the work done. Many of the subjects discussed were of great importance. He did not find much difficulty with the Customs, although some half a dozen men had quarrelled with the officers. One man was found to have a lot of tobacco after he declared he had none at all. Personally he had passed cameras and quantities of slides into Spain, Holland, and elsewhere, and the only case happened with a new camera, for which they asked duty until he found it was slightly scratched by the tripod head. He did not approve of a special label method. The Society was also much indebted to Mr. Friese Greene for acting as the Society's delegate in Paris, and also for being present to report on the London Convention, at which meeting he was the Society's representative.

Mr. GREENE thought the most interesting exhibit at St. James's Hall was the book of Talbot's calotypes, sent by the Bath Photographic Society. It was a pleasure to watch the old photographer looking at the pictures and wondering why they had kept so well. Indeed, there were few to compare with some of these made forty years ago. The improvement was in quickness, not in quality. *The value of the book has been assessed at 100l.*

Mr. Greene passed round a platinum print of the Convention group, 20×16 . The exposure was two seconds, $f/8$, and a copy was presented to the Society. Mr. Greene exhibited examples of bromide printing on opalescent celluloid

stamped in sundry ornamental designs. These were considered effective. He also handed round similar prints on ordinary mounts (opal cards) made by artificial light direct from negatives.

The CHAIRMAN, having thanked Mr. Greene, said the outdoor meetings of the season had ceased, and he wished to thank the Excursion Committee for the trouble bestowed in making the arrangements.

Mr. BRAHAM said the outings had been most enjoyable; they had advanced the popularity of the Society and redounded to the credit of the organizers. Every possible condition had been met.

MANCHESTER PHOTOGRAPHIC SOCIETY.

SEPTEMBER 12.—Mr. John Schofield (Vice-President) in the chair.

Mr. THOMSTONE said he had recently developed a number of landscape negatives with eikonogen, and was very much pleased with the results. He considered it slower in action than pyro and ammonia.

Mr. ABEL HEYWOOD, JUN., had tried eikonogen for transparencies, and thought the results were very similar to those developed by hydroquinone, which he considered was the developer for transparencies, because the shadows were more of the character of a stain, and not so opaque as those developed with pyrogallol acid; and, therefore, did not consider hydroquinone so good as pyrogallol for negative development.

Mr. R. ATHERTON had developed a good many transparencies, both stereoscopic and for the lantern, with eikonogen, and was very much pleased with the results. With Mawson's lantern plates he obtained a most pleasing tone, and any variation in exposure did not seem to alter the colour. He considered it the best of all developers for transparencies, and handed round a number of lantern slides developed by it.

The HON. SECRETARY (Mr. W. I. Chadwick) wished to confirm all that had been said in favour of eikonogen for developing transparencies. He had developed twenty-four stereoscopic transparencies, using only four and a half ounces of solution, and still the solution was by no means exhausted.

Mr. D. E. BENSON inquired as to the best lenses and their arrangement for micro-photography.

After several opinions had been given, Mr. Benson was referred to Mr. G. J. Johnson, a member of the Society (not present), who had done some splendid work in this branch, and who was considered an authority on the subject.

Mr. H. Smith exhibited a hand camera for stereoscopic work and some slides which were produced by it. The camera body was constructed out of an old stereoscope, the lenses three and a quarter inches focus, of the single landscape type, working at $f/12$, with a simple slide shutter actuated by an elastic band. The instrument, which was "home made," was very much admired for its simplicity and inexpensive and novel character.

Mr. ATHERTON read the following communication from "our old and respected President," the Rev. Canon Beechey:—

TO THE MANCHESTER PHOTOGRAPHIC SOCIETY.

[Adventures of a Photographic Amateur, Lausanne, May, 1889.]

FYITE I.

Lausanne! What a treat for a lover of art!

"What scenes photograph I shall carry home!"

So I said when I made my first artistic start,

Determined at once to the mountains to roam.

My light satchelled camera hung on my back,

My slides in a neat little bag were contained;

Most careful that nothing I wanted should lack,

My daughter went with me, and with me remained.

A nice walk we had for a couple of miles,

But nothing we saw which a picture would make;

My daughter was all conversation and smiles,

And nothing amiss I could possibly take.

At length to a sweet little valley we came,

Where there flowed a brig-t, swift, rippling rill;

No longer the landscape, though lonely, was tame,

For there in the vale stood a picturesque mill.

'Twas a quaint-looking building, essentially Swiss;

Behind it the hills rose all covered with trees,

Beneath it the river did bubble and hiss,

And large boulders lay as determined to please.

Then down came the lasses—the miller's fair maids,

And the miller himself, a fine, handsome man

(And a miller is merrier than all other trades);

And the whole were all posed as correct as a team.

So a picture was taken, a stereo as well,

And the camera packed in its satchel quite close;

But when all was prepared to forsake the wild del.

As to how to return a hard problem arose.

For the way down was steep, and the dell-side soft clay;

To get down had been hard, but much harder to climb;

'Twas clear we must look out for some other way

If we wished to get home to our dinner in time.

Now the dear little river still murmured below,

And seemed to exclaim, "Why not leap over me?"

And the miller, too, offered a plank to bestow,

Where the water dashed down in a fall, fell to see.

But to get there a passage of stones must be made,

And then a small leap to the plank must be ta'en.

My daughter the effort first safely assayed,

And soon I endeavoured to make it again.

But, alas for the fortunes of art and of age!

The stone which I sprang from roll'd under my feet;

In vain the held staff would my tenure engage,

For my legs were borne down by the current so fleet.

To go down a cascade is not pleasant at all,

And what it would end in is hard to suggest,

For I found myself rapidly drawn by the fall,

And the water already was up to my chest.

Then swiftly I made a bold clutch at the plank,
And, as fortune would have it, I got a good hold;
My feet to the bottom then rapidly sank,
Then out of the flood so seaward safely I rolled.

(End of Fytte I.)

FYTTE II. (The metre changes.)

When you go for an out in the time of your leisure,
The thing which you look for is, certainly, pleasure;
To growl and to grumble at little mishaps
Is what no one will do but the stupidest chaps.

So onward we walked still, my daughter and I,
Determined to laugh, and not, certainly, cry.
After all, when we'd made our bitterest structures,
Were we not going home with two beautiful pictures?

We had promised to send off the earliest print
To the courteous miller: and I would not stint!
Either pains or expense to make that print good,
But to tend and develop as well as I could.

What pleasure might happen from any new view;
This was deepest interest would always renew;
The thoughts of the day would come home to our mind,
And the view and the ducking for ever be joined.

Arrived at our pension, in dry clothes arrayed,
A hearty good dinner we certainly made;
And I, like a bird who'd escaped from a trap,
Lay down and snoozed on in a very sound nap.

Then waking, I knew by the count of the chime,
To go and develop would soon be the time.
And here to my friends I must hasten to speak
Of the *Société Lausanno Photographique*.

For no sooner they heard there was here in their town
Your ex-President, who they thought was a *frère* of renown,
Than they placed at his service whoever he might choose,
Their dark room for change and developing use.

So down there I went with my dark slide in hand;
Key and candle were placed at my instant command;
And I shut myself in, lit the lamp, and prepared
To develop the pictures for which I cared.

All the chemicals ready, the dishes all right,
I carefully shut out the least ray of light,
Then opened my slides, the first plate to prepare,
When, ah! what a sight! It made both my eyes stare.

"Why, what can have happened?" You'll hear in a minute:
When I opened the slide, why, no plates had been in it!
Here I think you'll all cry out, in accents so quick,
Why, who could be guilty of that stupid trick?
O friends photographic, don't scream, I beseech ye!
'Twas your own old ex-President, ST. VINCENT BRECHER!

Lausanne, May 29, 1889.

The members were reminded that the next meeting would be the annual meeting.

Messrs. W. J. Cunliffe and H. M. Whitefield were elected Auditors, and the few members who had not paid their subscriptions were requested to do so.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 20.—Mr. H. A. H. Daniel (President) in the chair.

The resignation of Mr. J. Healey, Corresponding Member of the Association, was tendered and accepted with regret.

It was proposed that a competition should be started amongst members for the best half a dozen lantern slides, to be brought in at the ordinary March meeting, 1890, which should be arranged as a lantern evening and *concerto*.

Mr. W. C. HEMMONS suggested that the services of one or two good demonstrators should be secured for some of the monthly meetings, which might be more or less popularised and rendered open.

The PRESIDENT said the officers of the Association would be glad to make inquiries with a view to some such arrangements, and he hoped that at an early date some announcement might be made.

The meeting then resolved itself into free discussion and exhibition of summer work.

Prints were shown in platinotype, bromide, and albumenised silver, by Messrs. Brightman, Norgrove, Hemmons, Lavington, Bond, and Hutchinson. Colonel Playfair showed some very good negatives.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 26.—Mr. A. W. Beer in the chair.

The PRESIDENT drew the attention of members to the arrangements respecting the competition prints and lantern slides, and announced that the following gentlemen had kindly undertaken the duties of adjudicating and awarding the prize medals offered by the Association, viz.: Messrs. George W. Webster, John Finnie, and E. R. Dildin, for prints and enlargements; and Messrs. George E. Thompson, E. L. Grundy, and Paul Lange, for lantern slides.

A "smoking social" will be held on October 18 at a quarter to eight p.m. There would also be a "social" in November.

Mr. FORRESTER submitted an Eastman bromide print developed by hydroquinone, the result being very favourable; also a specimen lantern slide upon Carbutt's cellulosid film.

Mr. GEORGE E. THOMPSON referred to Thomas's lantern plates, that he had experienced many instances of yellow fog; he had written to the makers, but their reply was not altogether satisfactory. He found where development had

to be retarded yellow fog was almost sure to result, but when the details came up quickly there was no fog manifest.

The PRESIDENT said he had used many dozens of Thomas's plates during the season, and, from his experience, was convinced the plates were all right, but the developer was often wrong. He found the formula, as given, deteriorated, and the same might be said of eikonogen. When fog and loss of brilliancy appeared he at once made up fresh developer. With regard to the warm colour for lantern slides, he found that with a very strong negative fifteen to twenty seconds' exposure (by contact) to daylight gave a beautiful terracotta or warm brown colour by either the hydroquinone or the Thomas's pyro formula.

Mr. THOMPSON said he obtained the most satisfactory warm tone with pyro, carbonate of ammonium, and bromide potassium.

Mr. THOMPSON then gave his lecture, entitled *Rambles along the Riviera from Marseilles to Genoa*, the result of a three weeks' visit in February last. The slides are quite up to the high level of artistic excellence attained by him in *Up the Mediterranean*, *Sunny Italy*, and *The Waterways of Holland*. This admirable series of views, coupled with Mr. Thompson's inimitable and humorously attractive delivery, gave great pleasure to his audience, evoking applause from time to time during the evening.

Correspondence.

Correspondents should never write on both sides of the paper.

THE LATE CONVENTION.

To the Editor.

SIR,—Now that the exchange of personalities between the critics of the recent Convention and its defenders is about played out, it may, perhaps, be permitted to me to allude in a more general and practical way to the (to me) apparent reasons of its want of success.

The whole conduct of the Convention seems to have been characterised by an entire absence of business aptitude in its moving spirits; true, on glancing over the list of the Council we find many able and practical men, but, unfortunately, the management of the whole affair seems to have been left to the less capable of its members, doubtless owing to the impossibility of the more capable and representative members of the photographic world having their time filled by their personal occupations.

At the dinner of members of Convention Mr. Pringle communicated to the members what he evidently considered a congratulatory matter: that it was hoped and expected, on settling the accounts, the result would be that the Convention this year had paid its way. I must say that from my point of view such a statement, far from being a subject for rejoicing, seems to be an acknowledgment of dire failure. Excuse has been made for want of more success on account of the absence of *everybody* from London; well, perhaps this is true in a limited social sense, but there still remained, say, 4,750,000 inhabitants from which to recruit a *clientèle*.

Let us inquire what efforts were made to enlighten this population on what was occurring in its midst. Only two days before the opening ceremony was the programme in the hands of subscribing members. Even then it was very meagre in its details. On looking it over I noticed three blank pages—two inside and one outside the cover; it at once struck me, as it would any one with a fair amount of common sense, that the Council might have taken a good number of sovereigns by letting these pages for advertisements. I asked a member thereof why this had not been done; he told me they had an offer of 5*l.* for one page on condition that they would guarantee a certain issue, and that this it would not have paid the Convention to do. It does not seem to have entered into the minds of the active managers that had they placed the matter in the hands of an advertising agent he would easily have obtained them a dozen or two pages of trade advertisements, which would have enabled them to give any guarantee of number printed which might reasonably be necessary.

Then the desire of the ruling spirits seems to have been to judiciously hide their light under a bushel, or, I should rather say, in a dark cellar, lest one ray should illumine the world and show their existence, for, according to their own statement, *they issued no free tickets to the press*. Let me write it again; it is so charmingly ludicrous—*they issued no free tickets to the press*. With what result? An occasional corner paragraph regarding the Convention on one or two occasions seems almost by accident to have crept into some of the daily newspapers, instead of the proceedings being daily reported, freely as they would no doubt have been had the press been properly treated. Then the fiasco about the withholding of the reports from the technical papers; I say nothing regarding the manner in which they subsequently appeared, as this seems to have been the Benjamin's mess of the whole proceedings, but by everything in heaven or upon earth I am quite unable to see the object of the first intended delay in publication, and I have, up to now, not succeeded in finding any one who could enlighten me on the point, and, therefore, can only come to the conclusion that it was a further exemplification of the desire to hide the existence of the Convention from those whose support it required.

Now let us see what the Council did in the way of advertising its session. I found nowhere in the usual channels any prominent notice of any kind whatever, but on asking a member of the Council about it, he told me that it was advertised *all the week (!) at each Metropolitan*

Station. Well, I am in two or three of the Metropolitan Stations daily, and generally having to wait for my train, look about me a good deal and amuse myself with inspecting the numerous attractive posters, &c., displayed there, but never saw one relating to the Convention till the day before its close, which consisted of a poster of a nice retiring French grey colour, placed in the position least frequented by waiting passengers; and I only noticed this by the accidental attraction of a cross slip in red letters stating "Now Open" being pasted over it. It reminded me of the story of the lady who, owing to reduced circumstances, was compelled to cry watercresses, and always supplemented her call by saying, "I hope nobody will hear me."

We have been told, as a matter of complaint from the Council, that certain delegates did not take up their membership, and paid their shilling at the door like one of the public. Who is to blame for this but the Council? They ought certainly to refuse to receive any nomination of a delegate not already a member.

Now, with the aforesaid public of about four and three quarter millions to work on, what do we find? The President congratulating the Conventionist on making both ends meet, instead of the Convention, if managed with business aptitude, resulting in a balance, as it should, of one or two thousand pounds to the good.

I think some alteration ought to be made in the manner of selecting delegates from the Societies; at present the idea does not seem to be to send representative photographic notabilities so much as to take any member who is supposed to be able to give a considerable amount of time. I know of one Society, with many members of high standing in the photographic world, which sent two representatives. No. 1's claim to distinction is, apparently, that on one occasion he read a paper on a reducing agent, which was subsequently shown from all informed quarters to be entirely misconceived; and No. 2's claim to notoriety is, so far as I can see, that he disturbs the meetings of his Society with —. If the Local Committee is nominated on these lines to any extent, it is not to be wondered at that the results are unsatisfactory.

I notice in the Convention programme ten recommended hotels, it would be interesting to know whether the proprietors of these establishments paid any advertisement fees for the insertion of their tariffs, or whether the Council made them a free gift of their space and printing—I am, yours, &c.,

CONVENER.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—My friend the enemy is still not satisfied, and, I am beginning to fear, will never arrive at that happy state. Wicked quotations will crop up, and, as I don't want to be too naturalistic in manner, I apologise for this one beforehand; I am sure of my friend's forgiveness. Does it not strike you that "Gratiano talks an infinite deal of nothing," and that your readers must be getting tired of this "unreal mockery" of a controversy? I will endeavour to encourage my pleasant opponent into one more reply, and the rest I hope will be silence as far as I am concerned.

Mr. Davison says that imagination to him means absolutely nothing. I was quite sure of this, but it is not our point at present. What I and many others want is a clear and sensible definition of what naturalistic photography really is. We don't want Mr. Davison's airy "gibe" of a former letter, that it is "the best of everything"; we don't want to know what it is not; we don't want merely destructive criticism; we don't want to hunt for it through the tedious pages of a voluminous treatise; all we want from Mr. Davison is a clear and concise definition of what naturalistic photography really is. It surely must be within the resources of a clever writer to gratify us in the compass of a column or two of THE BRITISH JOURNAL OF PHOTOGRAPHY.

It cannot be what we have all thought it to be if Mr. Davison practises what he preaches. In the present Exhibition, near the door, is a group of pictures—real pictures—by this admirable artist which will command the admiration of all who see them. Mr. Davison condemns combination printing in the most unmitigated manner, sometimes with a frenzy which almost carries one away and makes one determined to sin no more; yet—it is almost incredible—many of these pictures owe their beauty to combination printing. So skillful a combination printer is Mr. Davison, that I should never have found him out if I had not detected the use of one sky negative in two different pictures. I have always condemned this practice as against nature; can Mr. Davison justify it? Then, again, my friend scoffs at pictorial composition as it has been understood and practised for many years, yet many of these pictures are composed admirably according to the strict rules and laws made and provided. Who can fail to see the subtle use of the balancing point? The chiaroscuro is sound throughout, and the definition as sharp as his lens could make it. When a disciple denies his master to this extent, he must not be surprised to hear the cock crow! In theory Mr. Davison may be a naturalistic photographer; in practice I claim him as an artist.

I will not reply at length to his allusion to "attempts at historical subjects." He has, doubtless, read *Pictorial Effect and Picture Making*, and knows that in both books, and in other places, I have condemned any attempts of the kind in the strongest language that may be permitted to any but a naturalistic writer.

The next novelty, I hear, is to be the Tuning-fork School of Photo-

graphy; the fork being used during exposure to make the camera "dither," and thus produce the blurriness of nature as seen by the naturalistic eye.—I am, yours, &c.,

H. P. ROBINSON.

Tunbridge Wells, September 28, 1889.

STANDARD MEASUREMENTS FOR LENS FITTINGS.

To the Editor.

SIR,—It appears to me a pity that Mr. William Taylor did not make himself acquainted with facts before writing his *apologia* to you in the matter of his motion that the report of the Lens Committee be not adopted. I believe, sir, you were present when the motion was put—but I say so, liable to correction—while Mr. W. Taylor's remark that you (of all men) might misunderstand him is to show how little he really appreciates your "vast powers." I flatter myself I move considerably more in photographic circles throughout the United Kingdom than does your correspondent, but I have not met with any of the "deplorable misunderstanding" he would have you believe exists. Perhaps it will surprise Mr. Taylor if I state that the report was, as a matter of fact, the report of the Convention Committee, properly convened and properly constituted, all the members in London attending; that the report in draft was approved—with but a slight alteration—by the only available members at the time it was drawn up. It is, therefore, not "Mr. Wollaston's report," as would be gathered from the natural interpretation of his letter.

The "incompleteness," "disgracefulness," "grossly bad expression," and "impotency" of the report were clearly matters for the Council to take cognisance of, if they thought fit, and it was their business to alter, amend, or even reject it altogether, else why the rule to that effect? Mr. Taylor's opinion on these matters has not been asked, and, being gratuitous, it verges on insult to the Council. His self-satisfied remark that he is one of a happy few who know the correct specification of the standard screws again shows his low appreciation of others' brains and work. It certainly was not within the province of the Committee to specify in the report.

Coming to a more personal remark in this wonderful letter, Mr. Taylor would have you and your readers believe that I, "who professed such enthusiasm at Birmingham, should have so damned it" (the work of the Committee) myself. For his enlightenment I may tell you, Sir, without fear of contradiction, that I am not one whit less enthusiastic than I was on this question, but that, as I am entirely of his opinion that "public demand is the only thing possible for his (the optician's) conversion, or for any general agreement," I am doing my level best to bring about the object we both aim at by educating that public rather than by the reading of papers or the writing of reports, although these assist. I fancy I could satisfy even Mr. William Taylor that the course I am now adopting is preferable to the work of committees and such-like organizations, simply by a peep at my correspondence and my press-copy letter-book.—I am, yours, &c.,

S. G. BUCHANAN WOLLASTON.

Lennie, Chislehurst, Kent, September 28.

"EIKONOGEN."

To the Editor.

SIR,—Having made a few experiments with the new developing substance, eikonogen, I should like to lay them before your readers, hoping others will follow my example, as it is only by thus comparing results that we can form an opinion as to the definite position the new compound is destined to fill as a photographic developer.

On reading over the paper enclosed in the packet it seemed to me that the principal claim made for eikonogen was its great developing power; therefore, in all the plates I exposed I gave a very short exposure. The first formula I tried was one published in your columns by Messrs. Fradelle & Young. I found no difficulty in dissolving the eikonogen in the amount of water necessary to make a ten per cent. solution; but the substance in no way resembled the description given of it in the paper accompanying it, namely, "a white crystal powder"—it was a dirty grey, very like ashes; when first mixed it formed a brown solution, but gradually became a clear bottle-green. I used it as directed, without any addition except the sulphite of soda. After waiting some five minutes a trace of sky appeared, but the progress was so slow that I added some carbonate of soda, and the image came up gradually. On fixing it proved grey, and wanting both in density and detail.

For the next plate I added the soda carbonate before commencing, and the image came up something quicker; but I had to add a few drops of a solution of caustic soda, even then it was but a little better than the first. A very over-exposed image might, perhaps, be developed with the addition of sulphite only, as indeed it can with pyrogallol; but I am convinced that an under-exposed one would take hours.

I next determined to use caustic soda as the accelerator, and made up my solutions on the lines of Thomas's hydroquinone developer, only leaving out the citric acid. Again, I had to wait an abnormally long time before the image appeared, though there was a large amount of the caustic alkali present, which its printed directions describe as *too powerful*. The resulting negative was better as regards density and brilliancy,

but did not possess as much detail as a plate with the same exposure developed with hydroquinone, same formula. After development the eikonogen solution had become a dark brown, the hydroquinone remaining almost colourless for many hours. There was a marked yellow stain on the plate when fixed, but it rapidly disappeared in washing, the water becoming a brick-red colour. It was evident to me that the soluble bromide contained in the developer had an *extremely* powerful effect when combined with eikonogen, so I next made up a developer without any restraining bromide, the formula being:—

Eikonogen	20 grains,
Sulphite soda	45 "
Rain water	5 ounces,
Caustic soda	20 grains,
Rain water	5 ounces,

mixed in equal parts. On applying to the plate the image came up a good deal quicker, and in about eight minutes was completed, and proved the best I had produced. The developer was, however, so dark in colour that I would not like to have attempted to use it for a second plate.

From these experiments I would conclude that eikonogen is decidedly less powerful than either pyrogallol or hydroquinone, and more strongly affected than either by a restraining bromide. It gives a bright, soft image, and would seem less apt to give over-density than hydroquinone, but beyond this I can see no advantage in using it until some more satisfactory formula is discovered for compounding the developer. We must not forget, however, that the first formula given with hydroquinone were very uncertain, their powers having also been much over-estimated.—I am, yours, &c.,

GEORGE MANSFIELD.

To the Editor.

SIR,—I can endorse the statement of your correspondent, Mr. J. Gardner, re solubility of eikonogen. Having a doubt about the possibility of dissolving so large a quantity as ten per cent., I prepared a solution, or rather a mixture, according to the formula of Messrs. Fradelle and Young, and was careful to completely dissolve the sulphite of soda, before adding the eikonogen. However, I found that there was a white crystalline deposit occupying about one-fifth of the bulk of solution, which no amount of persuasion could induce to dissolve.

For instantaneous exposures, I find the strong solution of eikonogen recommended by Messrs. Marion & Co. particularly suitable; but I prefer two solutions instead of the one, as it keeps so much better when separate.

My formula is the same as Marion & Co's No. 3, except that I omit the potash. The alkaline solution is made up eight times the strength, namely, caustic potash one and a quarter ounces to five and a quarter ounces of water. For use, take one ounce eikonogen solution and add one drachm potash solution. This brings it very nearly the same strength as the one solution, with the advantage of being able to increase or diminish the quantity of alkali, and also enhancing the keeping quality.—I am, yours, &c.,

J. DEARÉ ENGLAND.

21, Charles-street, Royal Crescent, Notting Hill, W.

MOUNTING PRINTS.

To the Editor.

SIR,—In your report of the "London and Provincial Photographic Association" of September 19 the Chairman has computed that I said, I "always pasted paper on the back of a mounted photograph." This is hardly correct. The Chairman may have heard me state at one of the evenings of the Photographic Club that "one way to keep photographs flat when not mounted on cardboard was to paste a thin tissue paper on the back"—this is one of the best methods I have used, and it answers very well. The proper way is to damp the tissue in order to stretch it as much as possible, paste the silver prints with starch, lay it down on the tissue, to which it will at once adhere, the tissue may then be rubbed down quite flat. Another way to mount on cardboard and not to cockle, other than starching or gumming and allowing to dry, is to mount the print on paper the full size of the board, and, while damp, to paste the whole on the cardboard (now called the middle), another paper pasted to the back of middle, and the whole, when dry, placed in the press, or rolled; they will then be perfectly flat.

The question of mounting prints is always a serious one for amateurs; for this reason I put into the market my album, each leaf of which is single, and can be detached for mounting on. In my opinion, as a practical man, any ordinarily-bound album is of little use for photographic purposes; the leaves cannot get dry properly, and there is always danger of setting up chemical change and engendering spots.—I am, yours, &c.,

J. W. ZAEHNSDORF.

CELLULOID FILM PRINTS VERSUS HEAT.

To the Editor.

SIR,—Rather an amusing circumstance occurred on Wednesday last at the tea-and-coffee section of our Liverpool Photographic Club, which meets weekly. Holding up a film print by Mr. Tomkinson (one of our members), the size of a lantern slide, I said, "Why should this not be

used for lantern slides?" One of our notable members cried out, "It would never do, for it would melt by the heat of the lantern!" Another member said, "Don't you know it is made from gun-cotton, it would be sure to explode!" In reply, I said, "I differ from both of you, and will prove my statement at the earliest period."

The following day I put pieces in the kitchen fire up to 5 × 4, and it only burned like ordinary paper. The same evening we had a lantern exhibition, and I got Mr. Phillips (who was operating) to pass it through the lantern, and it came out without the slightest change. The great drawback to the advance of film (celluloid) photography is its high price. I name this with the view of getting manufacturers to remove this grievous obstruction to its adoption.—I am, yours, &c.,

JAMES ALEXANDER FORREST.

Waverley, Alexandra-road, Birkenhead, September 30, 1889.

LANTERN SLIDE MAKING.

To the Editor.

SIR,—Referring to a report of a paper read by me before the Birmingham Photographic Society, appearing in your issue of September 20, I notice an error in the formula of the iron developer for wet plate transparencies. The amount of water should be 8 ounces, not 16 ounces.—I am, yours, &c.,

E. HOWARD JAKES.

THE ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION.

To the Editor.

SIR,—In your impression of September 20, 1889, you publish a report of the above Society's Exhibition at Falmouth, and under the heading "Photographic Appliances," you refer to two cameras which I exhibited, and from a remark there made would lead one to suppose they were of a complex nature; whereas they are extremely easy to use and set up, although containing several novelties in construction.

The Judges evidently did not give them a thorough examination. I also sent with them a written description, which shows no signs of having been read.

The cameras in question are certainly of a "complicated order," if complication consists in having a ready means of adjustment of focus and extension, simple means of raising or lowering the lens without a screw, and a revolving disc of brass to which the legs are attached having teeth round its edge, gearing with a wheel and pinion attached to a folding key to revolve the camera right or left on the stand—certainly not of a more complex nature than an ordinary rack and pinion, as used in the lens mounts.

The camera referred to as having the parallel bellows has a new form of front, perhaps this was too complex! This front consists of two circular revolving panels, one fitted eccentric in the other, no adjusting screws—simply turn one or both panels right or left and the centre of the lens can be brought opposite any part of a 12 × 10 plate (this being the size of the camera shown) from the centre to within three inches of either side, bottom or top, of the camera front, and this without any projecting parts.

There are also a few spring catches to keep the hooks safely in position when the camera is folded which could certainly be dispensed with, and if accidentally broken would not render the camera useless. Or maybe the "complication" consists in the addition of a moveable nut to the endless screw, which enables the camera to be extended to its utmost limit—twenty-four inches—without turning the winch handle at all; but, nevertheless, the screw is there, and the focussing can be done in the old way. Perhaps, however, it is the mode of obtaining the swing to the back which struck the Judges as being complicated, only one screw at each side to loosen slightly, pull back or push forward the back, tighten the screws, and it is done.

Mr. Editor, can you inform me who these Judges were? I may have overlooked their names, but could not find an announcement in either their catalogue or schedule. I suppose I must humbly bow to their judgment. I may also add that these "complicated" instruments may now be seen at the Photographic Exhibition, Pall Mall, London, where I hope your reporter will inspect them when he visits that show. I have had two constructed on the same principle myself in use for quarter-plate size, and also for 18 × 15 inches, and this latter size I am able to manage to use entirely without assistance.

The novelties (if any) in these instruments are protected by two applications for patents, which I have no doubt you will notice in due course.—I am, yours, &c.,

WILLIAM SCORER.

North-street, Havant.

THE GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—Professor Edmund J. Mills, D.Sc., F.R.S., will deliver a course of lectures on *Photography* on Monday evenings, commencing on Monday, October 7, in "Young" Laboratory-buildings, 60, John-street, Glasgow.

PHOTOGRAPHIC SOCIETY OF INDIA.—EXHIBITION.—In reply to numerous inquiries, the above Exhibition opens in Calcutta on December 1. There is no charge for space. Mounting is compulsory. Framing is optional, but is strongly advised. Framed pictures secure best positions. The Committee will undertake to have glass put in frames if requested to do so; the cost will be about 4d. per square foot. The amount can be sent in postage stamps.

Exchange Column.

I will exchange 12x10 camera and single slide, studio table, and lamp for photographing at night, for Safety bicycle; also boat, oar, and water-piece, rustic bridge, and forty-five 2s. parts of Virtue's Imperial Shakespeare, for interior backgrounds and other accessories.—Address, F. C. D. Huan, Photographer, Shepton Mallet.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

H. B. HARE.—Thanks.

LUCERNE.—Do not alter the lens; it will act well enough in its present form.

G. W. MILLS.—Several good formulae for negative varnishes are given in the ALMANAC for the current year.

SNOW.—The Photographic Society's Exhibition is held at 5A, Pall Mall East. It will be open for some weeks.

C. CLARK.—Messrs. Sprague's process is kept as a trade secret. For the information you require, write to them.

A. C. B.—Try the use of a harder gelatine, such as that of Heinrich. This will, doubtless, get you out of your difficulty.

ASPIRANT.—The only suggestion we can make is that you advertise your requirements, whether you desire a situation or to do work at home.

C. J. W.—The defect round the margin of the negatives is due to the plates. Evidently they have been made a long time. Old plates frequently have this defect.

G. J. J.—From what can be judged from the prints, it would appear that the spots are due to something being splashed upon the negatives after they were finished rather than defects in the plates themselves.

R. B. B.—1. Of all the lenses you have the one best adapted for enlarging from half-plate negatives is the ten-inch focus "rapid."—2. The surface of the paper is very much a matter of taste, but, for anything but the smallest work, we prefer the rough.

WAVERLY.—We cannot give an opinion as to whether the patent in question is a valid one or not. A great number taken out in connexion with photography, probably (as you suggest), are not, if they were contested. You had better consult an expert in patent law before infringing.

A. B. C.—In taking a building of the nature described, tilt the camera to the extent necessary to get it all in, taking care that the back is swung so as to be quite vertical, and that the lens is raised so that its axis shall be on the centre, or nearly so, of the plate. A small stop will then ensure sharpness.

PUZZLED.—There is no remedy now. If the negatives are so much under-exposed as you say, nothing can be done but to take fresh. The only remedy in the case of under-exposure is in the development, and, of course, there is a limit in this; but after the negative is fixed no more detail can be got out.

"49."—It is purely a legal matter. Either you ought to receive the goods or the P. O. O. should be returned. The firm, however, is a highly respectable one, and we think there must be some oversight or mistake in the matter. You might write again, and if no attention is paid, then you might place the matter in the hands of your solicitor. Thank you for the promised contribution.

A. McKAY says he has a wide-angle single landscape lens, and inquires if there is any means by which he can make it take pictures on the same size plate but including a narrower angle.—The focus of the lens may be lengthened by the addition of a negative lens; but unless our correspondent has some optical knowledge he will find it much cheaper to purchase another lens of longer focus.

CHAS. LAWSON.—The only treatise on ceramic or burnt-in photography in the English language of which we are aware, is a collection of practical receipts and hints, compiled at considerable expense by J. Solomon, and now to be obtained (price 5s. we believe) from Mrs. Abenheim, 341, Camden-road, London, N. So far as we have tested them the instructions there given are quite reliable.

W. A. BOROUGHS asks if a gas calorifier is sufficient to keep a studio about twenty-five feet long by twelve feet wide nicely warmed during the winter months.—We are unable to say for certain, but we should not expect it would do so during cold weather. We should ourselves prefer to have one or other of the "slow combustion stoves," of which there are several different forms now in the market. Some of them are very ornamental.

DETECTOR says: "Would you kindly say if I may take a detective camera to the Paris Exhibition? I believe you gave some information on the subject in the JOURNAL, but cannot find out if I am breaking the law by taking it in the Exhibition. Of course I may carry it in the streets of Paris."—Photographs are allowed to be taken in the Exhibition during certain hours, and then only on payment of certain fees. If any one is found taking photographs surreptitiously they subject themselves to a fine and a forfeiture of the apparatus.

C., writing on Carbutt's films, says: "I regret that my experience of Carbutt's films goes to confirm what your correspondent 'L. M.' complains of. The whole of the first packet I tried were useless from transparent markings and sundry kinds of spots. And since that it has been quite the exception to find a film free from marks and spots. It is very disappointing, for in point of rapidity and density the films are admirable, and in point of convenience, both in developing, &c., and in storing, they beat all the film and paper negatives that I have tried.

W. SELLERS complains that in making a solution of white shellac in methylated spirit the whole of the gum will not dissolve, or, rather, he cannot get a clear solution. After standing for several days the top part of the solution gets clear, but when this is decanted the addition of more spirit will not dissolve the sediment. He asks how to proceed.—The whole of the shellac is not soluble in spirit, and what is not is of no use in the varnish, even if it were. Moreover, the bleached lac of commerce always contains extraneous matters besides. The sediment may be filtered out. When this is done very little loss is entailed.

R. H. T. writes as follows: "I have formed the opinion that the colour of a negative has a great deal to do with the resulting colour of the print, from the following experience. Will you kindly say whether I am right, and whether the different colouration occurs from the intercepting of certain rays of light by the yellow varnish? I have a negative the foreground of which prints much too dark, and I have been in the habit of covering the foreground (when sufficiently printed) with a mask; but I thought I would save trouble by coating it with a varnish coloured by the addition of iodine. Having covered the foreground with the varnish, I find that it prints to the proper depth, but while the mid-distance or uncovered part tones brown the foreground tones purple; in fact, the picture looks as if done from different negatives, and on different samples of paper, or at different times."—Printing through coloured media has a marked effect on the result. This may be exemplified by taking a piece of sensitive paper and printing part of it to a certain depth in an unobstructed bright light, then printing other portions to the same depth through coloured glass or paper, which will retard the printing, or in an unobstructed feeble light, and it will be noticed that there is a great difference in the colour. We have often treated on this subject.

GLOCK writes: "Will you kindly reply to the following query in your next issue, if possible? I purchased a quarter-plate camera a short time ago, having been advised to select that size in preference to 5x4, or half-plate, because of its portability and the ease with which negatives could be enlarged, when desired, from the quarter-plate size, thereby avoiding the weight of the larger sizes; now, however, I am told that I was wrong in buying such a small size, and that 'enlargements' can always be told as such, and the results are not to be compared to large 'direct' pictures, &c. Now, I shall be glad if you will just set me right on this point. I may mention that I do not want lantern slides, therefore they need not be taken into consideration in answering the following question, viz.:—To what size can a good average quarter-plate negative be enlarged so that the prints from such enlarged negatives show no falling-off in any way with respect to sharpness, detail, &c.?"—Enlargements from small negatives may be produced very good indeed, but usually they can easily be distinguished from direct pictures, unless very skillfully made. The degree of amplification a negative will bear depends entirely upon its quality and sharpness. A good and sharp negative will bear an enlargement of three or four diameters without very material loss in quality.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Thursday next, October 10, 1889.—First lantern night of the season. Visitors are invited.

HACKNEY PHOTOGRAPHIC SOCIETY.—October 10: A paper will be read by Mr. J. Hubert on *Bromide Enlarging*, with demonstrations. October 24: Lantern night.—*India*, by Mr. Freshwater.

KEIGHLEY PHOTOGRAPHIC EXHIBITION.—An Exhibition will be held in the Mechanics' Institute, Keighley. The Exhibition will continue from Monday, January 6, to Saturday, January 18, 1890, and will include both amateur and professional work. Silver and bronze medals and certificates will be awarded.

We have received a circular letter from Mr. H. P. Robinson, in which he withdraws a statement made in the latest edition of his work, *Picture Making by Photography*, to the effect that Dr. Emerson's work on *Naturalistic Photography* has been almost universally condemned by photographers and the photographic press.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—At the next meeting, Tuesday, the 8th instant, in Mosley-street Café, Newcastle, there will be an exhibition of one hundred and fifty slides by optical lantern of those sent in to the competition. The remainder (one hundred and fifty) will be shown publicly at the Lecture Hall.

CAMERA CLUB NOTICES.—Thursday, October 3, eight p.m.—Opening of fourth One-man Exhibition at the Club; pictures by Mr. H. P. Robinson. Monday, October 7, half-past eight p.m.—First smoking concert of the season. Thursday, October 10, eight p.m.—First technical meeting of the season: Mr. W. Ashbury Greene will read a paper on *Detective Cameras*; members are requested to bring apparatus; a show of cameras will be arranged. Thursday, October 17, eight p.m.—Description and demonstration by Mr. Lionel Clark of his platinum toning process. Thursday, October 24, eight p.m.—Lantern evening: members are requested to inform the Secretaries if they can bring slides. Thursday, October 31, eight p.m.—Discussion on *Eikonogen*, to be opened by Mr. H. M. Elder, M.A. Monday, November 4, half-past eight p.m.—Smoking concert: offers of assistance requested. Thursday, November 7, eight p.m.—Mr. Andrew Pringle will read a paper, entitled *One Hundred and Thirty Exposures*; the paper will be illustrated by examples.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1536. VOL. XXXVI.—OCTOBER 11, 1889.

UNWASHED COLLODION EMULSION.

To many it may, perhaps, appear a retrograde motion to revert to the use of an unwashed emulsion, or one which necessitates the washing of each individual plate after coating, instead of, as in the case of a washed emulsion, merely pouring the emulsion on to glass and allowing it to dry spontaneously. Similarly, there are, no doubt, many who would consider coating plates not at all a step back from the general practice of the present day of buying them ready for use; yet there are not a few who, from inclination or for motives of convenience, still prepare their own plates on special occasions. In like manner, there are, perhaps, some of our readers who, despite the fact of collodion emulsion being a commercial article, prefer to make it themselves, and to such we wish to point out some of the advantages of an unwashed over a washed emulsion.

There is no disputing the general superiority of the latter form of emulsion for ordinary purposes—whether negative or transparency. Treated, as it is, in bulk for the highest degree of sensitiveness and the total removal of all useless soluble matters, the acme of convenience is attained conjoined to keeping qualities, which, perhaps, excel those of the dried films themselves. We have used washed collodion emulsion seven or eight years old that has given at that age the most perfect results, but we should scarcely care to pin our faith on collodion plates of any kind that had been kept so long. In use, too, the trouble of preparation is reduced to the one operation of coating the glass, which is then transferred to a plate box or drying box to dry spontaneously, which, owing to the volatility of the solvents employed, and the almost or, it may be, total absence of water, it does quickly and with the utmost regularity.

With the unwashed emulsion, on the other hand, containing as it does an excess either of soluble bromide or of silver nitrate—for it is practically impossible to exactly hit the balance—together with the "decomposition products" or alkaline nitrates formed in sensitising, as well as a considerable proportion of water, each plate after coating must be carefully washed to free the film from foreign matter and give it a homogeneous character. It is then usually, though this is not always necessary, immersed in a "preservative" or "organifying" solution, the chief use of which is to fill up the pores of the collodion with a soluble substance that prevents its drying or shrinking into an impervious skin into which the developer cannot penetrate. With some kinds of pyroxyline, however, the film retains, after drying, a sufficient degree of porosity to render the preservative useless, and in the case of a washed emulsion the treatment it undergoes in the washing process brings it to that condition. Finally, the plates have to be dried, and this is either a lengthy

operation if allowed to proceed spontaneously, or requires care and special appliances if heat be employed in order to avoid unequal drying, any check in the progress of the dessication resulting in an unsightly drying mark.

This, of course, renders the preparation of the plates a more or less troublesome operation, at least in comparison with the simpler process of purchase, though infinitely simpler and involving the expenditure of far less time than the older bath processes, of which the description recently given of Dr. Hill Norris's "new rapid" collodion process is a fair sample. Yet there are circumstances under which we should unhesitatingly adopt the unwashed emulsion ourselves and recommend it to others.

In the first place, it is much easier to prepare. This statement is true in more ways than one, for not only is the operation of washing, as well as the expense of a double quantity of solvents saved, but almost any ordinarily good sample of pyroxyline will answer, which is far from being the case with washed emulsion. The latter requires a pyroxyline of a peculiar character to withstand the washing process, and such specimens are not infrequently, though perfectly suitable for negative work, unfit for transparencies, especially for the lantern, on account of a faint opalescence or want of transparency when dried. This, though an improvement rather than a detriment to a negative, is decidedly out of place in the glass positive, and here the unwashed emulsion has the advantage.

Next, an unwashed emulsion, if properly made, whether it contains free soluble bromide or free silver, is in a better condition to take density *with ease* than is the case, except under most favourable conditions, after the emulsion has been washed. We do not wish to infer that washed emulsion will not intensify, or even that it is at all difficult to do so, but, as compared with the unwashed, it requires a stronger development, or, in other words, more forcing, which interferes with the delicacy of gradation and transparency, or "juiciness" as it has been termed, of the image. We have, therefore, an easier method of preparing the emulsion to produce a result at least as good, though necessitating a little more trouble in the subsequent operation; and we think that the conscientious photographer, whether amateur or professional, who looks first to the quality of his work, will scarcely begrudge that extra trouble.

On the score of keeping qualities it can scarcely, perhaps, be said that an unwashed emulsion can compete with a washed preparation. Mention has just been made of an emulsion containing excess of silver nitrate, that is, an excess of that salt over and above the quantity required to convert the whole of

the alkaline bromides into bromide of silver. In this condition, as all old emulsion workers are aware, the preparation retains its working qualities for but a short time, a period, indeed, which may be measured by hours, though while in that state it possesses a very high degree of sensitiveness, which gradually gives place to fog, and the emulsion becomes useless. When, however, the soluble bromides are in excess, the keeping properties of the emulsion are greatly improved, and when carefully compounded we have kept an unwashed emulsion in perfect working condition for many months. It is, however, inferior in sensitiveness to that prepared with and used while still containing free silver, and unless very thoroughly washed to remove the effects of the free bromide, or subjected to the action of an "accelerating solution," it falls short of the rapidity of a washed emulsion prepared after the same formula. Still, want of sensitiveness need not be one of the faults in practice.

It is little more trouble to prepare a large batch of emulsion than a small one; indeed, in some respects it is perhaps easier, since there is less liability to error in the matter of quantities. If, then, a quantity be prepared containing a moderate excess of bromide, say two or even three grains to each ounce over the theoretical quantity, the preparation may be relied upon to keep its good qualities for a very considerable time; indeed, it will actually go on improving for a portion of the period. With that excess of bromide the films will be very slow, though not too slow for contact printing, but will give results of the very finest quality, combining the utmost delicacy of gradation with any desired density or vigour and great richness of tone.

If for the purposes of reproduction in the camera greater rapidity should be desirable, it is only necessary to add to a given quantity of emulsion, an hour or two before using, sufficient silver nitrate (dissolved in a small quantity of alcohol) to partially or wholly convert the excess of bromide; or the requisite quantity of silver nitrate reduced to fine powder may be introduced from ten to fifteen hours previous to use, and the emulsion frequently shaken during the interval and carefully filtered before use. An emulsion so accelerated or resensitised will, if used within a few hours—*i.e.*, if coated and *washed* within a few hours—give the same quality of image with greatly enhanced rapidity; but if the whole of the bromide has been coated, it soon commences to become foggy, and eventually quite useless.

Before this stage is reached, if any of the emulsion remain after coating the plates required, it is only necessary to add to it a given quantity of the original emulsion, sufficient to restore the condition of free bromide; the mixture will then regain its keeping powers, and if used in that state will be more rapid than the original; or if the higher degree of sensitiveness be again required, it merely requires the addition of sufficient silver to convert the free bromide in the added portion of emulsion. Many of the old collodion emulsion workers were in the habit constantly of working in this manner, claiming that they thereby obtained better quality as well as greater sensitiveness.

Another method of acceleration which is simpler, though not giving the same rapidity, consists in treating the film, after thorough washing, with an accelerating solution consisting of glycerine, albumen, or gelatine, together with a small quantity of alkali. A weak alkaline wash alone suffices to give the extra rapidity; but the use of a viscous material as well is often convenient, especially in hot weather, in preventing the plate drying unevenly. This plan obviates the trouble of resensitising with silver nitrate and the subsequent desensitising.

So far we have assumed that the object is to prepare *dry* plates for storing or for contact printing; but the films may be used with equal facility in the moist state, and this may often be the more convenient plan. For instance, if a number of transparencies are to be made right away, there is scarcely any necessity to waste time in drying the plates; the operations of preparation may go on concurrently with those of exposure and development, one plate being left to undergo its necessary washing while another is being exposed; or, better still, the required number of plates may be coated and placed in one of the convenient washing troughs to soak. A dozen plates of small size may be easily coated in ten minutes, and no harm will accrue from prolonged soaking, so a stock of films ready for use, as required, may be prepared in a short time and with a minimum of trouble.

A word as to the use of these wet plates in ordinary *dry* plate slides. If introduced into the slide directly after leaving the washing trough, the lower rebate of the slide and the adjacent shutter groove will soon become saturated with water to the detriment both of slide and plates; but if before insertion in the slide the plate be reared up to drain on blotting paper for a few minutes, it will become surface dry, and in that condition do no injury at all. In hot weather the glycerine, or other viscous preservative, proves useful at this stage, as it prevents the plate drying at the edges.

If carefully drained as directed, the moist plate may be used for contact printing, strips of paper being inserted between the edges of the negative and plate. We have frequently thus produced lantern slides, interposing the ordinary mask to prevent contact between the two surfaces, without any apparent loss of sharpness.

Other applications of the unwashed emulsion will suggest themselves as occasion arises; but we have said enough to indicate that it is not an altogether obsolete preparation. It is essential however, both for keeping properties and for the proper attainment of the combination of quality with rapidity, that the emulsion contains a considerable excess of bromide. Keeping quality for a limited period can be secured with an emulsion in which the balance is only just on the side of the bromide; but the quality of image rapidly falls off. In addition to that, the subsequent addition of silver nitrate fails to give either the same accession of sensitiveness or the same good quality as when more bromide is present. For this and other reasons the accelerating method with silver is inapplicable to a washed emulsion.

NEGLECTED PROCESSES.—THE EBURNEUM PROCESS

THE "Eburneum" is, no doubt, a process of which many of the younger readers have never heard, and one that many of the older readers have almost forgotten. Why this process has to be classed amongst neglected processes is somewhat extraordinary, seeing that eburneum pictures are exceedingly beautiful, inasmuch as they possess a delicacy which it is impossible to obtain on paper. They were not difficult to produce, and they are still easier to do now, by more modern methods, than they formerly were. Hence it is possible that they may still come into fashion. As the name implies, the pictures partake of an ivory character; in fact, they were photographs, principally portraits, on an artificial ivory.

The process was first introduced by the late Mr. J. M. Burgess, of Norwich, somewhere about five-and-twenty years ago. It was, we believe, the original intention of its inventor

to sell the process to a certain number of subscribers as a secret process; but before the number was obtained the secret leaked out, was published, and so became public property. The process was, however, practised but to a limited extent by any but the inventor himself, though the results produced by him were universally admired; notwithstanding this it soon fell into oblivion.

The process, as worked by Mr. Burgess, was this:—A transparency by the wet collodion process was produced on glass, the plate, prior to coating with the collodion, being treated with wax to facilitate the subsequent removal of the film. In the development the image had to be kept exceedingly thin, while, as a matter of course, all the detail had to be secured. As a rule the pictures were vignettéd portraits. After the picture, or, rather, pictures—for in practice several were usually made on the same plate to save trouble—were developed, fixed, and finished as transparencies, the plate was placed on a levelling stand, and the eburneum compound poured on. This consisted of a solution of gelatine, with which was incorporated a white pigment—oxide of zinc being the one recommended by the inventor. To this mixture a small proportion of glycerine was also added, so as to prevent the gelatine becoming brittle when dry, and to secure flexibility. Sufficient of the compound was applied to the levelled plate to form, when dry, about the thickness of a thin mounting card. After the gelatine had set, the plate was reared up and allowed to dry spontaneously. When dry, the pictures were stripped from the glass and trimmed. They were then finished.

These pictures, when skilfully made, had all the appearance of being on ivory, such as that used by miniature painters, but without the objectionable grain. Of course, the eburneum compound could be made of any tint by the addition of suitable pigments. It could also be perfumed, as it was sometimes, by the addition of a small quantity of an essential oil to the mixture while in the fluid condition. By a proper proportioning of the pigment to the gelatine the pictures could be as well seen as transparencies as by reflected light. Some photographers who essayed Mr. Burgess' process totally failed through not getting the transparencies thin enough in the first instance, and of too cold a colour, these conditions being quite fatal to satisfactory results. A very thin image, but full of detail and of a somewhat warm tone, is an essential for a successful eburneum picture.

About fifteen years ago, Mr. E. W. Foxlee applied eburneum in the carbon process, and showed some excellent results at one of the meetings of the late South London Photographic Society. In this case the carbon print was developed on collodionised glass, as in the chromotype process. Then, instead of transfer paper, the eburneum mixture was applied in the same manner as in the collodion process of Burgess. But somehow or other the process, so far as we are aware, was never practised commercially, notwithstanding the beauty of the results it yielded.

On more than one occasion we have advocated the employment of "ivory," which may be had at most fancy stationers, in the carbon process. This material is certainly more convenient to use than the liquid eburneum, for it only requires to be softened in cold water and then squeezed on to the picture, to which it becomes firmly adherent when dry. Photographs on the commercial ivory, however, are not so satisfactory as those on the eburneum, as they possess a far less ivory-like appearance. Still, there is no reason why eburneum should not be supplied in sheets like ivory. If a demand were

created for the material, a supply would soon be forthcoming, as it is easy to prepare.

The Eastman transferotype paper affords an excellent method of producing eburneum pictures of a high class. This method of making them would certainly commend itself to every one familiar with the working of bromide paper or the stripping films. The print is exposed in the ordinary way, but to obtain a warm tone a very full exposure should be given and the image brought out with a much diluted iron developer, keeping it somewhat thin, yet securing full detail. The picture is then transferred to a collodionised glass plate, which has previously been talced, precisely in the same manner as when transferring a stripping film negative. The plate is then levelled, and the fluid eburneum poured on and allowed to set, and afterwards dry. When the picture is then stripped off it is finished; or, in the case of sheet eburneum or ivory, it is simply softened in cold water and squeezed upon the glass in the same manner as the gelatine skin is treated in the stripping film process for negatives.

Opalescent celluloid films coated with bromide emulsion are now being introduced commercially, and they may prove a ready means of producing eburneum pictures. But the examples we have hitherto seen by this method have been too cold in tone, and much too opaque and heavy; hence, they lack the transparency in the shadows which is so essential to perfection. These shortcomings in the specimens brought under our notice appeared to be due rather to the development than to the method itself.

With the later methods of production just alluded to there may yet be a future for pictures on an artificial ivory similar in effect to those by the late Mr. Burgess' process.

THE paper on a *New Photographic Developer*, read by Professor Liveing before Section B of the recent British Association meeting, forms a scientific account of the new substance comparatively recently introduced into commerce under the name of eikonogen. It has been objected that this is a mere trade term—a "fancy name" in fact (we are not aware that it has been protected under the Trades Marks Act), but it is quite evident that its chemical synonym would never be used in ordinary parlance. It is an acid, and is correctly termed: Amidob-naphthol-B-sulphuric acid, its formula being $C_{10}H_5, NH_2, OH, SO_2H$, and was first described by Professor Meldola in 1881. Professor Liveing's paper is interesting, more particularly as being a compact chemical account of the new agent, for he states that his own experience with it is very limited. He has found it, however, to give, in his spectroscopic work, which alone is the department wherein he uses photography, a picture in which the lines are blacker and more easily seen under a microscope than when pyro is used.

WE recently described a new method of folding and using a filter paper so as to present the largest surface to the liquid, as described in the *Chemical News*, and in the current number an improvement upon it, in the shape of a novel support, is explained by Mr. C. R. Gyzander. As a support of platinum wire is not likely to be used by photographers, it will suffice to describe the shape in which glass rod or tube is used. The rod is bent first into the shape of a capital letter M, the loop reaching to the base of the letter. The left hand upright is then bent half way up and brought round to the front in the form of a semicircle, and the right leg similarly treated, but turned behind the loop, the two loops forming the support for the paper, and the loop serving to separate the two inner folds of the filter. When in operation, and used apart from a funnel, the liquid drops from the lower part of the rod, or when larger papers are employed they can be placed in a funnel upon this support and filter much

more quickly than under ordinary conditions, though less so than when the funnel is not employed.

THE process of determining the strength of silver solutions by means of a solution of chloride of sodium is so well known and sufficiently exact for all practical purposes, that we merely place on record a new method, capable of great accuracy, recently described by M. Adolphe Carnot in *Comptes Rendus*. It is based on the insolubility of silver iodide in a nitric solution, provided it contains no alkaline iodide. One hundred centimetres of silver solution is taken, and if the approximate strength is known, a sufficient quantity of decinormal solution of iodide of potassium is added, and the whole briskly stirred so as to obtain the precipitated iodide in dense clots. The liquid is decanted along with a little washing water in a beaker, and a small quantity of starch paste and about ten c.c. of nitric acid, slightly discoloured by age or exposure to light, added. If at this moment the liquid becomes blue, it is exactly decolourised by means of a standard (centinormal) solution of silver nitrate (1.7 gramme per litre). If it is not coloured blue, potassium iodide solution is poured in till the permanent blue tint appears, which is then removed again by the standard silver solution. The author states that he has by these means been able to obtain results accurate to the fifth or tenth of a milligramme.

SOME experiments by Herr C. Winkler show the difficulty of obtaining pure salts of so easily treated a metal as gold, and throw a further light on the ease with which some simple every-day reactions can be shown really to depend less on the principal agent than on the presence of impurity or foreign matter. Thus, most of our readers are aware that the destructive gas chlorine is, in most cases, quite inert, unless moisture be present; and many other equally cogent examples could easily be cited. Taking gold for example, Herr Winkler's results show how ordinary methods can be falsified. He precipitated some gold in solution by means of sulphurous acid, and then washed and dried it at 180° C., and subjected it at 140° to the action of chlorine that had been repeatedly washed with carbonate of soda solution and dried with potash. He then dissolved the desiccated salt in water, and heated it for a long time on a water bath and filtered the solution. When this solution was treated gradually with sulphurous acid no precipitation was produced, even after boiling or exposure to air; only a deep red colouration was to be seen. He believed the colour to be due to the presence of minute quantities of aurous chloride.

AGAIN, he treated purified gold suspended in water with pure chlorine in the absence of light and dust particles, evaporated the solution to dryness, dissolved the residue in water, and filtered. There was no aurous chloride here, and when diluted there was, in place of precipitate or the above-described red colouration, a green colouration. A pure salt of chloride of gold and sodium can be obtained by adding pure chloride of sodium to either of the above-described gold salts and heating for some time. The red colouration is given by the pure salt, the proportion of gold in which is put down as being 54.39 per cent. It will be seen thus that the makers of the commercial chloride of gold do not wander far away from the actual theoretical equivalent, their proportion being seven in fifteen, or between forty-six and forty-seven per cent.

ON THINGS IN GENERAL.

"THE steady advance of the photographic art—for art indeed it has come to be," a sentence which forms the opening of the *critique* on the Exhibition in Pall Mall by one of the London dailies, strikes the keynote which governs most of the recent reviews on matters photographic; and, after the supercilious way in which "mere photographs" were wont to be treated no long time ago, it is refreshing enough to read. Another paper puts the matter in a nutshell. "Time was when art and photography were considered as the poles asunder. . . . But the hostility of photography and art is in a higher sense than this a thing of the past. Good photography is now artistic or it is nothing. . . . What is demanded now is that the man behind the camera shall have the instincts of the artist. . . . in fact, lenses, dry

plates, and instruments are now tools in the hand of the artist as completely as the brush and chisel." I rubbed my eyes when I read this in the columns of a leading evening paper, for it represents to a nicety what I have always claimed—it is not the product of process and tools that makes a work of art; otherwise, the meanest sign painter produces works of art: it is the extent to which the result embodies the art knowledge of the producer. Who can deny this? and granted so much, who can deny photography the possession of such power? A limited potency, it is true; but, nevertheless, actual and existent. I would not have my readers imagine that I believe the improvement visible in the *technique* of photograph producing to be necessarily a sign of artistic improvement—quite the reverse; but there is abundant evidence now to be seen of a spread of that feeling for beauty, that power of bringing before the spectator some high thought, some conception, be it great or simple, that first found place in the brain of the producer, and all combined with greater power of expression. Rejlander never saw such perfect photographs as are now daily produced; but, on the other hand, no photographer, to my thinking, has ever excelled him in the "power of appeal to the feelings"—power of producing work which all who saw would stamp as the product of a mind instinct with art. The day is now quite past when, to slightly alter Dr. Johnson's dictionary upon another matter, the critic will say, "a photographic exhibition is worth seeing, but not worth going to see." I must confess to some little feeling of disappointment in the present Exhibition at the presence of a larger amount than usual of pure rubbish. What were the Hanging Committee about to permit its presence? Why also should they put on the line one of the poorest pictures in the room—an exceedingly flat "carbon" picture of a very conspicuous colour feebly worked upon in crayon, differing most conspicuously in colour from that of the print itself? However, I will not complain; the hanging was very effective decoratively, a point which must be considered, and there were few such conspicuous cases as this.

There were a few life-size heads to give point to Mr. Dallmeyer's dictum recently cavilled at, that "the direct large head, when taken under the most favourable circumstances, that is, with a lens of long focus, is undoubtedly much more pleasing than an enlarged small image." So far as work has been done at present this is all very true; but it is not necessarily a result of either mathematics or lens making, it is a question of process. I strongly believe that the day will come when an enlarged portrait photograph will be executed which shall not be distinguishable from one taken direct, a far more desirable consummation than the ability to make a good negative with a big lens. Given two results of equal merit, commendation should be given to the process which occupies least time and gives least trouble. Life is too short to go up a ladder to ascertain what's o'clock.

But why this eternal rodomontade whenever lenses are mentioned? Why this talk of long focus, and short focus, of conjugate foci, and theoretical and actual truth? Well might Captain Abney make the remarks he did at the British Association upon the want of science among photographers. The whole truth can be put in a line—the existence and extent of this so-called distortion (as a matter of fact there is no distortion) depend not upon the lens, but upon the standpoint, the distance from the object where the lens is placed. In the case of a portrait the difference between rectilinear and portrait lenses is quite a negligible quantity.

In no case in the whole range of photographic practice does the utter and entire absence of scientific—aye, it may even be said "reasonable"—method exhibit its naked ugliness to the extent that is seen in developing formulæ. It is positively nauseating to read the descriptions given of any novelty in this direction. We have already on our hands a new candidate for favour in the new sulphonic acid termed eikonogen, and there were fair grounds for hope that after so much had been said on the subject we might have some principle, some reasonable method of stating proportions in these formulæ; but no! If we want to know what is the difference between A, B, and C's method of working, what strength of "eiko" (will that be its laboratory name?) to the ounce or litre of water, what amount of alkali or bromide in proportion to "eiko," we have to make a calculation wasteful of time and temper, with also the possible result of finding two apparently different formulæ to be almost identical.

Such little vagaries as dissolving sulphite of soda at the rate of a pound to two pints of water one has got to look upon as a necessary concomitant of these formula-mongers, whose practical knowledge is about equal to their acquaintance with scientific method; but at the same time it might be convenient if the Editor were to get a stereotyped footnote, thus: "These proportions are impossible," the objection would be that it would be a serious inroad upon the profits of the JOURNAL. Such formulae and such modes of placing them before the public degrade the science, and render so many of its exponents little more than laughing stocks.

My lucubrations must end this week by a reference to the "new mode" of preventing blisters on albumenised paper. The practical photographer is well aware that though some brands of paper are specially liable to blister, suitable treatment will reduce them to a minimum; but failing any other remedy alcohol is excellent. Not however, as lately recommended, as an intermediate bath between toning and fixing: that would be absurdly costly, even when methylated spirit was employed. The place for the alcohol is in the fixing-bath: from five to twenty per cent., as found desirable, is a certain cure always, which salt is not.

FREE LANCE.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—II.

WE now commence a detailed notice of the many photographs in this year's Exhibition, which are well worth a very close inspection, and as medals have again been awarded for the best work, we will give due honour to those exhibits which the Judges have chosen as worthy of distinction.

Lyddell Sawyer (No. 84), *Dangerous Company*.—Medal.—This is one picture out of ten, all showing great artistic perception of form, and light and dark portions for pictorial purposes; in fact, many of these pictures suggest the idea that they have been photographed from paintings. The particular study to which the medal has been awarded derives its chief interest from the two figures—one a young girl, leaning against a seat attached to a tree in perfect ease, listening to the soft nothings of an admirer, who, partly in a boat and partly reclining on the grassy land, gives the title to the picture, which tells its tale in so pleasing a manner that all who see this photograph will sympathise with the very pretty way in which the everlasting story has been treated. We would call special attention to this picture for the very clever way in which the contrast of light and dark portions have been arranged so as to demand the fixed attention of the beholder. There is one point in this picture which is well worthy of attention, and that is the cleverly arranged bit of drapery which, laying on the grass, and in harmony with the oar of the boat, also laying on the grass, very clearly shows the artistic perception of the right balance in the arrangement of form; in fact, the whole selection and construction of this picture, with its contrast of light and dark, is a most felicitous example of photographic art work. But (and we hesitate whilst we write) why was the brush used on the print? We must be loyal to our scientific method of producing pictures, and, with trepidation, would warn this most promising young artist that the clever photographic delineation of nature must not be jeopardised by the unartistic brush. At another time we will call attention to the remaining very attractive photographs of this promising exhibitor.

R. J. Williams, jun. (Nos. 99 and 101), *Two Photographs*.—No. 99, *Sirripping*, and 101, *Prancing* (medal)—are very clever pictures. The figures, upon which the artistic perception has been, as it were, brought to a focus, are very clever specimens of that section of naturalistic art which consists in the choice of the right moment when the moveable object is in artistic accord with the fixed view of the spot chosen. In these two pictures this capability is most admirably illustrated. These photographs also show a departure from the hitherto very good work of this exhibitor, but who seemed to be tied down to the style of a well-known photographic exponent. These exhibits show an independence of the master which promises well for the student, and are two most admirable specimens of photographic art work, being far removed from those productions of photographic realism, which, in many instances, only give the results of science, without any art. The position of the figures in both pictures show what a powerful effect can be produced, even when the source of light is right in front

of the camera. These pictures remarkably illustrate the way in which photography should be utilised by artistic workers, viz., science portraying truth under the guidance of art.

Frank M. Sutcliffe (Nos. 136, 137, 138).—Medal.—These consist of three specimens of the usual productions which this exhibitor produces every year. They consist of pictures with an artistic perception of arranged or waited-for moments, when the figures combine into what will eventually prove to be a pictorial study. Whilst admitting that there is very great artistic construction shown in these photographs, we feel compelled also to state that some choicer specimens have been shown by this exhibitor—in fact, the work shown last year by Mr. Sutcliffe were remarkably fine examples of this really artistic photographic worker. However, as evincing an exceedingly effective capacity for utilising the picturesque in simple seaside and country-life figures, this photographic art worker keeps up the even tenor of his way, which we venture to suggest is capable of higher possibilities in photographic representations of more emotional scenes.

Green Brothers (No. 178).—Medal.—Here we come upon the debatable ground of enlarged work; by that we mean that the subject matter always being the same, or rather remaining in the same place or position, the final result will depend entirely upon the scientific capabilities of the operator to produce a negative or enlargement which shall contain the best record of the light and shade, and more especially detail, of the original negative. We cannot but express the notion that however successful or satisfactory such representations may be, photography does not do full justice to the scene portrayed, the chief interest artistically felt being in the colour, which a simple translation into black and white does not always realise. There may have been a larger amount of transparency in the water, which would have assisted the picture in its photographic rendering. The left side of this print appears somewhat coarse in detail, almost suggesting that the scientific lens was at fault on this side of the negative.

Ralph W. Robinson (Nos. 413 to 426, 439 to 441, and 457 to 479), *Portraits of some of the Royal Academicians and Associates*.—Medal.—We have here a very interesting collection of thirty-one whole-plate photographs of the celebrities of the Royal Academy of Art. Such an assemblage of the acknowledged aristocracy of fine art has never before been subjected to the comparatively lower grade of photographic representation, and very much interest will arise from a careful study of these very successful portraits, which derive great interest from their freedom of subjection of the usual photographic studio, being taken at the homes of the sitters. There is here no apparent posing for effect, and the whole series very forcibly bring to mind some remembrances of the Dutch school of portraiture, where the home surroundings of each portrait give an assurance of the personality and truthfulness of the sitter's every-day life. We arrive at the conclusion that the individuality of each sitter is very marked, consequently there is a peculiar charm and interest about these portraits, which not only reflect much praise upon the son of an accepted master of our art science, but also makes us familiar, in a very natural way, with the individualism of certain eminent men who have thus been brought into direct contact with the outer world. There are two matters which suggest themselves from a perusal of these very clever and promising photographs: one is, that such eminent exponents of fine art should have acknowledged the present position and capabilities of photographic portraiture by submitting to the possibilities and contingencies of our scientific art; the other, that naturalism by itself is not capable of expressing pictorial ideas, but must be subjected to the higher force of design and artistic control. It is very evident, from a study of this very successful series of portraits, that much thought and artistic usage of material has been given to these portrait studies.

Harry Tolley (No. 447), *Carting Hay*.—Medal.—This exhibitor, from whom we naturally look every succeeding year for some refined and artistic studies, has not disappointed us. This picture is very simple in its origin, but notice what thought and artistic perception has been brought to bear upon the accessories introduced, viz., the waggon full of hay, the horses, and the men, all these, possessing various gradations of tone, ranging from black to pure white, have been so arranged as to form a very artistic result. Notice the figure which has been arranged to lay down on the hay, just in front of the

foremost horse, thus carrying out the dominant idea, which must have been instinctively felt, that the whole outline of distant hills, the cart of hay, the horses, and this reclining figure, all tended towards a line in perspective. This result evinces design on the part of the photographer, and which, unknown to the general observer, conveys the sensation of a pleasant picture, and with nothing artistically objectionable in it. This is one of the year's exhibits which so much raises the possibilities and realisation of photographic art.

Robert Faulkner (No. 480), *Professor Stewart Blackie*.—Medal.—A most artistic and effective study of a difficult subject, placing the photographer in one of the most trying and momentous positions to which he can be placed, that is, the rendering of the intellectual attributes of a sitter by the agency of a mechanical instrument which automatically obeys his will, so that it is just the thoughts and intentions of the operator which we see before us, as well as the purely scientific aspect. Therefore, in this study we recognise the outcome of thought artistically shown in the arrangement of the position; then the right moment to appreciate the individuality of the model; and, finally, the precise moment of time when science obeys the dictum of art. This portrait, in all respects, deserves the most thoughtful attention of all who desire to raise photography to the position of something far above its ordinary mechanical efforts.

APPARATUS.

In the Apparatus Section and on the tables are a good display of many of the mechanical appliances which have been introduced during the past year.

The detective camera invented by Messrs. Swinden & Earps, for which a medal was awarded, differs in many respects from any others of the same class hitherto introduced. In this the plates, about twenty in number, are simply backed with ruby or other opaque paper and placed in a reservoir at the back. They are kept pressed forward against the exposing plane by springs, and after the foremost of the series has been exposed, it is, by means of a handle or plunger below, allowed to drop into a recess in the bottom, in which it lies face down, the second plate falling in turn upon it, and so on until the whole have been transferred from the back reservoir to that below. The opaque paper backing overlaps the face of the plate slightly, and thus achieves the twofold purpose of preventing the transmission of light from one plate to that behind it, and of protecting the sensitive surface from abrasion. When all the plates have been exposed they are removed from the lower reservoir through a door in the side, and the now empty back reservoir is recharged. The Photographic Artists' Supply Association, Charterhouse-square, are sole agents for this camera.

There are some very useful appliances connected with the oxy-hydrogen limelight exhibited by Mr. R. R. Beard, these consisting of regulators for compressed gas, which exercise a discriminating power upon the emission of gas from the cylinders. Mr. Beard has supplemented this desideratum by the introduction of his gas connector for two different-sized necks of cylinders, though why there should not be absolute uniformity in the screws of all cylinders we are at a loss to perceive. Anyhow, the connector is useful.

Mr. Thomas Samuels shows a variety of apparatus comprising his "Model" 5x4 detective camera fitted with interchangeable case, a tourist's portable hand camera for half-plates or films, a studio camera with focussing cloth always in position, and a changing back for a hand camera.

The "Al Fresco" enlarging camera of Mr. A. R. Wormald, of which we gave an account when describing the apparatus at the Crystal Palace Exhibition, is here to be seen.

(To be continued.)

SOMETHING NEW IN STUDIO CAMERA STANDS.

THE word "new" in the above heading is possibly rather a venture—some term to use in these days, and will tend to raise expectations not easily gratified; nevertheless, I hope to justify its use by adding another idea to the common stock.

The early and still most common form of studio stand—that consisting of the rising pillar and table top with the Archimedean

screw and rackwork as the means of putting it in motion, and also the table stands of both English and American design and manufacture—have all the common fault of deficiency of range, the necessities of their construction not admitting of both sufficient elevation and getting near enough to the floor in the same piece of apparatus. There is a patented form of stand which is not defective in these respects. It does not, however, appear to be so widely known as it merits. Of the two failings, that of not being able to go low enough is the principal, child and animal photography on the floor being practically beyond the operator from this cause alone, unless he use a supplementary floor similar to the one I described and employed in these branches of the art some years ago. Without this the production of the pretty and unaffected pictures of children playing on the ground were not possible, as the views from the high stand had too much of a bird's-eye cast to be pleasing; and besides, standing and many other poses were beyond the powers of quick-acting lenses. The old pattern might be made with less rise now the question of rapidity of exposure is not the prime consideration, and this would enable some modifications to be made whereby the camera could be worked at a lower level. In collodion days it was necessary, to ensure average definition, that the lens should be humoured in every possible way, and that no advantage which the rise and tilt of the stand or the raising of the camera front were capable of giving should be neglected, as attention to these matters meant better pictures with a larger stop.

Many years ago a writer in these pages, in discussing the merits of the studio stand and noting its shortcomings, suggested in remedy that the table carrying the camera might be hung in uprights and counterbalanced by weights on the principle of, and similar to, the hanging of sashes. The idea embodied, and I should imagine to a great extent renders invalid, some of the claims of a recent patent which includes these features. The idea struck me as being of the right sort, and a note of it served for the germ of the modified form about to be described. The system of counterbalancing by weights having many objections, the problem was, How to hang the table in the uprights to secure the advantages of that system, and to have besides a ready means of adjustment to enable cameras of various weights to be employed at will. A tight blind cord solved it. The principle of tension thus illustrated, and capable of being regulated to act between almost any extreme by the simple turn of a screw, gave all that was required for the purpose, and was soon practically applied to a stand with the range of a few inches from the floor to about six feet from it, whose table or support for the camera can in a second or two be adjusted to support one pound or fifty, and so sensitive that slight pressure will place it at any part of the range where it will remain or may be further secured with a bind screw.

I have constructed a couple of stands for large and small cameras respectively, both of which, although of different model, embody the ideas sketched out above. The smaller one to carry a whole plate universal has its foot or lower portion made according to the model of the usual form of Archimedean, but much lower, and of a size sufficient only to give the requisite stability. This, instead of being pierced at the centre with the square hole for the admission of the central pillar, is left intact, but cut away at the sides for the reception of two substantial and deeply grooved uprights of sufficient length for the range decided upon. These, when fixed and cross-tied above, complete the framework to receive the support for the camera. This is of the usual form, and is fitted with the means of tilting and giving lateral motion exactly as its predecessor. Its sides, however, are fitted with two vertical slips to take the grooves of the upright frame, which are pierced with holes on their upper and lower ends for the sash-line fastenings. On the cross-tie are screwed two shank pulleys which, when this is fixed in position, come into the grooves of the uprights and provide the means of suspension. The lower ends of the uprights, where they pass through the lower board or timber of the foot of the stand, are fitted with sliding blocks bearing two similar pulleys and having a screw with wing nut projecting from the bottom end of each. These form the other points round which the cord circulates. Across the bottom of the stand, and extending between the uprights, is a piece of spring steel hung on pivots at the centre of its length, scale-beam fashion, which is pierced at its ends with holes to receive the screws of the pulley blocks where they are retained by their wing nuts.

To complete the arrangement for action, a length of sash line is taken and fastened in the upper hole of the vertical slip on the side of the table, its other end, being passed over the top pulley from the front, is conducted down the groove in the upright to the lower one, round which it passes to the under side of the slip, where it is pushed through the hole and fastened. The other side of the table is suspended in the same manner, and completes it ready for regulating the

tension of the cords to any weight the table top has to support, or to any state of the weather and its effects in expanding or contracting them. This is effected by means of the screws. The nuts are turned up equally, till the cords are strained tight enough to support the table itself. The camera is then placed upon the table, and a few more turns given to either nut till the tension is right for that also. The spring equalises the pull and divides the weight between the cords, and thus ensures the passage of the table and its burden, as it is raised or lowered in the uprights, to be free and smooth, with no liability to stick, as would be the case if no means of automatic adjustment were present. A bind screw on the sliding portion operating a slip to grip the upright destroys any possibility of slipping, and when this is released and the tension is right, a mere touch is all that is needed to carry the camera through the whole extent of its range to within a few inches of the floor to five or six feet above it. This system of tension, the application of which I conceive to be new, possesses many advantages over counterbalancing by weights—the one being capable of adjustment, while the other is a fixed quantity.

The second stand, from being designed for large and heavier cameras, is of a different model, especially in respect of its foot. This consists of two pieces of timber framed together with cross-pieces, and made more solid by another stout cross-piece, in which are stepped the two uprights. These, again, are of a substantial kind, about six feet high, with a cross-head above, and held truly perpendicular to the foot by scrolled pieces used as struts on the sides. Besides this use these scrolls serve the purposes of ornament, and destroy the appearance of nakedness and instability which characterise the uprights when no such supports are applied. On the insides of the uprights are worked two grooves about three-quarters of an inch apart, which are fitted with tongues of mahogany to serve as guides for the table or cabinet support for the camera that is to slide between them. In the main stuff at the top and bottom the pulleys are fitted, the lower ones being arranged to slide as in the preceding stand, and may be either used with counterbalancing weights or tension cords, as may be found most convenient. The sliding support for the camera is made in the form of a small cabinet to contain the etceteras required in the working of the studio camera; its top having all motions—lateral, tilting, and so forth—usually found in well-made stands, and has a bind screw to keep it steady in any desired position.

In a large studio a stand of this kind has a very superior look, both solid and good. Its weight gives it steadiness, while its being fitted with rather large castors enables it to be moved into position as readily as any stand of lighter make. There is none of the grinding business about it of the older forms, as immediately the bind screw is released a slight pressure up or down elevates or lowers the camera into position with the greatest nicety, and without noise or bustle.

JOHN HARNER.

THE WHOLE DUTY OF THE PHOTOGRAPHER.

I.

"*Je n'en vois pas la nécessité, moi !*"

THE French cynic notwithstanding, most men are agreed that they must live, and all whom we call in the least civilised endeavour to do more, and to live well or beautifully. It is said that a human creature may support life in this country on about seven or eight pounds a-year, whereas the support of an agricultural labourer costs between thirty and forty pounds. In so far, then, as the civilised man surpasses the bare necessities of life and acquires luxuries, does he surpass the animal and become an artist, good, bad, or indifferent, according to circumstances; sorrowfully bad, it must be admitted, in most countries, though not in all. The Indian and Japanese, living on rice, and almost without clothes to cover them, are true artists, and have given laws of beauty to the Western world.

The attempt to live well has naturally as many different developments as there are different dispositions of men. Some are content with a sufficiency of whisky, others require fine food, but all agree in demanding the satisfaction of some sense which may be more or less subtly developed. The gratification of the sense of hearing was, no doubt, the origin of music and poetry, and indirectly of all literature. The sense of sight has been similarly served from the earliest times by the production of beauty in colour and form. The photographer is one of the recent products of the world-wide demand for things fair to see, and his highest duty is to satisfy this demand in the best manner possible. This is what might be described as his function with regard to the sensuous side of man; he has many other duties

which I regard as lower, and which serve the intellect. Thus, just as literature has to be degraded to the production of scientific treatises, and all the other "books which are not books," so the crafts of drawing, painting, and photography have to be made available for conveying information to mankind through the eye.

I wish first to treat of what I regard as the duties of the photographer in this lower and less vital sphere of labour. As a photograph easily surpasses any other sort of picture in accuracy and detail of form, so all descriptions of things new to man ought to be, when possible, completed by photographs, and the photographer should be regarded as essential to every exploring party, whether in search of antiquities in Egypt, unknown types of man in Africa or America, new plants or animals or insects anywhere in the world.

In order to gain some idea of what photography may do in this way for us and our descendants, let us look a little into the past to see what it might have done for us if invented at an earlier date. For long enough the so-called historians have occupied themselves with chronicling the doings of kings and princes and the fighting of battles. Even this sort of writer would acknowledge that accurate portraits of his characters would be precious beyond calculation. What would we not give for correct portraits of Edward the First, or Queen Elizabeth, or Shakespeare—who ought to come first? Or here, in the north, would we not give anything we have for portraits of Queen Mary, or Robert Bruce, or Michael Scott? Of Bruce it is true there is a portrait by Blake, but the modern critic is apt to call in question the reality of the spectral appearance from which Blake worked. There is another class of historians who are gradually replacing the devotees of kings and battles with a real story of the progress of human life, and to this class of writer it is hard to say what sort of record would not be valuable. How precious is an old map, even though there are none of great antiquity, and the earlier ones are wildly incorrect! Still they are better than nothing to a generation thirsting for knowledge. A very learned historian (Thorold Rogers) has devoted many years of hard labour to collecting from every imaginable source all evidence bearing on the ways of life of the people of England in olden times. For all his research, the picture of the life of a peasant of the fourteenth century is very incomplete and unsatisfactory. It is possible to show how long he worked, and what was the purchasing power of his wages, and so to prove that his condition was in many respects much better than that of his descendant of the nineteenth century; but as to what sort of house he lived in, what tools he worked with (except that very few of them were made of metal), what clothes he wore, and even what sort of man he was himself, we are and must remain almost wholly ignorant. Any accurate picture of the house and its surroundings, interior and exterior, would convey more to our minds now than all the laboriously compiled figures of the historian or statistician. But this is a small part of the legacy that the imaginary photographer of that day might have left to us could he have existed. Accurate records of progress in every form would now be of enormous value, both to the scientific historian and to the biologist. There is some reason to believe that the average height of the men of our race has increased in the course of centuries, and it is almost certain that the weight of a fat bullock now is about three times what it was in the days of the earliest records; probably the sheep has progressed in the same manner. And this wonderful change is by no means confined to animals. Our food-bearing plants have also developed under the hands of the skilled cultivator. But how? At what rate? Through what stages or processes of change? We know not; but all this and much more might be told us by photographs or accurate pictures of these things as they were and as they are, and Mr. Francis Galton would not require to spend his life in hunting men's memories for statistics of heredity, the field of knowledge would lie open where to choose.

Of the methods of commerce of that old time we are almost as ignorant. We do know that very long journeys were undertaken, that the cost of the carriage of goods was not high, and that by one means or another heavy goods were conveyed, not only through the length and breadth of Britain, but even from the remotest parts of Europe; and that the great periodic markets, like Stourbridge Fair, drew buyers and sellers with their wares from every country in Europe, and even from Arabia, Persia, and India. How these merchants came, what manner of men they were, and even what they brought with them, are questions surpassing the knowledge of the historian. These and many other unsolvable problems might all be matters of common knowledge to us in this day had there been any one who made it his business to produce accurate pictures of the objects and events passing under his notice. All this is very visionary, and the truth is, such a being could not have existed in a non-critical age, when men took things as they found them, with-

* The story is as follows:—*Culpit* (excusing himself for his offences): You see I must live, my lord. *Judge*: For my part, I don't see the necessity.

out comparing, testing, criticising, and considering what will be the effect of such an action? what will posterity think of this?

Times have changed deeply since then, and we now live in an age of increasing criticism and self-examination, whether for good or for evil we cannot say. This change appears to me to warrant the opinion that the time has now come when we may begin consciously and designedly to preserve historic records for the use of posterity. What has posterity done for us? the cynic may ask. I neither know nor care; let it suffice that we have it in our power to do much for posterity, with which any reasonable being may rest satisfied.

Naturally it is not possible for any individual or small group to make and keep records for generation after generation; this is the proper function of large organizations or societies which are immortal. It is not long since a proposal for a Royal Photographic Society was mooted, and though I am not aware that at the moment it attracted much attention, I have no doubt that within the next few years such a body will come into existence; and let us all hope that when it does the F.R.P.S. will not fall into the same evil repute as another four-letter title beginning with F.R., but that it will carry a guarantee of a real scientific knowledge of photography, instead of being a sort of charm or fetish bought for money. Such a Society should keep a library of great albums containing a record as complete as it can be made, and in *permanent photographs only* of the present state of the world. This is not a small task; indeed, to do it completely far surpasses the resources of any one nation, but I hope to see the foundation of a Royal Photographic Society soon followed by a similar organization in every civilised country.

How may such a record be kept? The energy and skill to do it are by no means wanting; the photographer seems to be much more truly ubiquitous than the proverbial Scotchman: he is to be found in balloons, as well as in catacombs, mines, and sewers; he swarms on the glaciers and peaks of the Alps, he eludes the guards of Buddhist temples, he penetrates forests, "where the hand of man has never set its footprint;" I believe he has been at the bottom of the sea—in short, wherever man has penetrated his three-legged friend has not been far behind. This is good, and often very good; but it is not all. To begin with, what do most photographers do with their results? It is much to be regretted that, as a rule, they make a few silver prints, and either keep them, or give them to a few friends, or sell them, as the case may be. I think I can imagine the indignant contempt and fury of the photographer of half a century hence for my brethren of this time, who, having at their choice a multitude of beautiful permanent processes, still obstinately continue to waste their best exertions on the production of pictures which will be nothing but waste paper in a few years. If the results produced in carbon or platinum, or any other permanent material, were in some way repulsive to the sight, this would still be no sufficient excuse for neglecting to produce a certain number of them—not for hanging on walls or for show, but for preservation. The fact, however, is quite the other way; most of the permanent processes yield results of immeasurably higher artistic merit than the common silver print, to which we adhere with such infatuation. Far the most beautiful, as well as the most enduring form of sun picture, is the carbon transfer on opal. Both image and support are in this case everlasting (barring accidents), and yet how rare are such photographs in comparison with trashy prints having the "brilliant surface" so much sought after by the barbarous. Professional photographers are much to blame for the slowness of the introduction of carbon transfers. A professional who is much in fashion at present lately produced an excellent negative of one of my friends, and I wanted a carbon print on opal, single transfer. On inquiring the price of such a thing, cabinet size, I was told 4*l.* 4*s.*, "enlargements dearer according to size." I did without. Now, including all possible expenses, there is no reason why this price should exceed five shillings. Of course, all photographers' charges are not the same, and photographs on opal glass are making their way into the market steadily, whereat all who love things beautiful should rejoice.

All this, however, is hardly relevant to the question of how may the history of the present day be handed down to our descendants in a true and graphic form? In many ways.

Firstly, I should say, by photographing the human beings of this time—not only those who can pay for being taken, but also those who cannot. Of the former class, I take it, pictures enough and to spare are being daily produced, but very little record is being kept of the state and appearance of the poor. The Crofters' Commission excited a passing interest in one class of poor people, and we had a few photographs of Croft houses and their inhabitants in working garb. These will be most valuable documents a century hence, if they are still in existence. Such photographs illustrating social states should be multiplied, which might surely be done easily now by means of one or another of the many detective cameras in the market. Nothing is

surer than that the social relations of classes in this country will change profoundly in the not distant future, and after the change has come about records of the state of matters before will become valuable. Let it be remembered that though the poor are the majority, they are naturally inarticulate and die unrecorded.

A new departure in portrait photography has been made lately in the production of composite photographs. Whether these will ever have much value, except as curiosities, is rather questionable, but I am disposed to believe that they may one day be regarded as valuable as records of types of face. In order that they may serve this end they would require to be done in great numbers, and the prints must be permanent.

All photographs ought to be labelled, for how can any one be expected to remember what they all are, and when and how they were taken? Those which are intended for permanent preservation should be very exactly labelled with date, time, place, and as much as possible of the conditions.

Cosmo I. BURTON.

(To be continued.)

THEORY.

FROM time to time there appears in the photographic journals an elaborate article in support of some particular theory, and, judging by the language in these papers, the inference might reasonably be drawn that photographs were in great part matter of line and rule, or the outcome of equations more or less complex.

It will be familiar to readers of the *St. Louis-Canadian Photographer* that quite recently the theory was promulgated that photographs should be inspected or studied at a distance from the eye of the spectator equal to the focal length of the lens by which they were taken. There are objectives in use with a focal length of three and a half, four, five, or six inches. Will any theorist kindly study a photograph, say, *four* inches from the eye and report the result? This is really bringing the figures of our youth into a prominence which is scarcely to their credit. What can the majority of us see in a picture four inches removed from the organ of vision? and what a wonderful thing this photograph must be, according to the theorists, that it can only be properly studied at a distance from the eye corresponding to the focal length of the lens which projected it. Surely some account ought to be taken of the near-sighted people and the people of long sight. We read the newspaper at arm's length if necessary; a print or a painting we criticise according to its fineness of execution, its breadth of lighting and effect; but a photograph is quite another consideration—out with the pocket-rule or the tape measure and query the focal length of the lens before we are in a "position" to scrutinise; and then those art critics shrug their shoulders and declare photographs are only mechanical productions, and photographers may be anything they please to designate themselves in this world so long as they do not arrogate the title of artist.

Why is not the theorist a consistent "bundle of atoms?" Why does he not cry "Excelsior!" and proclaim the dogma that before studying the photograph in accordance with the eye and focal length of lens, noting the size of the diaphragm used must be duly ascertained and the pupil of the human eye contracted or dilated accordingly? The subject will resolve itself into an equation something after this fashion:—Let x represent the pupil of the eye when examining a photograph taken by a five-inch lens, aperture $f/4$. Required to know what will represent that eye when looking at another photograph taken with a six-inch lens, aperture $f/32$, Q.E.D.

Another subject which has been discussed with most profound acumen and unbounded fertility of language is that of the swing back. The majority of the text-books and manuals on the "art" (?) of photography unhesitatingly advise the novice, when he cannot get the top of that church steeple or Jubilee memorial into his picture, to at once tilt his camera and swing his back; and the good people who propound these crazes write their next sentence on the "art" (?) of photography and once again the art critics give their shoulders another shrug, telling the world at the same time that a photographer never can be an artist for he knows nothing whatever of art. Now, who in possession of all those natural senses with which he is supposed to have been endowed at birth, who of us in this category would lie flat on his back in the roadway to study the "varied beauties of the landscape?" The idea and the situation are alike absurd. But the absurdity is only a question of *degree or intensity*, if posing one's body with all the grace we can muster at an angle of, say, 30, 45, or 60 degrees from *terra firma*, we proceed to make what we are pleased to term "pictures," but which some people term "only photographs." We often read of the intelligent observer, or the dispassionate listener. Let us endeavour to make

this swing-back business plain, even unto him, and ask him to stand in front of any edifice and note the effect which the various architectural lines composing that building convey through his eye to his mind. Next, let him from a rocking-chair study the same building at angles varying with the elevation or depression of the seat and again note the effect. It will not for one moment compare with that obtained by the vertical position. And it signifies not whether it be the human eye or the optician's lens which has been tilted, the outrage on the laws of perspective is precisely the same, and would be committed by no one cognisant of those laws.

The photographer's ready reply, based on the manuals of his art and the dicta of the various camera-box makers, is that though the lens has been tilted the back has been swung vertical with the building, and that whatever errors have been committed by the front of his box they have been rectified by the elaborate construction behind. And once again those art fellows give another shrug and say photographers never will be artists, even if some of them are very fair picture-frame makers. Why, the photographer's reply makes the matter worse so far as regards perspective, for it proves his complete innocence of that branch of an artist's education.

There is one piece of photographic *argot* which must be noticed anent the swing back. "He must tilt, or he cannot get the subject on his plate." What a confession from one who aspires to be considered an artist! To put this into plain English, the average photographer confesses that his mechanical appliances are such that he must resort to a cabinet-maker's dodge in order to secure the entirety of his subject, at the cost of whatever laws may happen to exist on perspective or anything else; it is all the same to him, so that he "get it"—the weather-cock on the steeple. And this "getting it in" the plate seems to be the height of but too many a photographer's ambition. It does not occur to him to procure another objective of shorter focus or of wide-angle; the machine he happens to possess must do the work, abortion or no abortion, perspective or no perspective, and the manipulator of this mass of incongruity is disgusted if some individual insinuates that photographs after all are only mechanical productions. Of course the novice is delighted with a swing back. There are some, in this weary waste which we call earth, whose backs are fearfully and wonderfully made, they are so pliable. But to put the camera box anywhere, anyhow, and by the mere turn of a screw "get it all in," this must be an advantage, a blessed state of things, which can only be fully appreciated by the phibb-backed brigade. If the top of that Jubilee tower will not "come in," and there exist no means of substituting another lens, in the name of mercy, charity, and art, leave the subject untaken, and let posterity suffer the loss rather than add another to the long list of pictorial abortions by the aid of the swing back.

There is one more subject on which the theorist loves to discuss—the fixing and the washing of the albumenised paper prints. Let them remain in the fixing solution for twenty minutes; this is the favourite time, though some incline to fifteen and some twenty-five minutes; the difference of opinion is quite natural and the theorist is most heartily welcome to it. Here is the *fact*. A representation of subject in monochrome, of more or less delicacy of tone, is to be arbitrarily released from the operation which cleanses and beautifies its lights at the expiration of twenty minutes. Prints slightly over-printed, prints slightly under-printed, prints from brilliant negatives, in which the lights are not only introduced in printing but absolutely hard, and prints from delicate negatives, wherein the lights have been considerably lowered by the operation of printing—one uniform time for removal by the theorist from the hypo bath—twenty minutes, and this time not a removal from the soda, print by print, but the soda solution is to be drained off, leaving the prints in one soddened mass, with what remains of the strong solution clinging with a not too agreeable pertinacity to each individual print. These unfortunate prints are then to be subjected to alternate washings of warm and cold water, commencing with the former after removal from the hypo. It would be interesting to know the philosophic basis on which this theory has been founded. Most of us whose experience in photography exceeds a couple of decades will remember the cardinal truths enunciated at that time and not to this day questioned on anything like authority. It was this: Photographs should not be immersed in warm water until the major portion of the hypo has been eliminated. Warm water accelerates the action of sodium hyposulphite.

The print should have been removed from the soda just at the point when further operating will unduly bleach the lights, and just at the point when a lesser time in the hypo solution will leave those lights too load in tone. Place the print judiciously removed from the hypo direct into warm water, the warm water will accelerate the action of the soda remaining in the pores of the paper, and the bleaching action will have been carried too far. Photographs which have been suffered

to remain in the fixing solution by set time may be treated to hot and cold water without detriment to their quality as works of art—they may even be immersed in strong acids without loss, because they are simply mechanical productions turned out of a dish by any dummy who can tell twenty minutes on a "Seth Thomas" clock. But how is it these theorists never advise the student that, in removal from the soda bath, the prints should be tested for fixation by transparency in the whites in transmitted light? This point attained, whether at ten minutes or thirty, any further prolongation in the solution will depend on the artistic feeling of the printer, warning him the lights are being unduly lowered or when further bleaching is necessary in order that the harmony of the subject shall be preserved. It should be remembered by the theorist that though a proof may be *fixed* in ten, fifteen, or twenty minutes, it may not be *fit for removal* from the soda under half an hour, and, on the contrary, its character may be such that a moment longer than ten minutes will suffice to remove it from the category of a work of art to that of a mechanical production.

It must have cost an infinite amount of work and a stupendous expenditure of brain power to propound the theory that washing proofs should be *alternately* in warm and cold water. Why not cold and warm? Why not two, three, five times warm to once of cold, or *vice versa*? Why not hot water exclusively, and so have a pretty kettle of hot water all round? A vast number of experiments might be safely carried out on the basis of these suggestions, which may be further complicated by a series of tables on the ratio of permanence attached to warm and cold-water washing when carried on in the full glow of the pale moonlight, and when manipulated with the lunar rays more or less screened, the former condition represented by *x*. While at it there's nothing like a real abstruse theory, and the tougher it is the better it is for its propounder.

"How many grains of salt shall I eat with my egg, doctor?" "How strong shall the fixing solution be, most learned theorists?" And from the lips of the modern oracle issues the parrot-like phrase, "Four ounces to the pint." Four ounces to the pint, with a mechanical twenty minutes' immersion, when many operators who work with brains use *eight ounces to the pint*, and out in about ten minutes, or as soon as transparent and the lights correct in tone and in relation to each other.

J. H. E. J. HARRIS.

—*Con. Number St. Louis Photographer.*

RECENT DISCOVERIES IN THE NEBULÆ BY MEANS OF PHOTOGRAPHY.

It is not so long ago that it was pronounced to be "impossible" to photograph the nebulae at all. The enormous improvement in the sensitiveness of photographic films within the past few years has permitted wonderful advances. Some of the results of such work are so recent that they are known only to the readers of scientific journals, and they are so important that I wish to exhibit them here to a wider circle.

The very first photograph of a nebula was taken in September, 1880, by the late Dr. Henry Draper, at his observatory at Hastings on the Hudson. In 1881 he obtained, with an exposure time of 104 minutes, a picture of the nebula of Orion, which showed stars that were fainter than the faintest visible to the eye in his telescope (a refractor of 11 inches aperture, made by the Clarks, of Cambridge), and which displayed essentially all the details in the nebula which I had been able to make out with the much larger telescope at Washington (26 inches aperture). Moreover, my work at Washington required years, while his was done in one night. This photograph of Draper's led the way, and showed what might be expected from future work of the same sort. Draper's early death closed his series of studies in this path. His researches were taken up by Mr. Common, of London, who built a three-foot reflector for the purpose, and who succeeded (in 1882) in making a magnificent picture of the Orion nebula.

Mr. Roberts, of Liverpool, using a reflector of 20 inches aperture and of short focus, has made a series of pictures of this nebula also, which serves to show the law according to which it is built up. His series begins with a negative exposed for five seconds only. This exhibits the central bright stars of the nebula and a small portion of the brightest nebulosity. Successive pictures with exposures of 30, 60, 180, 360 seconds show more and more of the nebula itself, and the last one gives all of the object which can be seen in a powerful telescope.

Not only is everything visible, but it is permanently registered, and the six minutes of exposure have sufficed to make a map for which a year's work might be necessary if done with the eye alone.

Other photographs of 15, 30, 81, 210 minutes show more and more of the nebula and extend its limits over vast spaces.

The various photographs of the series, taken together, establish the order of brightness of the different parts of the nebula, and give a set of lines of equal light, by means of which its structure becomes more intelligible.

It is of Mr. Roberts's recent wonderful photographs of the nebula in Andromeda that I wish more particularly to speak. This great nebula is just visible to the naked eye, and is mentioned in Sufi's *Uranometry* (about 900 A.D.), and is a well-known object to possessors of small telescopes. Little was added to our knowledge of the nebula until Professor Bond, at Harvard College Observatory, made a careful study of it in 1848. The nebula was shown to have an immense extent, and the most curious feature exhibited was the presence of two long, straight, vacant spaces or canals extending through most of the central portions. The work of Professor Bond was repeated with the same telescope about 1874 by M. Trouvelot.

Little can be added by the eye to this splendid picture. Small details can be corrected, but it must be accepted as a substantially correct representation of what the eye sees with even a very large telescope.

In a part of the same object as photographed by Mr. Roberts, with an exposure of two hours for the first time, we obtain some adequate conception of the true forms of this great nebula.

Instead of the two straight rifts of Bond, sharply terminated at both ends, we find two huge vacant *rings* of blackness surrounding the central portions. Other rifts and vacancies exist in the photograph which are quite invisible to the eye, and the whole nebula is exhibited in a new light.

It is seen to consist of a system analogous to that of the planet Saturn—a central mass surrounded by rings, which are separated from the central body by empty spaces. Like the rings of Saturn, the rings of the Andromeda nebula are probably composed of myriads of small discrete solid particles revolving in swarms about their primary. The vacant spaces in Saturn's ring are caused by the attractions of the larger satellites of that planet on the smaller particles of the ring. No doubt the vacant spaces in the nebula are caused in the same way.

It is possible that the two brighter masses lying beyond the central bright body of the nebula are, in fact, the effective causes of the vacant spaces. But we can safely go a step further in our search for analogies. Laplace considers Saturn as a striking proof of the nebula hypothesis which he proposed. The planet represented the final stage of the very process by which the solar system might have been condensed out of the primal nebula. In the Andromeda nebula do we not actually see before us a still earlier stage of the same process, where worlds are forming, though not yet formed? Are not a planet like Saturn, the Andromeda nebula, and one of the inchoate gaseous nebulae, three successive steps in the evolution of the universe?

The interval of time required for the progress from one of these stages to the next is so immense that the whole of human history is a mere instant in comparison. But have we not a different means of tracing these steps? As Sir William Herschel nobly said in 1789, "The maturity of a sidereal system may thus be judged from the disposition of its component parts. . . . This method of viewing the heavens seems to throw them into a new kind of light, and one advantage that we may at least reap from it is that we can, as it were, extend the range of our experience to an immense duration. For is it not the same thing whether we live successively to witness the germination, blooming, foliage, fecundity, fading, withering, and corruption of a plant, or whether a vast number of specimens, selected from every stage through which the plant passes in the course of its existence, be brought at once to our view?"

From this point of view we may regard Mr. Roberts's discoveries in the Andromeda nebula as the most important which have been made since the time of the Herschels. His photograph really represents a stage in evolutionary history which has been prefigured by the eye of reason, but which is new to the eye of sense. We cannot doubt that the methods which he has employed are to yield more evidences of the same nature. And it is sure that his methods are to be faithfully followed up.

The brothers Paul and Prosper Henry, of the Paris Observatory, have devoted the past few years to perfecting their apparatus for astronomical photography as applied to the making of star charts. In the course of their work they have discovered an entirely new nebulous region connected with the principal stars of the Pleiades group. Formerly only one nebula was known in this group, attached to the bright star Maia.

The photographs of Paris have shown the whole group to be connected with a complex nebula.

From the upper part of the right nebosity a slender thread of light is seen to extend toward the west, passing through at least eight of the stars of the cluster. It is certain that these stars are connected with the nebula, and that the nebula is connected with the seven bright stars of the Pleiades group, and must therefore be at the same distance.

As might naturally be expected, photography is a powerful aid in the discovery of new nebulae. Professor Pickering, at the Harvard College Observatory, has explored a small region of the sky in this way, and his photographs show thirty nebulae in a region where but eighteen were previously known.

The new nebulae were faint and small naturally, but the experiment shows what can be done in the way of mere discovery.

The need of astronomy is, however, not so much the discovery of new objects as more information about well-known ones.

Dr. Gothard, of Hungary, has lately shown that even a comparatively small telescope is adequate to give this. With his ten-inch reflector he has photographed many nebulae (on a small scale necessarily), and on examining the negatives, Professor Vogel has found that even these small

pictures are superior to the best drawings of the same objects with the largest telescope. There are many similar researches marked out and waiting for experiments, and the success of Dr. Gothard has proved that giant telescopes are not essential.

The refractor of the Lick Observatory has some advantages in researches of this nature on account of its great focal length (forty-seven feet), which gives a large size to the picture. The experiments which we have so far made promise excellent results in photographing the nebulae. An exposure of ten minutes on some of them is ample. When the great telescope is completely fitted for photographic work (which will be shortly), it is to be assiduously used in this field.

I have gone rapidly over the advances which have been made in the photography of the nebulae in the nine years since the first nebula photograph was taken. The wonderful pictures of Draper, Common, Roberts, and others will have a permanent value, as they serve as means for comparison with later work, and as it is only by such comparisons that evidences of change can be detected. Photographs of the nebulae have a great advantage over mere drawings, no matter how carefully made, for such a purpose, as they are devoid of personality and record *exactly* what they see. Moreover, they command a large field of view, while the ordinary eyepiece is far too small to deal with large objects.

By exposing the negative to the light of a standard lamp (as is done at Harvard College and at the Lick Observatory), we may impress on the plate a series of standard squares of known brightness. Comparing these with the nebula, we may gain a numerical estimate of the brilliancy of each portion of each nebula examined. Such data are priceless for the purpose of detecting future changes in the nebulae.

The revelations of the Andromeda nebula photographs are distinctly new, and throw a flood of light upon the secret processes of creation itself. Not a hundredth part of the brighter nebulae have yet been photographed, and it is certain that discoveries no less important than those of Mr. Roberts are near at hand. One great advantage of the new method of research is its absolutely autographic character; and an incidental excellence is that its results are so easily exhibited to others than the observer.

EDWARD S. HOLDEN, LL.D.,
Director of the Lick Observatory.

—Scientific American.

TRANSPARENCIES—RETOUCHING, AND OTHER MATTERS.

[Abstract of Presidential Address to the Dundee and East of Scotland Photographic Association.]

IN a subject such as photography, dealing as it does so much with individual taste, there must constantly be much difference of opinion, but if criticism, however hostile, be made in a kindly way our meetings will be a source of more than pleasure to every one, and a cause of annoyance to none. The search for a suitable subject upon which to address to you a few lines has been a difficult one. The mere mention of such well-worn subjects as developers, toning baths, and such-like, cause a thrill of wearied disgust to any but the veriest beginner.

Optics, a fascinating study when once fairly tackled, somehow shows a most repellent front with its seemingly intricate and confusing diagrams. The cry generally is, Keep all theoretical matters to yourself, and say in a word how we are to make better photographs, or how to get equally good results by a quicker and simpler method. I have chosen to-night a subject which, while we must dip a little into the theoretical, has for its aim and object a purely utilitarian purpose; it is, in short, a way by which you may vastly improve your photographs, simplify the process, aid permanency, and at the same time reserve a power over the finished result which is impossible in any but this one way.

Without further mystification, I would ask whether you have ever noticed how much more true to nature a photographic transparency is than a print upon paper or other opaque base. For a long time a war was waged as to whether the modern dry or the old wet gave the finer result. Now it is almost universally admitted that, except under certain conditions, the advantage is all on the side of wet collodion, and plate makers do not hesitate to make this wet-plate quality an advertisement cry for their own special production. I have all along held the opinion that prints from wet-collodion negatives were far finer than from gelatinobromide dry plates, but I deny that the same holds good with transparencies from the same negatives.

Gelatinobromide negatives, intensely beautiful in their delicate gradations, seem to me to be altogether unsuited for printing from upon an opaque base, but when used to produce a transparency from them, the case is altered, and an average wet-plate negative will fall far short of the gelatinobromide for this purpose. I do not say that the best productions of wet collodion are not up to the best dry plate, even in transparency work, but what I do say is that the average of good work is far higher from gelatinobromide than from wet plates. But you will wonder what all this has to do with the subject in hand; surely a return to wet collodion is not to be suggested? No, certainly not; but it is to be suggested that for the highest efforts of the photographer, printing from gelatinobromide negatives upon an opaque base be discontinued. This does not necessarily imply that all the best pictures are to be put up as transparencies. Although nothing could be more beautiful, it would be highly inconvenient; but, in short, my suggestion is that a transparency thin and delicate be

made from a negative either the same size or enlarged, and this to be superimposed upon an opaque base.

At first sight this proposal seems to offer no advantage, but consideration for a moment will show that it has many. Let me enumerate some of them. First, then, the gradations are far finer in gelatino-bromide than in any printing process upon paper. Whatever there is in the negative will be found in the transparency. Especially is this true as to detail in the dark parts of the picture—a vital point, as this is just where gelatino-bromide fails when printed from in the ordinary way. Secondly, by placing this transparency upon slightly tinted paper, different effects may be produced. Thirdly, by roughly rubbing in with a stump upon the paper base a lighter or darker ground, the light and shade of the picture as a whole is thoroughly under the control of the operator. Fourthly, the transparency may, with the same trouble, be any reasonable size. Fifthly, a carefully made and well-washed transparency upon glass is, in all likelihood, quite permanent. And, sixthly, the whole process is quite within the powers of the average operator, and opens up a vast field for the exhibition of individual taste. By working roughly (but with correct intention) upon the paper background, high lights may be subdued, or dark parts lightened; clouds may be strengthened, or altogether put in, and, in short, one has a reasonable control over what he intends to produce.

But there may be objections to this idea upon certain grounds, and, first, it is not a new idea. Granted; but when introduced many years ago the wet process was in vogue, transparencies infinitely more difficult to produce, and, consequently, the game not so much worth the candle; besides, I do not think that it was ever suggested to work upon the light and shade as I suggest, but merely to add a few pencil hatchings to simulate a pencil sketch.

But, it may be argued, if so much is to be done by hand, is there not the old objection to retouching in a doubly aggravated form? If it be objectionable to obliterate by means of the hand almost invisible defects, how much more so to boldly model the whole light and shade of a picture, and, indeed, almost strive to rob it even of the semblance of a photograph? I reply to that, that from the overwhelming number of those who use retouching it is plain that the consensus of opinion is in favour of its legitimacy, nay, of its necessity, at least in the meantime.

Granted, then, that it be allowable to remove by hand the almost invisible defect, I hold that the only limit to the practice is the limit of necessity, and if it be proper to add anything by hand, the amount to be added must be settled by what is required. Tried by this test, the plan of altering boldly the whole light and shade of a photograph is perfectly legitimate, for the principle involved is the very same whether you remove a freckle or illuminate a whole hillside.

But is there any advantage in this plan over, say, printing in platinum or gelatino-bromide paper and working upon that? There is a very great advantage, in so far as the artist is unhampered by the fear of spoiling his picture after having brought it so far. He works upon a piece of plain paper which is to be placed behind his picture, but which if it be not quite to his taste, may be destroyed and another made in a few minutes, leaving his transparency as good as ever; besides, not nearly the same skill is required, for the work is only to show through from behind, and may be broadly put on. The objection, that even this requires some little artistic ability on the part of the operator, I hold to be no objection at all, for a photographer without some little artistic ability is not worthy the name, while those who sigh for a method whereby their taste may have freer scope will think this requirement a recommendation in place of an objection.

There is one other point which I fancy may be objected to by some, and that is, that by this method, while it may give a very good result, it is a result which cannot, without the very same amount of trouble, be re-duplicated. After all your trouble you cannot throw off half a dozen copies even, but must content yourself with a single picture. From a commercial point of view I admit the objection, unless, indeed, the lithographer be called in to produce your backgrounds by the hundred; but for the amateur this is no objection, for he generally wants only one copy, and it must not be forgotten that difficulty in reproducing a certain article adds immensely to the value of the original. I am convinced that those who give this method a trial will very much enjoy the power which it puts into their hands, and although the first attempt may not be entirely successful, I am sure that they will immediately feel that the process is capable of great things through practice. J. K. TELLOCH, M.B.

Foreign Notes and News.

THE scientific study of the phenomena of lightning has, like many other subjects, to thank photography for a new discovery. Wheatstone stated as the result of his observations that the lightning flash lasts for at most one one-thousandth of a second. M. Trouselot has, however, proved that this opinion is incorrect, and that the passage of lightning is so far from being instantaneous that it even in some cases takes up several seconds. This M. Trouselot has demonstrated by holding the camera in his hand and moving it backwards and forwards during the period of exposure. The image of the lightning on the plate appeared after development in the form of a number of broad horizontal bands parallel to the direction

in which the apparatus had been moved, thus presenting the appearance of a small flag fluttering in the wind. Trouselot repeated these experiments a number of times, the result showing in every case that the electric discharge is not instantaneous, but gradual. Those gentlemen who are in the habit of priding themselves on the wonderful dexterity they display in lightning catching will probably receive this piece of news with mortification.

THE recent meeting of the various German Photographic Societies at Weimar appears to have afforded an opportunity of illustrating the truth of Goethe's remark that "There are properly speaking no subjects that are unpoetic," for Herr Seidel, Professor at the Grand-ducal Sophia Institute in that town, bade the assembled photographers welcome in a poem of which, as it presents the various aspects of photography in a very attractive light, we venture to append a translation.

"All welcome to you with your 'Art of Light'!"

That bids e'en lightning render it assistance,
So that an image from the gloom of night
Grows as we wondering gaze into existence.

To picture the bird's flight, the bounding steed,
And human life in all its varying phases,
The cloud's course through the sky, the vessel's speed,
All this your art in thoughtful wise embraces.

The human face, too, whether young or old,
Into forgetfulness you keep from dying,
And for the world its likeness fresh you hold,
When he it pictures in the grave is lying.

The daring bridge, the castle's mouldering wall,
Town, palace, landscape, and cathedral spires,
In your 'dark chamber' they are focussed, all—
Must serve as models when your art requires.

Nor sun, nor moon through an eclipse can pass,
Her transit even Venus cannot make it,
But that you come in troops, with lens and glass
And camera, on the look-out to take it.

So enter here—here you are welcome quite
In this our home of high association,
Where dying poet's lips spake, 'Light, more light!'
Of your new art as in anticipation."

THE last number of the *Vienna Photographische Correspondenz* devotes a good deal of space to the question of diffusers for electric light photography. Captain Himly, a translation of whose paper on *Hydroquinone* we gave some time ago, has devised a very ingenious arrangement: Two electric lights are placed within a large sheet-metal hood internally coated with white glaze; the lights are so screened that no direct rays escape, and the studio is illuminated by the diffused light reflected from the glaze only. Another simpler and apparently very practical arrangement is that of Ronzellen. This consists of rigging up a large paper shade and throwing the light on it by means of a concave mirror, which gives a very good indirect illumination. The light is, of course, so screened that none of the direct rays fall on anything but the paper screen.

A GERMAN contemporary some time ago drew attention to the occurrence, both this year and the year before (when it was first observed), to a very interesting atmospheric phenomenon—the appearance, namely, during the summer months of luminous clouds during the night. Trigonometrical observations carried out at a number of different points established the surprising fact that the height of these clouds varies from sixty to seventy kilometres above the sea level. This extraordinary altitude enables us to supply a very natural explanation of their appearing luminous at times when ordinary clouds are no longer directly visible. But it excites our wonder as to how clouds could ever have reached or remained suspended at such a remarkable elevation. Dr. Koppe, of Brunswick, believes them to be due, in all probability, to the volcanic eruption which took place in Java on such an extraordinary scale in 1884, and to be consequently, in all probability, formed of sulphuric acid which was then projected into the higher regions of the atmosphere, where it has since condensed. As they present many interesting peculiarities of form and structure, it is satisfactory to know that special stations for observing them have been established at Berlin, Rathenow, Nauen, Magdeburg, and Brunswick, that the Berlin observatory has had a number of special instruments made for the purpose, and that a valuable series of photographs of them has been obtained.

DR. VOGL gives the following receipt for the employment of eikonogen:—

1.	
Crystalline sulphite of soda	40 grammes.
Eikonogen	5 "
Distilled water	500 c.cm.

2.	
Carbonate of potash or calcined soda	60-75 grammes.
Distilled water	500 c.cm.

For use, mix equal volumes of 1 and 2.

* Goethe.

OPINIONS OF THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

The Graphic.

THERE is little novel to be noticed this year in the Photographic Society's Exhibition, save that the number of silver prints are becoming fewer and fewer each season, and that the various methods of platinotype are fast growing into universal favour. More artistic taste, also, is shown in the arrangement of figure groups, and there is decidedly less tendency to pose the models in their best clothes, or in borrowed plumes, which make them look profoundly uncomfortable and unhappy, or as stiff and stark as mannikins in a marionette show. More care is taken to choose purely natural subjects—such as sailors on a quay—fisherwives gossiping at their house-door (of this there is a charming example shown, *Wives and Wrens Ashore*, by Mr. David R. Clark)—or a couple of lovers wandering down a country lane—such as *Sweet Spring-time* (by the way, the landscape looks far more like autumn), by Ralph W. Robinson. Two especially good examples of this class of photography are *Shrimping*, by Mr. Gay Wilkinson, jun., which has been deservedly awarded a medal; and Mr. Lyddel Sawyer's *Here's a Nest, Lads*. Of the Gerard Dow-like interiors, in which, some years since, Mr. Adam Diston so excelled, there are but few examples, the only one above the indifferent being *A Pleasant Study*, by John Terris. There are some very good landscapes, but scarcely above that high average which has been attained of late years; while the mountain views shown can in no way compete with the well-known views of the High Alps by the late Mr. Donkin, the admirable Caucasus views of M. Déchy, or Mr. Frith's views of Norway. A certain pitch of excellence appears to have been attained by the majority of the exhibitors, but except as regards the actual printing no material advance seems to have been made upon last year's work. We may, however, mention some views on the Italian lakes by W. Dillworth Howard; the *Head of Derwentwater*, by Green Brothers; *Park Place, Henley-on-Thames*—a good example of what can be done on a celluloid film—by J. Bracebridge Hilditch; and a seascape, *Fingal's Cove, Staffa*, by D. H. Macfarlane. Turning to sea studies, William Parry sends two good photographs of H.M.S. *Victoria*, Messrs. West and Co. some yacht studies, and Mr. Henry C. Peabody some especially clever snap shots of the yachts *Beetle* and *Rosalind*. Of portraits there are no end, and of these there are some particularly noteworthy exhibits by professional photographers. Mr. R. Faulkner sends an especially fine likeness of Professor Stewart Blackie, which a few years since might well have passed as an etching by Rajon; Mr. W. J. Byrne some admirable *At Home* portraits, taken in ordinary dwelling rooms, and several excellent portraits of the Emperor of Germany, taken last August at Osborne; and Mr. Ralph W. Robinson, a large number of Royal Academicians, taken in their studios. There are comparatively few natural history studies, but *The Stag at Eve had Drunk his Fill*, by Miss Florence A. Harvey, is one of the prettiest pictures in the room, while Mr. A. R. Dresser sends some extremely comical photographs with a hand camera of a dog jumping through a hoop. The animal's various attitudes should be noted by animal painters. Much disappointment will be felt at the paucity of photographs with the detective camera, though these miniature cameras form the most interesting section of the exhibit of new apparatus.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 14.....	North Middlesex Club	Jubilee Hall, Hornsey-road.
„ 15.....	North London	Myddelton Hall, Upper-st., Islington
„ 15.....	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
„ 15.....	Bolton Club	The Studio, Chancery-lane, Bolton.
„ 16.....	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
„ 16.....	Bury	
„ 16.....	Hyde	
„ 16.....	Manchester Camera Club	Victoria Hotel.
„ 16.....	Edinburgh Photo. Club.....	5, St. Andrew-square.
„ 16.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 17.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 3.—Mr. W. M. Ashman in the chair.

The CHAIRMAN inquired whether the method was known by which the red prints shown at the Photographic Exhibition by Colonel Noverre had been produced.

Mr. W. E. DEBENHAM had been informed that they were printed upon rough paper, salted and silvered, and not toned.

Mr. A. COWAN inquired as to the method of using a telescope for producing large images of distant objects.

Mr. A. HADDON said that a single lens of very long focus would be best to use, but if a telescope were employed the eyepiece should be separated farther from the inverting lens than when used for observations. He illustrated his remarks by diagrams upon the blackboard, and explained that both definition and illumination would be improved (if a terrestrial telescope was in question) by removing the inverting lens.

Mr. DEBENHAM suggested the use of a microscopic objective in place of the eyepiece for forming the large image.

A query was read:—“What effect has alum upon the developed plate?”

Mr. COWAN replied that it hardened the film, decolourised the pyro stain, and caused the negative to dry more quickly. When making lantern slides it was important to have the shadows quite free from stain, but the same effect could be got without alum by using a large amount of sulphite in the developer. A very long washing to remove all pyro from the film before fixing tended much to clear shadows, but did not equal the effect of the alum bath.

The CHAIRMAN remarked that an acid wash before fixing would, by leaving a little acid in the film, liberate sulphurous acid in the fixing bath, which would act powerfully as a decolouriser. On the whole, he preferred chrome alum to potash alum as a bath for gelatine plates.

Mr. C. H. COOKE also preferred chrome alum.

The CHAIRMAN doubted whether ordinary alum was harmless to the negative, but chrome alum was. By introducing the negative to a chrome alum bath and then placing it in the fixing bath he did not see that anything could arise to damage the negative. As to mixing alum and hypo, it had been claimed that the hypo would do more work in fixing when so used than separately, and it had been so stated in the last photographic annual. He had tried it carefully, but did not find the hypo to fix either more in number or more quickly.

The subject of different developers being brought forward, Mr. H. M. HASTINGS said that he had found nothing like eikonogen for instantaneous pictures. For other work he was not so satisfied with it, as if the negative was at all over-exposed it could not be kept back so readily as with pyro. The image, even when very dense-looking, allowed a certain amount of light to pass.

Mr. HADDON: Like the image formed by ferrous oxalate, which required to be much denser than the pyro-developed image. There was no reason why eikonogen and pyro should be mixed. As to sending out the eikonogen, it would be better to use bottles that could be kept air-tight with corks or stoppers than tins, as at present. When once opened, all the contents of the tin should be mixed at once, as the air soon altered the substance.

Mr. HASTINGS had not found the slight difference which access of air for a moderate time to the tin effected in the eikonogen made any difference in the practical working of the solution.

Mr. W. H. HOOPER was elected a member.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Committee of this Association met on the 4th instant at 181, Aldersgate-street, E.C., Mr. W. Bedford in the chair.

A considerable time was devoted to discussing the affairs of the Association.

The Photographic Society having granted the use of their Exhibition on Friday, November 8, for the benefit of the Photographers' Benevolent Association, it was decided to give a lantern display, as hitherto. The Gallery will be open from seven till ten p.m., and it is hoped will receive the support the object deserves. The charge for admission will be 6d., or tickets can be obtained of the Secretary, Mr. H. Harland, 83, Hawksley-road, Stoke Newington, N.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 1.—Mr. A. Mackie (Vice-President) in the chair.

The Hon. Secretary showed six framed platinotypes of views in the Isle of Wight and at Hampstead.

Mr. G. J. Clarke exhibited some prints on bromide paper.

It was determined to hold the first lantern evening of the season on Tuesday, November 19; and the annual meeting of the Society will be on Tuesday, November 5. There will also be an exhibition of members' work on the third Tuesday in February.

The SECRETARY then read a paper on *The Relation between Exposure and Development, and the Subsequent Improvement of Negatives*. In his opinion there was no exposure which could be taken as a standard and called a “correct exposure,” as could be proved by giving a plate a normal exposure for one developer and developing it with another, when that exposure would in most cases cease to be normal; again, if on commencing to develop a plate it proved under or over-exposed, it could be made into a good negative by modifying the solutions or using other developing agents, as hydroquinone or the more recent eikonogen, with the preliminary hypo bath, for under-exposure; and the citrates of potash or soda, in conjunction with bromide of potassium, for extreme over-exposure, in some cases using a preliminary bath of bromide of potassium. For subjects with extreme contrasts it was advised to give a full exposure and stop the development early, thus producing a soft printing negative. The action of citrate of potash and bromide of potassium was explained, and the various methods of correcting under and over-exposure given, including a redevelopment method. For the after improvement of negatives, a five-grain to the ounce solution of ferricyanide of potassium and another of hyposulphite of soda of the same strength, and mixed in equal proportions, was recommended for clearing out fogged shadows in over-exposed negatives when the development had not been properly controlled. The image would be reduced to almost a ghost, and should be intensified with the mercury and cyanide of silver process, when the result would be a bright negative. Several methods of intensification and reduction were given.

Mr. L. MEDLAND stated that when developing with eikonogen he had always seen the first plate in the solution veiled over when using the developer without bromide, the second plate was not veiled.

Mr. MACKIE considered that a certain amount of bromide would be dissolved out of the first plate and account for the other plates being correct.

The HON. SECRETARY stated that he had not noticed any veiling when using the eikonogen developer without bromide for under-exposed plates.

Mr. DRAGE said he had always used bromide of potassium, and found that any amount of density could be obtained when using it; he also found the old solution very useful for developing bromide paper.

Rev. E. HEALY stated that by using a careful method of developing he had obtained one hundred good negatives out of one hundred and ten exposed plates, using a pyro and ammonia formula, and commencing development with a minimum of ammonia.

Mr. MACKIE said that chemicals should be kept, as far as possible, in ten per cent. solutions; he also said that if negatives were examined in daylight after taking them from the hypo bath they would be reduced in density, and if left long in a bright light they would be stained yellow as well; they should be washed before bringing them from the dark room.

The next meeting will be on Tuesday, October 15, when Mr. Clarke will read a paper on *Enlarging for Amateurs*. Visitors are invited.

LEWES PHOTOGRAPHIC SOCIETY.

OCTOBER 1.—The President in the chair.

Messrs. S. Norman, A. Webbing, and F. Tait were elected members.

The PRESIDENT then read his annual address, which touched on various matters relating to photography, and the paper was supplemented by two very fine Daguerreotypes, produced by Daguerre himself, and a print $19 \times 7\frac{1}{2}$ from a wet-plate negative. The President remarked that those who were acquainted with the wet-plate process would know what a difficult matter it would be to coat a plate this size with an even film.

At the next meeting, which will be held November 7, Mr. P. Morris will open a discussion on *Developers*.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

OCTOBER 2.—The President (Mr. William Shaw Adamson) in the chair.

Mr. John Duke was admitted a member.

It was agreed, on the motion of the Secretary, that the subscription of honorary members be reduced to 5s.

It was agreed that arrangements be made for an exhibition next spring, the Committee to draw up a scheme and submit to the next meeting.

Thereafter, a large number of slides were passed through the lantern. The slides exhibited were the work of Dr. Anderson, Messrs. Ross, Braid, Mackie, and Stewart.

LEEDS PHOTOGRAPHIC SOCIETY.

SEPTEMBER 19.—Mr. Godfrey Bingley in the chair.

Referring to the subject of development Mr. S. A. WARDINGTON (the Hon. Sec.), said he did not agree with any developing formula in which you mix two solutions in equal parts to form your developer; the chances were certainly against the developer as mixed with the subject and the exposure. The developer he recommended, and which he had used for some years, was that given by Messrs. Whitten & Walnwright with their instantaneous plates. The following is the formula with a slight modification, namely, using the pyro in solution with meta-bisulphate of potass:—

Pyro.....	20 grains.
Meta-bisulphate of potass.....	20 "
Water.....	10 ounces.
2.	
Ammonia, s.g. 880.....	1 ounce.
Potass bromide.....	60 grains.
Water.....	3 ounces.
3.	
Potass or ammonia bromide.....	60 grains.
Water.....	1 ounce.

There was certainly nothing novel in the formula, but it would, he believed, strike every photographer that with solutions mixed in this form, a tremendous power was placed in his hands. Two grains of pyro per ounce was the most that need ever be used, and by diluting with water, any strength under this could be obtained. The ammonia solution was so strong that four drops to the ounce of the pyro solution were quite sufficient to start development, and two or three drops of the bromide solution would instantly check a too rapid development; indeed, if a Royal Commission was appointed to inquire into the best formula for a developer, he believed that this, or one very similar, would be recommended. In using a stop, Mr. Warburton said he preferred the smallest he could use under the circumstances, and for general use U.S. 32 or 64 were the ones he used most. Referring to the subject of "backing" plates, there is no question as to the great advantage to be gained, and the following was a capital mixture for the purpose, drying easily, not powdery when dry, and instantly removed by a wet sponge before developing.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE following are the Judges' awards in the lantern slide competition:—Class A (open to all professionals and amateurs), silver medal, Mr. J. W. Wade, Manchester; bronze medal, Mr. Cyril Frith, Bognor. Class B (open to amateur members of the Association), silver medal, Mr. Edgar G. Lee, Colliercoats; bronze medal, Mr. Henry R. Procter, Tynemouth.

A selection of the slides (about two hundred) sent in for competition will be exhibited at the Literary and Philosophical Lecture Hall, Newcastle, next Wednesday evening, by means of the optical limelight lantern.

The gentlemen who kindly acted as Judges were:—Messrs. J. G. Allison, P. M. Laws, and C. J. Spence. The medals were the gifts of the President (Mr. A. S. Stevenson, Tynemouth) and the Vice-President (Mr. J. P. Gibson, Hexham).

The following is a list of the slides that obtained the silver and bronze medals in Class B:—Silver medal, Mr. Edgar G. Lee, Colliercoats: *Swans at Roar, Drunken Ship, Highland Cattle, On the River Wear, Holiday Time, Among the Surf*. Bronze medal, Mr. Henry R. Procter, Tynemouth: *The Shades of Evening, Crammock Water (Winter), Crammock Water (Summer), Young Alligators, The Cobble Cottage, Scale Force*.

Class A, six entries, two hundred and fifty-one slides received. Class B, six entries, sixty-three slides received.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION

OCTOBER 3.—Dr. J. K. Tulloch (President) in the chair.

Seven applications for membership were handed in.

The President then delivered his opening address [see page 670].

Dr. Tulloch exhibited a transparency, $8\frac{1}{2} \times 6\frac{1}{2}$, enlarged from a quarter-plate negative, with a paper background worked upon as suggested in his address, and backed with a piece of plain glass, the whole being bound together with strips of paper. The result was artistic and much admired.

Several good negatives were shown which had been developed with eikonogen. So few of the members had tried this new developer that very little information was elicited as to its working capabilities.

Two negatives on Ilford plates were sent to the meeting by a beginner, and an explanation was asked of the cause of the colour of the deposit being similar to that of a wet-plate negative. The developer used was ammonia-pyro procured from a dealer.

A member present knew the formula of the developer, and that it contained an excessive quantity of sulphite of soda; the developer had probably been made up for a considerable time, and the cause of the appearance of the negatives was assigned to the conversion of the sulphite into sulphate.

Correspondence.

Correspondents should never write on both sides of the paper.

EIKONOGEN.

To the EDITOR.

SIR,—As some correspondence has taken place with reference to our note to Messrs. Marion, re the above developer, we think that some explanation is due. At the time we wrote the letter, we did not in the least anticipate that it would be used for publication, and therefore it was greatly deficient in detail. For many years we have prepared most of our solutions on the rational ten per cent. system, and therefore, when the new developer was brought before our notice, we naturally made it up on the same principle. The proportions we mentioned answered perfectly in our own practice, as the whole amount of stock eikonogen was usually diluted at one time, and therefore, if any portion was undissolved, it was immediately taken up when the full bulk of water was added. The publication of the letter was, in fact, premature, as we very shortly found that "eikonogen" was not soluble to the same extent as most other chemicals, and therefore unsuitable for ten per cent. strength. The weaker solution mentioned by us to be used for developing, viz., one in a hundred, should therefore be prepared in the first instance. In all the correspondence on the subject, the principal point of our letter appears to be entirely ignored, viz., a simpler method of preparing the developer than the complicated instructions sent out by the makers.

The developer is undoubtedly very powerful, as, with the sole addition of sulphite of soda, it is capable of producing most excellent negatives, but at a slower rate than when used with washing soda. A longer experience with it has proved to us that the most suitable solutions for developing, in order to secure the finest effect of detail and density, are eikonogen, one ounce in a hundred ounces of water, plus four ounces of sulphite of soda, and soda (washing) one ounce in a hundred of water.

For normal exposures, equal quantities of each, but varied at discretion in the same manner as solution of pyro and ammonia, according to exposure, &c. For instantaneous work and some effects of lighting, stronger solutions of both are advisable, say one in fifty. In ordinary every-day use, this method of preparing the developer would be found to possess extreme simplicity, which we think any of your readers who may have seen the original formula sent out by Messrs. Marion will admit is not possessed in the complicated description of "parts," "grammes," "grains," and "drachms," appearing to be an imperfect or possibly too literal translation of the German formula. Solutions of bromide and soda at ten per cent. strength can be kept in reserve for use if required, and we can personally vouch for the quality of the results obtained by the above-mentioned system.—We are, yours, &c., FRADELLE & YOUNG.

216, Regent-street, London, W., October 5, 1889.

NUKTIGONIA AND DAYLIGHT DEVELOPMENT.

To the EDITOR.

SIR,—Nuktigonia, as explained in your last issue, appears to mean very much the same thing as *Development in relation to Eyesight*, which is the title of a short article I wrote for THE BRITISH JOURNAL OF PHOTOGRAPHY ALMANAC, of this year, wherein it is proposed to assimilate the pyro and hydroquinone developers in colour with that of the iron, which is known to be very light-resisting, by the addition of some suitable dye, and thus do away with the necessity of excluding so much light from the developing room. The fact that a plate had been developed without fog, by means

of oxalate of iron, in *daylight* was recorded by me in THE BRITISH JOURNAL OF PHOTOGRAPHY, I think, about six years ago, but others may have tried the same experiment as early. However, the fact that a plate can be so developed is now generally known, and it is well that Brother Jonathan has caught the idea of daylight development, for he is an ingenious, practical fellow, and therefore most likely to help us in our attempt to open the dark-room window. Eikonogen affords some protection to the plate by reason of its colour (in solution), particularly when it has become very brown through use and age. A little of this mixed with a portion of the new developer is a great advantage.

By the way, would it not be an advantage to both suppliers and users of eikonogen if the discoverer would vouchsafe to tell us more exactly what ought to come out of the unique boxes we are supplied with? Like another of your correspondents, I looked for a "white crystal powder," and, behold, a powder more like homœopathic cocoa came forth! It is declared to be "absolutely free from *poison*," but unless this description is more accurate than that of its colour, it would be unwise to taste eikonogen.—I am, yours, &c.,

W. HANSON.

71, Great George-street, Leeds, October 4, 1889.

PHOTOGRAPHING OF PREPARED CANVAS, ETC.

To the Editor.

SIR,—The number of THE BRITISH JOURNAL OF PHOTOGRAPHY for September 27 contains an article on *Photographing of Prepared Canvas, &c.*, by W. H. Davies, in which the following lines appear: "But it is perfectly patent to all who choose to look that it" (photography) "has quite revolutionised the landscape art, not only of this country, but of Europe, with perhaps the single exception of Holland and the Low Countries." It would be interesting, indeed, to learn in what way the landscape art is for a single instant revolutionised by photography.

It is further stated that "several of the most famous names in art circles are content with either copying early (?) but carefully drawn designs by the use of our art, but go much further than that and get the same reproduced on the canvas or the panel prepared for painting." I should like to know what advantage the artist would earn by such manipulation; and I deny the truthfulness of the insulting assertion that an artist exists who has "publicly contemned photographers and their art, but who was not above accepting the hundreds of pounds which have been got for his pictures, without mentioning the fact that they were painted on photographic copies of his own work truly, but still to the extent stated aided in the mechanical reproduction by photography."—I am, yours, &c.,

F. B.

Liverpool, Oct. 7, 1889.

THE LIMELIGHT AND BRIN'S OXYGEN

To the Editor.

SIR,—About the middle of August some of your readers may remember that I made some remarks, based on the experience of the preceding winter, concerning the want of purity in oxygen as then supplied by the Brin Company, and consequent deficiency in the light, and in the hope of eliciting from them information on the subject. About a month after I received a letter from the Company, explaining past difficulties with which they had had to contend, stating that these had been overcome since February last, after which date they were sure the oxygen supplied had been satisfactory, and asking me to visit their works and assure myself of what had been done, and of what they were now supplying. This I took the earliest opportunity of doing, and it is only just to the Brin Company to explain matters as they have now been shown to me, and from which I am glad to know that there is not likely to be any further complaint of quality, and that the annoying delays which occasionally took place last season are not likely to be repeated.

To explain briefly a matter which, I have reason to believe, is regarded generally with considerable interest: not only has an entirely new furnace been built, but the construction has been in an important respect radically altered and the old one discarded. In the old furnace the long iron retorts were all arranged horizontally, the ends coming to the front of the furnace; and the changes of temperature, incidental to the process as then conducted, causing expansion and contraction, led to constant slight leakages at the joints, which were continually causing trouble, by allowing atmospheric air to leak in whilst the oxygen was being withdrawn. Vexatious stoppages, as well as variation in purity, were thus caused, and occasioned constant study to remedy the weak point. In the furnace or producer now built, and at work under the superintendence of Dr. Thorne (the Company's chemist), all the retorts are arranged vertically, and the temperature is kept constant, while the work is done by altering the pressure. All retort leakage appears by this means to be overcome, and they yield an oxygen of at least ninety-five per cent., whilst the small impurities introduced by imperceptible leakages in filling the cylinders do not appear to reduce the standard as delivered to the public below an average of ninety-three, ranging generally from ninety-two to ninety-four per cent. The gas is regularly tested morning and evening, and the ordinary evening test whilst I was there fully bore this out. There was no disguise about the difficulties of the past, especially whilst the old furnace was—as the Secretary expressed it—"on its last legs," and it is a real satisfaction to find that they appear to have been now

overcome. We had a little trial of some matters I had brought down and the light was certainly as fine as could be wished for, with a tolerably powerful jet of about 700 candle-power.

Zirconia.—Dr. Thorne is experimenting with the German material I mentioned in the same letter, and showed me specimens which had been incandescent—though not with strong jets—for three weeks. The Company have every hope of introducing this material into this country during the winter. As I supposed, it is not pure zirconia, which is all the better; and if it can be moulded in thin discs, I have considerable hopes of it.

LEWIS WRIGHT.

October 7.

"SIDEREAL PHOTOGRAPHY."

To the Editor.

SIR,—Your readers will be glad to see, on page 593 of your well-filled JOURNAL, that Professor Morize, of Rio Janeiro, is to be one of the photographing astronomers of the Pan-national Convention at Paris.

So acute and so critical a mind cannot but be of great advantage to the perfecting of the scheme, though it seems only a pity that his Government does not grant him leave of absence to visit Paris at this time and assist personally at both the making of the instruments and arranging the mode of computing the results, in place of his remaining at Rio until the Brazilian quota of instruments is sent out in supposed faultless trim, but some of them are then found by him to have, perchance, just one defect, entirely untouched and overlooked.—I am, yours, &c.,

Glova, Ripon, October 4, 1889.

C. PIAZZI SMITH.

NATURALISTIC PHOTOGRAPHY.

To the Editor.

SIR,—Although Mr. Robinson has ventured to add a chapter in a new edition of one of his books on the subject of "Naturalistic Photography," and presumably knows what has been going on in the world of pictorial art, he is still crying to know what naturalistic photography really is. This affectation of siding with the ignorant may be an effective wile on the part of a smart controversialist, anxious more for popular support than for truth, but it will not deceive those who have felt concerned to understand these matters and who have followed throughout the discussions upon the subject. Mr. Robinson is hopeless. He will only look at, and treat, an argument from a personal and sportive standpoint. He makes cheery boast that he never says what he means. He has fully proved the truth of his pleasantry in this little controversy. But there may be some who are beginning to understand the hearings of the dispute, and, for the sake of these, I venture to try still further explanation, even definition, which Mr. Robinson craftily avoids.

I commenced with the general principles that the naturalistic artist in his study of nature seeks truth, and selects the best of everything to express what he sees and feels. This Mr. Robinson then called a definition, but now he very strangely dubs it an "airy gibe." Notwithstanding the falsities of combination landscapes, the mockery of ladies charading as rustics, and conventionalism in composition, he claimed himself a naturalistic under this definition. But he desired to add to truth some fiction or imagination, and when asked for his meaning placed in this connexion upon the word "imagination," he shifts from it as "not being our point at present." Nevertheless it is our point, and one which opens up a most important difference between the principles of the ordinary and the naturalistic schools. The one finds its admiration for representations of nature excited by the truth with which the subtleties of a beautiful scene are rendered, the other lays greater stress on the decorative cleverness with which the space devoted to the picture is filled by lines and masses. The one finds its poetry in the scene, the other claims that it is added from without. The one must work under the inspiration of the subject, the other can grind out its combinations according to rule in the studio, because it is not nature, it is so-called art that is wanted, as though art were past pictures and not capable of change and development in its principles.

Mr. Robinson calls for a clear and sensible definition of naturalistic photography as if it were a specification of a patent that was wanted. Would Mr. Robinson like to give a clear and concise definition of art? He must know that it is sufficient in these subjects to state that which differentiates clearly one set of principles from another, and, in this sense, naturalism in art may be said to be a severe regard for everything natural and true in tone, costume, action, and expression. Naturalism is a revolt from the domination of conventionalism in composition and in colour, and has resulted in a school of thinkers and workers who gain their inspiration from nature, and charm us by giving us truth, beauty, and poetry expressed in the translation of their impressions. Of course there are degrees in naturalism, and, in such a revolt, some excesses would be expected. But these are not to be feared in photography. Photography, indeed, has had much to do with the growth and development of naturalism itself, and it is harder for the photographer to offend against naturalism than for other artists.

Composition, with the ordinary school or with those who dispense it in book receipts, is a mechanical arrangement of the lines, and masses, and objects in a subject, without special regard to that subject itself, but

merely from a desire to get a pleasing pattern within the limits of the picture. Objects placed in this way almost invariably defeat their purpose by introducing a feeling of artificiality, which may be enjoyment to the composition mongers, but is felt by the naturalistic artist to mar the effect in almost every case where the object has any importance, or where the treatment of it really springs from a consideration of any of the so-called rules of composition. Composition to the naturalistic artist is a far more important and subtle matter than these mere pie-crust rules. It is that the tone, grouping, action, incident, and objects in a picture shall all be such as to help the expression of his subject by the artist, who feels that everything outside this intention is best left out.

Mr. Robinson probably cares nothing about truth of tone. Until very recently he has uttered no word upon this subject, the most important of all to the photographer. He would apparently emphasise the necessity for a wedge-shaped light coming somewhere diagonally in the picture, and call this a rule of chiaroscuro, but he would not think of enforcing the necessity for the tone of a picture being in keeping with the subject to be expressed, and true to the effect in nature. Similar differences will be found to hold in regard to treatment of costume and action between the two schools.

To turn to Mr. Robinson's pleasant personalities, I find he has again been rummaging his dictionary of quotations for more sportive gibes to serve up in place of argument. It will not probably trouble him that his quotation is not accurate. What must have given him the most chuckling satisfaction is, that the passage being so exactly applicable to himself, he should have anticipated "his friend the enemy" in the use of it.

Mr. Robinson is consumed by a fear that his opponents will never be satisfied. The question naturally arises, satisfied with what? With his defence of outrageous combination landscape painting? There has been no defence. With his justification of the use of lady models as rustics? Not a soul thinks of imitating him. With his claim as to imagination? He declines to say what he means by it. With his wonderful contention that the distinctive quality of photography is definition? He wisely allowed the refutation to pass without comment. With his vaunted challenge to competition? We are content to leave the decision as between naturalism and unnaturalism even to the public in the present or any other Exhibition.

It is one of Mr. Robinson's pleasantries to persistently write the word naturalistic as opposed to artistic. Perhaps it ought to be pointed out that the opposite of naturalism is artificialism, a point worth thinking upon by my friend.

Another personal matter. I am charged with combination printing in the several photographs near the door in the present Exhibition. No wonder Mr. Robinson was deceived by my skilful combination. In only one of the seven is there any cloud printed from a separate negative, and that is not improved thereby. Even were it otherwise Mr. Robinson knows that it is not combination of cloud and landscape which is objected to as so heinous a crime, but landscape combinations with other landscapes. There are degrees of severity in naturalism. The printing in of clouds is sometimes a necessary evil.

Mr. Robinson condemns very justly the use of the same cloud negative in more than one picture. Strange, but true, the practice which he condemns as against nature he is himself guilty of. He boasts that he has always held this practice to be against nature, and asks, "Can Mr. Davison justify it?" Certainly not, but he has some excuse in youth and inexperience, which Mr. Robinson cannot find refuge in. If using the same cloud more than once is contrary to nature in Mr. Robinson's opinion what, in the name of inconsistency, is the use of the same model over, and over, and over again in varying character, now a fisher-maiden, now a haymaker?

As to the other points, it is interesting to notice that another critic objects to one of these very photographs of mine (which Mr. Robinson states deny my theories) as carrying the naturalistic idea to excess, whatever that may mean.

I do not think any injustice was done Mr. Robinson by the reference to "attempts at historical subjects." It is not a far cry from lady models dressed as fisher-maidens to the same as historical or fanciful personages, and if Mr. Robinson objects to the procedure, it is only because he is a little less un-naturalistic than others of his general way of thinking. In a very recent article he contemplates the possible future representation of murders, bereavements, and other painful scenes, in a supreme manner by photography. After this why kick at historical subjects?—I am, yours, &c.,

(GEORGE DAVISON.)

LEEDS PHOTOGRAPHIC SOCIETY.—AUTUMN EXHIBITION OF PHOTOGRAPHS.

To the Editor.

SIR,—Will you kindly grant me a small space in your JOURNAL to reply to a large number of correspondents who ask me for particulars of the above?

Exhibits are confined to pictures by members of the Leeds Photographic Society, and no prizes are offered. The exhibition was opened on the 1st instant, in one of the rooms of the Leeds Fine Art Gallery, and will remain open until January 2.

By inserting this letter in your next issue you will save photographers the trouble of applying for space to exhibit, and greatly oblige yours, &c.,
Leeds, October 8, 1889.

S. A. WARRINGTON, Hon. Sec.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED :—

F. Higgins, Chard.—Three photographs of orders, medals, and relics of Admiral Viscount Nelson, Duke of Bronte, K.B. One photograph of marble bust of Admiral Viscount Nelson, Duke of Bronte, K.B.
J. Stuart, Glasgow.—Photograph entitled "Wednesday Afternoon in St. Enoch's square, Glasgow."

CYMRU.—See reply to "V. Dunn."

J. R. GOTZ.—Received. In our next.

SYNTAX.—The Photographic Exhibition closes on November 13.

V. DUNN.—We are sorry to find that any London colourist has acted in the manner described. It is clearly a case for the County Court.

T. E. G.—I. We advise you to accept the offer you have received.—2. Send the specimens to this office with an addressed wrapper for their return.

OCCASIONAL CONTRIBUTOR (Manchester).—Thanks. Send a few more, if not for publication, at least for private circulation among metropolitan photographers.

NEMO.—We should advise you to have the nine-inch focus lens in preference to the seven-inch, seeing that you already have one of six and a half inches, and of the same form too.

TRANSPARENCY.—The ornamental borders referred to for transparencies are mostly produced by the sand-blast process. Some we have seen of foreign production have been done by the aid of fluoric acid.

J. ROSS.—We do not remember your query, as we do not retain letters after they are answered. However, as you say the matter, whatever it is, is to be found in the index for last year's volume, why not refer to it yourself?

A BEGINNER.—You had better employ the pure carbonate of soda, not the bicarbonate—it is preferable to the impure article. For a five per cent. solution of pyro, half the proportion given in the usual formulae for a ten per cent. solution.

F. C. F. (Capetown).—Next to the portrait lens the "universal" is the quickest of those on your list. The next in order of rapidity of those you name is the rapid symmetrical, which, in our estimation, will answer your purpose quite well.

WM. SCOTT (Ghent).—We cannot say where there is a good opening for a first-class photographer in England. The general complaint in most towns is that there are too many there already. Certainly, competition is very keen in every large town we know.

C. BLACKWELL.—If the gelatine pellicle remains in the flaccid condition you mention, it is clear that too much—far too much—glycerine has been added. Try reducing the quantity to one-fourth. Bear in mind that only sufficient must be used to prevent brittleness of the gelatinous film. All beyond this is positively injurious.

J. S. WOODRUFF.—If for the acetate of lead you substitute three times the quantity of acetate of soda you will have a good toning bath. One ounce of the solution should be diluted with eight or ten ounces of water for use. You should bear in mind that the colour of the prints depends more upon the character of the negative than the toning bath employed.

TORBAY.—The different makers who prepare ready-sensitised papers do not publish the particular method they employ. Each maker keeps his method to himself, and to this extent the preparation is a trade secret. Possibly some of the manufacturers would teach you their process for a liberal consideration. An article on this subject is in type for the ALMANAC.

F. E.—1. The albo-carbon light with two burners and a metallic perforated shield in front is the better of the two systems described. In our volume for 1887, at page 87, you will find an article treating on this subject.—2. A good rapid doublet of four inches focus will certainly answer for enlarging, but we should give preference to the portrait objective of longer focus.

J. GASKIN WOOD.—There is very little difference between the two plates; but probably you did not use a yellow screen. Orthochromatic plates are of very little, or any, advantage without it is for copying subjects, such as that you describe. Had you employed a yellow screen you would, doubtless, have obtained a different result. Read Mr. Bothamley's lecture delivered at the recent Convention.

C. D. ROBERTSON.—Glaze about twelve feet of the roof and side, commencing, say, from about five feet at each end on the north side. The glass need not be carried up to the ridge, but about two feet six or three feet from it. With such a studio you will be able to place the sitter at either end, and so take either side of the face. The ends should certainly not be glazed. Any architect will supply you with working plans if you explain to him what is required.

OAKLEIGH.—Certainly an enlargement may be made by a single lens, but under the circumstances mentioned it will require a much longer exposure than you appear to have given. Bear in mind that the longer the negative the longer *cart. par.* must be the exposure. It is imperative that the light be well distributed over the entire surface of the negative. Should you still fail, send a drawing showing the relative position of light and negative, or, better still, call when next in town.

VITA asks:—"Will you kindly say how to prevent air bubbles from coming on silver (albumenised) prints in enamelling. I have used the gelatine bath one ounce of gelatine to twenty ounces of water, and one to ten. They come on in drying. I simply use gelatine and water. I enclose sample print."—The air bubbles do not come in the drying but arise in the manipulations. Air gets imprisoned between the print and the collodion. The only way of avoiding them is to use more care in the squeegeeing of the prints on to the glass.

A. S. RULE wishes to know if a person can prevent him from taking a photograph of his house, provided he takes it from a public thoroughfare. He says that, last week, he was about to take a photograph of a very pretty house in Hertfordshire, when the proprietor came out and forbade him doing so, at the same time threatening "to smash his apparatus and him also if he did not clear off at once."—If the photograph were taken from a public highway we know of no law to prevent it; any forcible means taken to prevent it we imagine would amount to a legal assault, and would be punishable accordingly.

CONVENER writes: "In my letter *re* late Convention in your last issue the word 'impossibility' in the second paragraph should read 'probability.' I do not know whether this was my error or your compositor's. Let me say that a word replaced by a dash towards the end of my communication was not in any sense morally unfit for publication; perhaps the printer could not decipher it. Anyhow, I am pleased to have information that the second delegate mentioned as nominated did not eventually represent the Society in question, but that, by a happy circumstance, he was replaced by a very desirable and satisfactory substitute."

FROM Mr. Arthur S. Medrington, Bold-street, Liverpool, we have received two authentic portraits of Mrs. Maybrick. Mr. Medrington says: "These are the only genuine portraits, direct from life, of Mrs. Maybrick which have been or can be published. I photographed her myself, and have been requested and authorised to publish these pictures, in order that the public may have a correct likeness, and with a view to counteract the impression produced by the photographs from wax models which have been so extensively sold as genuine portraits, but are considered to give an entirely false idea of her features."—We have never had the privilege of seeing the original, but these portraits seem as though they were excellent likenesses; they are quite unlike other alleged portraits that we have seen.

M. writes: "If your correspondent, 'W. A. Boroughs,' will get a 'George's Calorien,' sold by Farwig & Co., 36, Queen-street, Cheshire, he will be able to keep his studio warm or as hot as he likes. It must be a very cold place that cannot be warmed by one of the larger size. They can be used with gas or coke. I have had three in use, one for sixteen years, one for ten, and have one in my entrance hall—which I put in last year—to warm the whole house. The great advantage of them is that the air is perfectly pure and never smells of hot iron. The advantage of the gas ones is that you can leave them alight day and night without any fear. They never smoke or require any attention, and as my painter's studio was at the top of the house there was no coal to carry up. I should advise him to try one."

M. writes as follows: "I have been collecting my hypo residues from fixing prints and negatives in a paraffin cask, and when full put in some liver of sulphur, as per instructions in JOURNAL of February 22, 1884. The solution was black before and remains so, though I have put in at intervals one pound of liver of sulphur, so that I don't know if the residue has settled or not, and cannot see by taking out some to test. Should it be so, and how can I tell when it is settled?"—If our correspondent will test the solution according to the instructions given in the article he quotes, he should have no doubt on the subject. Had he read the articles on this topic which have appeared in our columns during the past few weeks, he need scarcely have been at the trouble of writing. Full and explicit instructions for testing the solutions are given in them.

W. M. ROBERTSON (Davos Dörli, Switzerland) puts the following queries: "1. Can wooden dishes intended for photographic purposes be coated with a varnish, such as shellac varnish, so that they will resist the action of ordinary photographic chemicals? If so, what liquid can shellac be dissolved in? I tried to dissolve it in methylated spirits of wine, but did not succeed.—2. Is there any other and better varnish than shellac?—3. Would wooden dishes covered with guttapercha be serviceable for photographic uses, and is there any special kind of guttapercha which can be used for the purpose? I have one or two wooden dishes covered with wax (paraffin), but find them disagreeable to handle.—4. What is the best material to make the worm of a small still to distil water? Is there any silver-lined tubing made for this object, and where can it be purchased?"—In reply: 1. Wooden vessels, thoroughly coated with shellac, will answer quite well. The best solvent is methylated spirit. Possibly the spirit used was too weak.—2. Shellac varnish is as good as any.—3. Yes, provided they are not used for warm solutions. Pure guttapercha must be employed. Paraffin is an excellent material and is thoroughly impervious.—4. Tin pipe (not "conno pipe") answers every purpose. If silver-plated tube be desired, it should be of copper. Messrs. Benham & Frowd, Chaudos-street, W.C., will supply a copper worm silver-plated.

WITH reference to the correspondence which has appeared relative to Lens Standards at the late Convention, Mr. William Taylor writes to say that his letter which appeared in our issue of September 27 was not intended for publication, but only written as a personal explanation of his action relative thereto, being chiefly a summary of the criticism which he made in Mr. Wollaston's presence when moving the rejection of his report, a motion supported by Messrs. Dallmeyer, Beck, and other well-known gentlemen, the rejection of the report being adopted without the utterance of a single word in favour of it. Subject to this explanation, we think it is well that the matter should have been brought before the public. A Committee was appointed in Birmingham in July last year to do certain work which would involve a good deal of time and care; but up to within a very brief period of the London gathering, no meeting of that Committee had been held. This delaying of an important measure such as that in question, and rushing it forward just at the last moment, cannot be commended; and we, with many others, are glad that attention has been directed to it by Mr. W. Taylor, although his letter, as he explains, was of a semi-private nature, and not meant for publication.

PHOTOGRAPHIC CLUB.—Wednesday, the 16th instant.—The subject for discussion: *Platinotype Printing*. Last outing of the season on Saturday, the 12th instant. Tea at the Bull and Bush, Hampstead, at five p.m.

THE editor of the *Photographic Quarterly* sends us a copy of his first number. In addition to eleven articles by Rev. T. Perkins, A. M. Rossi, Rev. W. Aston, John Hall Edwards, and others, it contains two page illustrations, one of them being a characteristic portrait of Mr. James Glaisher, F.R.S. The various articles are ably written, and the *Quarterly* is generally well got up.

WE have to record the death of Mr. William Gillard, of Gloucester, in the forty-ninth year of his age. As a photographer he occupied a prominent position, having been a successful exhibitor at many exhibitions, for which he had obtained numerous medals. His work was not only highly appreciated and patronised by the leading families in his own county, but also by those residing in places far beyond its confines.

Among the leading articles in the *New York Herald* of October 1 last, the following apology was inserted, owing to the infringement of copyright of one of Messrs. Byrne & Co.'s Royal photographs by the above newspaper:—"In the *Herald* of August 25 appeared an electrotype of the family of the Prince of Wales, which was inadvertently imitated from a copyright photograph, which, as it now appears, was originally and exclusively taken by Royal permission by Messrs. Byrne & Co., the eminent photographers, whose studios at Richmond are so well known to Londoners and tourists. The *Herald* picture was necessarily much reduced, but the original photograph and its copies are of Imperial size. The likenesses are, of course, perfect, as taken from life under peculiarly valuable circumstances, and differ artistically from the flood of photographs of the Marlborough House family, which are made up in groups from single photographs, often of themselves copies. The plate is peculiarly valuable, as presenting the Duchess of Fife in the very last photograph of her as the maiden Princess."

THE PHOTOGRAPHIC TRADE.—A meeting of gentlemen interested in the photographic trade was held at the offices of the London Chamber of Commerce, Botolph House, Eastcheap, on the 8th instant, Mr. Walter S. Bird presiding. It was unanimously agreed to form a Photographic Trade Section of the Chamber, for the purpose of advocating trade interests as apart from the scientific or amateur interests of photography. The question of copyright, it was considered, should be one of the first to be dealt with by the new section in co-operation with the Printing and Music Trades Sections, which were reported to be already dealing with their respective branches of the subject. It was also thought that the new section might co-operate with the Electrical Trade Section for the establishment of a standard of light, and also in regard to the adoption of the Whitworth screw as a means of obtaining uniformity of size. Messrs. Walter S. Bird (Autotype Company), Frank Bishop (Marion & Co.), Thomas R. Dallmeyer, Friese Greene, William Grove, H. S. Mendelssohn, L. Warnerke, S. Buchanan Wollaston, and T. P. Watson (W. Watson & Sons) were appointed a committee to undertake the organization of the section and to communicate with those firms, both in town and country, who have not already joined in the movement. The meeting then adjourned until November 4, at 5 p.m., when progress will be reported and a working committee appointed.

A BEAUTY show has just been held in London, in which prizes have been awarded on the strength of the photographs forwarded to the Judges. This plan is obviously in some respects an improvement on that which compels lady competitors to appear *in propria persona*, to present themselves as mere exhibits at a public show. Many a fair one who would utterly shrink from that vulgar form of display and all its attendant risks would be eager enough to try her luck in the photographic lottery, and all the more so that the disappointment of drawing a blank could be easily hid. But, these advantages apart, of what value can decisions be that have only, in the parlance of the dark room, "a photographic basis?" Who does not now know that the retoucher turns the world of beauty upside down, and that if he does not—sometimes cannot—improve true loveliness, he can so alter the aspect of the plainest countenance as to make it—so far as the photograph is concerned—a marvel of artistic charm. The Judges of the London show had to satisfy themselves of the identity of the prize photographs with the senders thereof, but they do not tell whether or not they convinced themselves of the truthfulness of the portraits. Is it not quite possible, at a time when the actual likeness of sitters is so liable to be "improved" away by the photographic retoucher, that some of the competitors whose photographs were cast as rubbish to the void may, after all, have been the real queens of beauty in the show? The point, however, may not be held of great account in a show which seems to have had for its supreme object the advertising of a well-known soap.—*Aberdeen Evening Gazette*.

OUR FORTHCOMING ALMANAC.—The Editor will feel obliged if those friends who purpose contributing of their practical experience, research, or experiment to the ALMANAC, and, through it, to their brethren all over the world, would kindly send their articles or hints—no matter how brief—as early as possible, as it is the intention of the publishers to go to press early next month.

We learn from the Publishers that the advertisement pages are fast filling up, and will be closed in a few days.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1537. VOL. XXXVI.—OCTOBER 18, 1889.

DANGEROUS HYPO ELIMINATORS.

AN old proverb teaches us that while one man may steal a horse with impunity, another may not venture to look over a hedge without getting into trouble. In like manner it frequently happens in photographic practice that what answers perfectly well with one operator proves disastrous in the extreme with another, simply because the small but important element of "common sense" is omitted from the formula.

How often in chemical matters a strict adherence to written instructions leads to dire failure when the necessary but unspecified ingredient, "brains, sir! brains!" is not used, perhaps no one is in a better position to know than a photographic editor. It almost seems as if one style of photographer—and he may be selected from the ranks of both amateur and professional, and from every class, educated and otherwise—lays himself out to specially discover methods of failure which would not strike the ordinary practitioner. At the same time, there are instances in which an imperfect knowledge of chemical facts rather than mere want of common sense is the cause of the trouble. What may be the true source of the difficulty in the case to which we are about to refer we leave to our readers to judge.

Within the last three days we have inspected three large albums of views, the production of an amateur who is noted for the very particular care he takes, or tries to take, in everything he does. With scarcely an exception, the whole of the prints, some three or four hundred in number, showed signs of fading; not the ordinary sulphuration commonly known as fading, but rather a bleaching action, mixed with a little of the yellowing more commonly associated with sulphur fading. Consulted as to the cause, upon inquiring into the circumstances under which the prints were produced, we had little hesitation in deciding that the very means adopted to secure their permanence had been the cause of their rapid and total destruction. That, in fact, to the injudicious or unintelligent application of what may be a really useful precaution was to be attributed the unpleasant result.

We have over and over again in these columns pointed out and tried to impress upon our readers the folly of trusting to the so-called "hypo eliminators," rather than to honest washing for the removal of the hyposulphites from fixed prints. It has been proved beyond any shadow of a doubt that it is not hyposulphite of soda, *as such*, that brings about the destruction of the photographic image, but rather injurious combinations of the decomposition products of that salt with the silver forming the image. Now, the very action of such so-called eliminators is, in the first place, to bring about the decomposition which is likely to set up the deleterious action;

and hence, as we have pointed out, eliminators should only be employed with the utmost caution, and after very thorough washing of either print or negative. We believe we are only stating what is fact in expressing the opinion that a "hypo eliminator" can only be used with *perfect safety* after a sufficient amount of washing to *thoroughly remove all hypo*; in other words, that such applications are practically useless.

The different agents employed for the purpose of course vary in their effect, some possessing a directly injurious action upon the silver image, independently of their formation or liberation of sulphur and sulphur compounds. The most harmless, or, as we should put it, the least injurious, is, perhaps, alum, which has practically no effect upon a properly washed print or negative; but the same cannot be said of peroxide of hydrogen, or eau de Javelle, Labarraque's solution, "chloride" of lime, "ozone bleach," hypochlorite of zinc, or other solutions of a similar character. These have all a powerful bleaching action, both on print and negative, and consequently present an additional danger beyond that of sulphuration.

It is now a quarter of a century since Mr. F. W. Hart first suggested the use of the hypochlorites for the purpose in question, but, if we recollect rightly, he laid particular stress on the necessity for care in the method of application in order to avoid the counter dangers. And when, about the same time, Dr. Angus Smith proposed the use of peroxide of hydrogen for the same purpose, he also directed attention to the possible danger that might arise from the remedial treatment, and practically it has been found that both with silver prints, and in more recent years with gelatine negatives, the same amount of trouble necessary for the use of the "eliminator" would, if applied in the form of fair *washing*, produce an equally permanent result without any danger.

In the case of the albums referred to as our text, the prints had all been *carefully* washed before receiving their final treatment with eau de Javelle as a final safeguard. This was applied in sufficiently dilute solution to produce no immediate bleaching action, but the mistake was made of not removing it from the prints when its work was done. Few photographers, we imagine, have not heard of the danger arising from the use of paper or mounts from which the "anti-chlor" (alias "hypo") has not been thoroughly removed by the manufacturer. If the paper maker finds it necessary for the stability of his material to "kill" or neutralise so dangerous an element as the chlorine employed in the bleaching process, it is surely scarcely judicious on the photographer's part to apply the same agent to his films without exercising the utmost care in its removal when it has served its purpose.

And what we desire to impress upon all is, that the same amount of care applied in simple washing will effect the purpose in view, the removal of the hyposulphites at least, as efficiently as any eliminator, and without danger.

ECONOMY IN THE DARK ROOM.

THE suggestion having been made that our series of articles on *Economy in the Printing Room* might be supplemented with advantage by some remarks in the same strain upon other departments, especially the dark room, we show our acquiescence by this week reviewing the work of that particular region, merely premising that as the articles already written embrace most of the subjects that would fall under that heading, anything that we say will have a tendency to be didactic. For example, we have dealt very fully, and advisedly so, with waste hypo solutions. We hear from many quarters of the immense amount of waste that takes place in this direction. Practically speaking, in those establishments where there is any attempt to collect the silver from discarded fixing solutions, the precipitation by sulphide of potassium, or "liver of sulphur," holds the field, of that there is no doubt; yet in discussing the subject last week with a firm who are amongst the largest dealers of photographic chemicals in the country, we were told that it was, comparatively speaking, quite rare to receive an order for this chemical; and we know it to be a fact that on one occasion a local chemist, who was recommending this mode of saving to a photographer using nitrate of silver very largely, was told, "Oh, yes; you would like to get an order for the stuff, would you not?" Yet with photographers everywhere crying out about low prices and reduced profits, photographers who would consider themselves utterly deficient in elementary common sense if they did not collect their print washings, it is nevertheless a fact that they daily throw away silver equal if not superior in amount to what they obtain from their print washings in serene indifference to—it cannot be said ignorance of—this most blameworthy waste! Again we urge, in the strongest manner, upon every thinking worker to collect every drop of fixing solution and extract the silver from it before throwing the liquid away. In the dark room, of all places, is this needful; for we believe that the custom is almost universal of using up the hypo till it is almost saturated with silver. This is simply false economy of the most glaring kind, for negatives are, equally with albumenised paper prints, subject to danger of fading or injury through the decomposition liable to be set up in the film by the juxtaposition of silver haloids with weak hypo solutions; and hypo solutions that were saturated to start with very quick have the attributes of weak solutions when their solvent power upon these salts is almost saturated. It is to be remembered that, to use the popular mode of expressing the action, hypo will dissolve a very small proportion of silver haloids. True economy is therefore best carried out by using fresh hypo long before it has taken up all the silver it can, and no one will have any fault to find with this item in his balance sheet if he adopts our oft-repeated advice to save his "hypo residues."

Pyrogallol is the most important chemical used in the dark room, and economy in its use cannot be treated in any very varied manner; but when we have seen a large array of empty pyro bottles stowed away in some corner in this department, we have more than once asked why it was not bought in bulk? "The trouble and bother of weighing," is the usual reply. We suppose that because it weighs light it is thought difficult. We

need scarcely say that such is not really the case. Yet, to avoid this imagined difficulty, photographers who use pounds weight in a year pay something like a penny an ounce—for such in effect is what they do when, as is usual, the empty bottles are not utilised—or about ten per cent. upon its cost to be rid of the trouble of weighing. We do not hear of such a sum being paid to avoid having to weigh acetate of soda, or nitrate of silver, or "hypo" crystals, and it is really absurd to throw money away over this particular chemical.

There is, however, much to be said for pyro economy in another direction, using the same solutions several times over. We have some time ago narrated experiences in this way, and have seen developer used over and over again with advantage. When a few negatives only are dealt with, it is really not worth the trouble of storing away once-used solution; but when negatives in large quantities are developed at once, considerable saving in this way may be made. We have lately tried some experiments in this way, and have found that the same solution may be used three times over with little disadvantage. The second plate passed through differs little from the first; but the third has a decided yellowness of colour, which is still increased when the fourth plate has passed through. We should of our own experience be inclined to fix upon three as the maximum number of times a solution may be used when extreme yellowness is objected to in the colour of the negatives. Much depends, of course, upon the thickness of the film as regards the number of plates to be passed through, for the thicker the film the greater the liability for it to become quickly yellowed. Much also depends upon the proportion of sulphite of soda employed, and its use now is very common, notwithstanding the objections to its use so strongly brought before photographers a few years ago. There is a distinct difference in the extent of the yellowing to be perceived in the finished negative according to whether the proportion of two, three, four, or even five ounces to one ounce of "pyro" be adopted. Four ounces was originally recommended by the inventor of the process; but we find a distinct gain to accrue from using the largest of these proportions, namely, one ounce "pyro," five ounces sulphite. It will be found that the extra one ounce leads to very increased "staying power" in the solution, which, even after the third negative has passed through, is still by no means very dark in colour, and is far less likely to engender bubbles in the liquid, these having a particularly unpleasant way of attaching themselves very firmly to the film.

It will, we think, be interesting to our readers to know the practice of a brother photographer who has a large connexion and orders chemicals in quantity. We therefore conclude the present article by publishing the formula he adopts for his pyro stock solution. It is simply:—

"Pyro"	1 pound.
Recrystallised sulphite of soda	5 pounds.
Citric acid	$\frac{1}{4}$ ounce.
Water (if boiled all the better)	2 gallons.

This solution will keep for months (if not years), and will stand a considerable amount of careless storage without becoming discoloured.

AN admirable opportunity is now afforded those who desire to see the collated works of Mr. H. P. Robinson, these being at present on exhibition in the Camera Club, to which any one may for this purpose have access on presentation of his card. Here the old time-honoured productions of this clever artist are to be seen adorning the walls. His *Bringing Home the May*, *Fading Away*, the *Lady of*

Shalot, and, indeed, all his work, including his last picture—*Merry Fisher Maidens*, now in the Pall Mall Exhibition—are to be found. Their perusal cannot fail to interest and instruct. All who possibly can should see them.

THE interesting specimens shown by Mr. Levy in illustration of his experiments communicated to the Photographic Club last week, an account of which will be found on another page, are at present in our possession, and for the next two or three days may be seen on application at our office. Thereafter they will be restored to the archives of the Club. Mr. Levy's experiments are of great value, and the specimens entirely bear out all that he says.

If proof were wanting of the rapid spread of photography, it is furnished in the multitude of new societies which are springing up in every direction, and the number of members that are enrolled, as well as the interest taken in the meetings. Take, for example, the West London Photographic Society, which is not yet a year old, and it numbers about eighty members, as we see by its report. But this is by no means exceptional. What is more, in these new societies the members attend and take a lively interest in the meetings. If some of the older societies' meetings, say those of the Parent Society, for instance, were as, proportionately, well attended as most of the younger ones are, their present premises would prove somewhat inconveniently small.

THE numerical strength of any society must not be taken as a criterion of its vitality. This can only be judged of by the attendance and discussion at the meetings. A society may be composed of several hundred members, yet if only a score or so interest themselves in its meetings it indicates a moribund condition. The old North London Photographic Association was a case in point. At the time of its demise, now many years ago, it had, if we remember rightly, somewhere about 120 paying members; still, it used to be considered a good meeting when even less than twenty attended. We direct attention to this subject as a hint to Committees and Secretaries of new societies to keep up a good *pabulum* for their meetings.

THE country, at the present time, is in a glorious condition for photography, though the weather for it may, just now, be a little uncertain for outdoor work. The autumnal tints, as now seen, render the landscape exceedingly charming. Although the recent gales may have, in some parts, thinned the leaves a little, it will make no practical difference in the picture. Indeed, in some cases it is an improvement rather than otherwise, as the foliage being somewhat thin gives an enhanced autumnal effect. A considerable advantage will often accrue at this time of year in landscape photography from the use of orthochromatised plates, provided they be used with a pale yellow screen and with discretion generally; because the great variety of tints which in most places now exist, and add such a charm to nature, will be the better rendered in the photograph. The plates for the purpose should be specially sensitised for the red rays, say, by the addition of cyanine to the usual eosine orthochromatising mixture. At this season natural clouds can generally be secured with the landscape—an immense advantage pictorially.

Do photographers—that is, professional photographers—care sufficiently as to whether their pictures are permanent or not, or as to how soon they may pass into the sere and yellow stage? There can be no question that the silver prints sent out at the present day are not so permanent, as a rule, as those which were issued from the same establishments, say, fifteen or twenty years back, notwithstanding that as much care is said to be bestowed upon their production. Various reasons are assigned for this, such as lightly sensitised paper, thin negatives, deleterious mounts, &c., or perhaps a combination of the whole. Be the cause what it may, the fact is incontestable. Although photography has made such rapid strides during the past quarter of a century, yet, so far as the permanence of silver prints is concerned, it has certainly retrograded. It is no unusual circumstance to see pictures, for which from one to two

guineas per dozen was paid, to show unmistakable signs of fading during the first year or so—sometimes even within a few months, while others, twenty years old, are in a far better condition. Surely the public have the right to expect the same degree of permanence in their photographs now, with all the vaunted advances in the art, as they used to get when photography was yet in its infancy.

THE above suggests a question which will, doubtless, arise some day. It is this: Would an action at law lie against a photographer for the recovery of the amount paid for photographs which had faded in an unduly short period? If it did, it would prove exceedingly unpleasant for many large firms—and small ones, too, for that matter. It might be pleaded that it is a recognised fact that silver prints do fade in time; but that would hardly avail when they go within a few months, while others, after twenty or more years, are still intact. It might well be argued that if produced under similar conditions all pictures ought to be equally permanent.

SCARCELY a week passes that we do not receive a number of letters from correspondents—amateur photographers—on the subject of toning. The most general complaint is that the prints, after being in the bath sometimes for an hour or more, still remain red, and when fixed change to a dirty brown or grey colour. Almost invariably the letters terminate with a request for a "good formula for a toning bath for rich purple or black tones," as if this were all that was required to secure the desired colours. This week the letters received on this topic exceed the usual average, and the examples enclosed, in every case, show an entire misconception on the subject of toning generally. For example the print has usually been utterly ruined by over-toning, although the fault has generally been attributed to the bath employed. Few beginners appear to realise the fact that the trouble in obtaining deep tones may be, and in the cases now before us are, due either to the manipulations or the paper, but principally to the negatives themselves.

WE have frequently pointed out that the particular toning bath employed has very little influence upon the colour of the print. This depends almost, if not entirely, upon the negative and the paper used. With a suitable negative and paper, identical tones, from a red-brown to a deep purple or black, may be obtained by almost every toning bath now in use. But unless these conditions are fulfilled, no special formula will help matters to any material extent. With a feeble negative—one lacking in contrasts—it will be impossible to obtain deep, rich tones, no matter what toning solution or paper be employed. It is true that some papers will stand more toning than others, but none to the purple stage unless the negative is a vigorous one. But with a suitable negative and most of the commercial papers, almost any tone desired may be obtained, and that, too, with nearly every kind of toning bath. Some papers, however, there are which even with a strong negative will not tone beyond the warm stage, and if the prints be left in the solution too long they will, when finished, be cold and flat, mealy, and without vigour, though if they were removed at an earlier stage good prints of a warm tone would be secured. This remark applies with equal force to prints from feeble negatives on whatever paper that may be used. Few negatives nowadays are so feeble that they will not yield fairly good impressions if the toning is not carried beyond the warm stage. When the zenith of tone any print will take is reached, any further action is one of degradation. This point should be borne in mind by the inexperienced, who appear to imagine that the colour of the print is entirely dependent upon the particular toning bath employed.

OPAL pictures of the scrap type, we are given to understand, will be more extensively utilised as "Christmas and New Year's Cards" this winter than hitherto. Many provincial photographers might, we surmise, materially increase their returns during the dull season by issuing photographs of picturesque local scenery on opal glass, with suitable seasonable greetings inscribed thereon, and neatly mounted. The inscription might be written ornamentally on the negative so as to appear white in the finished picture. Such pictures would, no doubt,

sell well at a fair price, and at such would yield a good profit; that is, if we may judge from the price at which the cheap opals sold at the stationers are now being produced.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—III.

In resuming our remarks upon the pictorial aspect of the Exhibition, we will first notice those pictures which were precluded from competition by their producers being elected as Judges of Awards.

George Davison (Nos. 7 to 13).—A series of well-studied pictorial bits of nature, some having figures introduced with much care. The chosen positions of these figures indicate a thoughtful attention to their capabilities of assisting the composition by form and depth of tone. In some of these studies there is a total absence of those very light renderings which so often will assert themselves in the immediate foreground. In No. 10, *Albury Heath*, it would appear as if the negative had been left to its normal condition, and the usual result had taken place; but in others—especially Nos. 11 and 12—the foreground is made to appear very deep in tone, the treatment in all cases is very effective, and at once reveals an artistic perception of what to do and what to leave undone; but the question arises how this has been produced—is it possible to have carefully toned down certain parts of the print after it had left the negative? In No. 11 this subjection of foreground increases in depth of tone to the lower portion of the print, and so suggests the surmise. Such treatment is absolutely the first step towards combination printing. However this may be, the result is very good, and the whole seven pictures show a well-directed artistic faculty, from which the great army of photographic picture makers should receive most valuable lessons.

F. Gale (Nos. 38 to 41).—Four small studies by this most artistic photographer, whose choice of subject-matter to act as the harmony to the melody of his figures is now looked for at each succeeding Exhibition; and although these pictures are not quite up to his standard of excellence, yet they show most careful attention to form and selection of dark and light portions, which not only satisfy the artist, but which also arrest the attention of the ordinary admirer of pictorial work.

H. P. Robinson (No. 65), *Merry Fisher Maidens*.—This is one of those composition photographs about which so much literary talk is now being expended; and apart from the purely scientific right and wrong of these productions, we can only remark upon such work from the artistic side, and that is, how far can photography be made the medium for the production of pictures in which art supplements the scientific operations? Leaving this warfare which is agitating the army of material purists, we can only discourse upon the productions before us; and whilst there is much, very much, in this pictorial outcome which shows the master—and of whom it must also be stated that he ranks very high amongst those who strive to raise photography to the possibility of fine art where *facsimiles* are not the sole object of reproduction—at the same time, there are some few points to which exception might be made; but the conception and realisation of pictorial subjects, by means of tools so much of which is automatic, must always make the productions of this exhibitor go far away beyond the ordinary attempts of others, unless they also possess and cultivate the artistic faculty.

W. Bedford (Nos. 271 and 284), *Ludlow Castle*.—Two views of this romantic spot, where the castle is made subservient to the study of foliage, of which there is much in these two frames. This treatment of the subject involves a study of form and detail which conveys an accurate representation of the local surroundings; all this has been treated in a very judicious and masterly way, the result being a most accurate rendering of this very picturesque locality.

David R. Clarke, M.A. (No. 98), *The Way of the World*.—A picture of the courtship of two members of the working classes. The photographic work of this exhibit is very good, but the composition might have been considerably improved if the standing figure of the man had not been quite so straight; again, on the opposite side of the picture there is a square black mass of nothing, which weighs down the effect to a very commonplace result. Notwithstanding

these points, there are evidences of a desire to produce a picture which is really very good, considering the nature of the models. Therefore we notice this work in detail, with the anticipation that at some future time far better pictures will be forthcoming.

A. Horsley Hinton (Nos. 113 to 117).—A series of five photographic studies of old tree-stems, &c., which are exceedingly good specimens of careful and studied attention to the working of the machinery by which is recorded facts and detail of a very complicated order, which these pictures so clearly show. There is a charm about the quality of these specimens of careful and very clear work which is very pleasant to look at, and they bring us back to the real outcome of photographic work, which is exquisite detail associated with well-balanced light and shade.

School of Military Engineering (No. 120), *Ickley Wood*.—Two pictures in one frame, which are very good examples of the work of these clever engineers. These copies have been printed very deeply in order to secure a powerful effect, but sometimes the gain of richness in one part is overpowered by the blotting out of detail in another, and a general overcast of very dark bits is the result; otherwise the choice of subject and general effect is very good. A closer attention to the possibilities of unlighted or locally deep-toned portions not yielding to chemical action, and thereby becoming plague-spots, as also the unreality of such black masses, would have made these pictures much more suggestive of really very good work.

Francis Cobb (Nos. 134 and 135).—Two pictures of country places and picturesque buildings, both treated from a well-considered point of view. Here again the characteristic mark of photography, viz., its capacity to show detail, has been well made use of, and presents us with matter which, when well chosen, as in these pictures, affords much pleasure. The figures in No. 134 would have been more effective if they could have been placed nearer the centre; and again, the same cloud negative being printed in both pictures, however effective and possible to a certain extent, yet is open to objection when the two photographs are hung together; a fate which they undoubtedly deserve.

Rev. F. C. Lambert (No. 171), *A Labour of Love*.—Another of those pictures where the aiming pictorially at sentiment by photographic means seems to be so much in vogue at the present moment. Considerable attention has been given to the composition of this group of the two sexes, but the question arises, Is it worth while recording so much of every-day life from the realistic point of view? The mission of art should be to poetise the ordinary by judicious posing of models and combination of form; and why should photography, which records anything placed in its way, be subjected to so much of literal work? We throw out these remarks because any one who shows the slightest disposition to utilise science for the production of art work must progress; it is only the way that requires to be clearly pointed out. There is so much thought and care evinced in the treatment of this picture, that we make these remarks with a desire to raise photographic art to a still higher status.

S. Bourne (Nos. 185, 186, 187), Three small photographs of pretty bits of landscape. There are eleven pictures hung consecutively; but these three are the best. At the same time, the subject-matter would have better suited a larger size, where the detail would be more conspicuous.

Captain Abney, C.B., R.E., F.R.S. (Nos. 250 to 257), *Views in Switzerland*.—These photographs convey a most interesting idea of the locality, more so than when bits only of mountains are shown; for here we realise what the locality is like. But these photographs being small hardly do full justice to the scenes. They are a little too delicate in treatment, and consequently suggest prettiness rather than grandeur.

John J. Thornton (No. 261), *Off We Go*.—Some boys with a boat are just releasing it from its fixed position, and we can imagine the rest. The arrangement of the effect is very good, and the treatment of the position of the figures tells the story very clearly. This photograph promises much for any future work treated in so clear a manner.

Henry Stevens (No. 270), *Flower and other Studies*.—A frame of eight prints, six of which are flowers, which still maintain the even but very successful attributes of this careful student of a most difficult study, where the combination of light objects, such as the

vases and the almost white floral beauties, results in very pleasing and attractive pictures; but we miss those much larger specimens of his skill in this particular work which formerly gave more scope for composition and pictorial effect.

W. J. Byrne (No. 301), *At Home Portraits*.—Here we have a frame of fifteen portraits taken at the residences of the sitters, amongst whom is one of the Princess of Wales, apparently walking up a staircase. This one photograph is very interesting, as it so completely realises the home of a noble lady, who apparently has been photographed whilst ascending the stairs in a most natural and effective position. It would have been almost impossible to have procured such a picture in the studio; and the same thought applies to all the other noble and high-bred sitters who fill up the large amount of similar studies. Apparently, there are difficulties which arise under these conditions; but the more important and valuable fact looms out, viz., the utter absence of the ordinary conventionality of studio accessories. The series lose much of their value by being all arranged close together in one frame, and would have been much improved if about half the number had been allowed wider expanse in the mount.

W. W. Winter (Nos. 312 and 327), *Portraits of Ladies*.—These are large direct portraits taken apparently upon 24×20 plates, and are very good studies, the charm of which arises from plain backgrounds having been used in each picture. There is some very effective lighting in both these exhibits, which would have been very much increased if those dreadful white mounts had not been used. In all pictorial subjects the principal matter, which in these cases are the faces, should be kept prominent by the tone of the frame or mount, and where several of such mounts come together, the effect is not only disastrous to the portrait, but disturbs the vision of the looker on. There are plenty of examples in this year's Exhibition which clearly evidence the correctness of these remarks.

Gambier Bolton (Nos. 351), *Lion Study*.—A very fine photograph of the king of beasts, where the pose of the head and forelegs is most effective. The treatment of the negative has also been in complete accord with local gradation of colour, and much praise is due to the photographer for so careful a study of a most difficult subject.

W. Wainwright (No. 350), *English Scenery*.—There are five views in this frame and an interior to evidence the work of this exhibitor, who does not appear quite so happy this year in the choice of his points of view; and most certainly it would have helped the effect if more detail had been effected in many parts. There is evidence of much thought and design in the position of the figures and accessories, but so many portions of the trees and foliage have so little detail that an injustice is thereby done to the otherwise artistic study which has been given these exhibits.

O. Essenhigh Corke (No. 400), *Knowle House*.—Four views of the interior show a good rendering of difficult work in rooms filled with old furniture, where by the carefully attended disposition of some articles of furniture an effect has been realised which is very satisfactory, as showing a desire to depart from the house-keeper's views of proper positions, and some very interesting photographs have been the result.

THE APPARATUS.

The "Giah," a camera of the *genus* detective or hand, exhibited by Messrs. Mawson & Swan, claims special notice. At first sight its construction and its appellation seem fittingly adapted one to the other, the former being seemingly complex, and the latter somewhat mysterious. Doubt respecting the name is allayed when we are informed that "Giah" is merely the Welsh for Winter, Mr. Winter, the active London representative of the firm mentioned, being at once the inventor and a native of the principality. Let us hope that there will be a limit to this kind of nomenclature, else will the Gaelic, the Erse, and the vernaculars of Indian and other tribes and nationalities be imported to the exclusion of the well-worn Greek. The general idea in the Giah is this: In all cameras there is an unused space between the lens and the sensitive plate, both above and below that angular line which connects them, and why not utilise this space by having a reserve of sensitive plates above and of exposed plates below? The mechanical problem to be solved is the

transferring of a plate from the reservoir of the unexposed to the exposing position, and then removing it to the reservoir below prepared to receive it.

The unexposed plates are placed horizontally, film downwards, in the twelve upper grooves of a square lift, there being twelve similar grooves provided in the lower portion of the same lift for the reception of the plates after exposure. A rotary slide is provided having two grooves, which are parallel and duplicates of each other. When the lift of grooves is at the top the upper groove in the rotary slide, containing the unexposed plates, is exactly opposite the lowest groove, and the first plate is free to slide into it by slightly tilting the whole apparatus. A quarter turn backwards of the rotary slide carries the first plate into a vertical position, film forward, for exposure, after which another quarter turn in the same direction carries the plate into a horizontal position, film upwards. A slight tilt forwards will now cause the exposed plate to slide into the first of the lower set of grooves in the lift. The duplicate groove of the rotary slide is now in the same position as was at first occupied by the other, and is ready to receive the next plate, and the same set of movements are repeated. In order that the lift may be lowered, so that the grooves therein may come successively opposite to the grooves in the rotary slide, the two are geared together by a rack and pinion movement, and after all, or part, of the plates have been exposed, the lift is returned to its first position by simply turning the rotary slide in the opposite direction.

The lens, which may be of any suitable character, is carried in a closed tube or tunnel, which is placed in the space left between the unexposed plates at the top and the exposed plates at the bottom of the lift. Means are also provided to prevent the return of the plate after tilting; to press the plate gently up to register during exposure; to indicate on the outside the number of the plate in position; to facilitate the stopping of the rotary slide accurately at the quarter turns, as required; and what is the most important point, to ensure that the grooves in the lift and the rotary slide respectively are brought exactly into line with each other at each half turn. And should any doubt exist as to the position of the plates, small ruby windows are provided under cover, so that the operator may at any time satisfy himself on the point. All the movements are automatic and simple. The operator has only to turn the rotary slide backwards—one-quarter turn each time—and the plates, without backing or sheathes, are carried into the exact position for exposure, and afterwards stored up. At no time are they exposed to any light excepting during exposure; the films cannot be injured, and the plates may be changed in bright sunlight without the slightest danger.

As one of the chief points in hand cameras is unobtrusiveness, the case is so constructed that nothing of a noticeable character is seen. And further, an experienced observer would fail to decide that the neatly covered box was a camera, mainly because the lens hole is hidden. This is done by what appears to be a strap (connecting with the carrying handle), which apparently runs right round the case, covering up the lens. A portion of this strap is, however, an imitation only, and is in reality a metal strip, covered with leather and pivoted on the same axis as the circular disc which forms the real shutter on the inside. By turning this imitation strap to the right slightly over a half turn it remains in a vertical position, and the shutter is set. The lens hole is still covered. On liberating the shutter the strap flies round to its normal position, carrying the shutter with it. The lens is not uncovered during the setting of the shutter, and the speed is readily adjusted by a suitable index finger on the bottom of the case.

The exhibits of Mr. J. R. Gotz are so carefully enclosed in a glass case as to preclude their being handled or examined. But as we have been privileged to examine most of them under more favourable circumstances, we are enabled the better to speak of them. The collection of Suter's lenses, with the English agency for which Mr. Gotz has been inseparably connected since their inception, has this year made somewhat of a new departure, inasmuch as the time-honoured flint and crown glass of hygone times, of which photographic lenses have been made, have in this instance been made to some extent to "take a back seat" and give way to the glass more recently obtained from Jena, by which old ideas respecting refraction, dispersion, and spectral irrationality have been revolutionised. As we have said on a former occasion, the judicious employment of this glass in photographic

objectives extends the area of sharp definition to a greater distance from the centre of the field of delineation, thus flattening the field with a larger aperture than heretofore.

THE WHOLE DUTY OF THE PHOTOGRAPHER.

II.

AFTER the photography of man and the making of type portraits of human beings as they are at present, I reckon next in importance to be the recording of the way men work. In this the photographer may find much exercise for his ingenuity; nothing should be beneath his notice—attitude while working, clothes, tools, and all surroundings should pass before the impartial lens; but of this more under the second and higher function of the photographer.

Thirdly, beasts and their ways of life are of no small interest, and the biologist of the present day would be well pleased to have any sort of information as to the form and appearance of our familiar domestic animals a few centuries ago, in order to measure the rate of their variation. As it is, he has to do without these data, but there is no reason why the evolutionist of the future should not be better off.

Many other living things should be photographed to scale, in order to estimate their rate of increase—as an instance, lichens. There is a story of a French savant, who, when a little boy, climbed on to the roof of his father's house, and there, in pure idleness, chipped with his knife a ring round a spot of lichen on the slate. Fifty years after he chanced to be again on the same housetop, and there were both the ring and the lichen, scarcely changed in half a century. From this, and a few other isolated observations, we know that these lowliest of created things, soft-fingered and delicate as they are, can eat into the hardest rocks and outlast the forest trees. Measurements of the exact rate of their growth and change are still wanting, so far as I know—to our shame be it said. I would propose that a measuring line, with clear and accurate graduations, should be laid across patches of lichen on stones, and large-scale photographs made of these every year, or every ten years, till some definite knowledge is arrived at. This is an isolated instance, but any number of similar applications could be thought of, none of them, perhaps, worth attempting by any individual, but well worthy of the attention of a society of longer life than that allotted to man.

Accurate pictures indicating the size and form of the flowers of the present day would have, in the future, the same sort of value that those of beasts will possess.

Fourthly, the perpetuation of the present aspect of buildings and natural objects is a function of no small importance. Let it not be forgotten that stones and lime do not last for ever, nor are the rocks eternal—all things change, and at this time a large and increasing section of the scientific community is engaged in investigating the rate and conditions of these changes. It rests with the photographers of to-day to place this study on a sure basis of exact knowledge.

This is a slight and superficial indication of the nature of the trust which at present rests in the hands of us photographers. The task is not a light one, but we are a numerous and rapidly increasing body, and it is by no means beyond our powers.

For the preservation of these records when made, I say they ought to be inserted in great albums, sacred from the polluting touch of the silver print, kept with care by the Royal Photographic Society of the future. Such a society would have, as one of its highest and most trusted officials, a keeper of the albums, on whom would devolve the responsibility of choosing photographs and seeing them mounted and fully labelled with every precaution for their preservation.

To fill such albums, it would only be necessary to let it be widely known that permanent prints of the kinds I have spoken of were wanted to produce a supply far exceeding the capacity of any albums ever dreamt of.

A very interesting class of portraits which ought to be preserved for future use exists in the photographs of criminals taken at the various convict prisons throughout the land. I have seen many hundreds of these, and they were very interesting as a study of the physiognomy of every sort of human degradation, although the most prevailing characteristic was an amazing stupidity. All the photographs of this sort that I have seen were bad silver prints, and most of them were already far on their way to oblivion.

As to such albums lasting till they became of inestimable scientific and social value let there be no anxiety, paper is more enduring than bronze. Have we not little books on common paper four or five centuries old, and others of parchment of ages exceeding a thousand years? Pending the formation of the R. P. S., why should not the Camera Club give evidence of its public spirit by beginning such a

collection as I have spoken of on the understanding that the albums would be taken over by the larger society as soon as possible?

Although I have written thus far about things which photographers might do, and which they either neglect entirely or perform insufficiently, it must not for a moment be supposed that I accuse my brethren or myself of leaving undone *all* those things which we ought to have done. Far from it; scarcely a day passes without our hearing of some new and ingenious application of photography to the service of man or of science. This is as it should be, but as I honour the craft, so I would have it be in all things worthy, and that is why I insist that it should still be of so much greater utility.

That photography is not more widely applied is often due to ignorance on the part of those who ought to know better. Scientists are only now beginning to recognise that in the sensitive surface they have an eye which can simultaneously see and truthfully record whatever is properly presented to it, and can, moreover, see many things which really exist, although not discoverable by the unaided human vision. Though the solar spectrum to the eye includes only a short band of seven colours, by properly contrived instruments it can be shown to continue for, probably, at least ten times its visible length in each direction, and all this may be seen and investigated with great accuracy by means of sufficiently sensitive surfaces. For investigating the rays beyond the red end of the spectrum a surface sensitive to heat is required, and although Captain Abney did succeed some years ago in preparing plates sensitive to the rays from a boiling kettle, I am not aware that photography has in many cases replaced the thermopyle, though its advantages would be great if plates could be readily prepared sufficiently sensitive to the red rays. For the investigation of the spectrum beyond the visible violet there are no methods known except those depending on photography, which has been applied with considerable diligence. One recent and curious result of this application is the discovery that the description of liquids as coloured or colourless requires to be modified, because many liquids which allow all the visible spectrum to pass through them, and which we, therefore, call colourless, exhibit broad and remarkable absorption bands in the ultra-red or ultra-violet, so that we may say that these liquids possess characteristic colours, only our eyes are unable to see them.

It is unnecessary here to enumerate all the multifarious ways in which photographers serve almost every science known to man, suffice it that I consider that it speaks very highly for the energy and ingenuity which have been turned in that direction during the past fifty years that photography is now recognised, not only as the handmaid of the sciences, but as a science by itself well worthy of study.

Cosmo I. BURTON.

COLOURED PHOTOGRAPHS.

X.

THE *yellow* family is a large one, and although we gave it considerable attention in our last paper, there are still many members which must receive our consideration. I hope none of my readers are losing patience and wishing both me and my analysis at an untimely end. I fear this analysis may be considered somewhat like physis, not cared for by the generality; nevertheless it is good for us, and we must imbibe it. To acquire a thorough knowledge of anything requires a good appetite, and to those who have such, with the addition of a good digestion, I hope these papers, while on this particular stage, will not be considered as over-large doses. In our last we finished with *Mar's yellow*, and having fully considered this we come next to—

Roman Ochre.—This pigment is similar to yellow ochre in many ways, in its origin and in its durability, as well as a strong resemblance in colour. It is made from a native earth coloured by sesquioxide of iron. As I said, it is somewhat similar in colour to yellow ochre, but possesses less of the orange hue; it is likewise more transparent, and consequently for many purposes is very often preferred.

Brown Ochre.—This colour is similar both in its composition and properties to yellow ochre and Roman ochre, but differs considerably in its hue, being a rather deep-toned, brownish yellow. This colour is much valued by artists for its density. Like the other ochres it rejoices in a good reputation for durability, but this is somewhat qualified by the suspicion of its being likely to *injure* somewhat delicate colours. By the latter I mean not so much the apparently delicate, but those constitutionally so.

Yellow Carmine.—This pigment is a very rich, powerful, and transparent colour, and is the first of a set of three lakes prepared by the precipitation of the colouring matter of quercitron bark in combination with alumina. It sometimes appears under the name of *yellow madder*, but this must not mislead you, although it is somewhat calculated to

do so. Naturally the substitution of *madder* in the place of *carmine* suggests the possession of a greater amount of permanence, but it is altogether presumptive, and consequently more than likely to deceive. Its lack of the quality of permanence is more than an ordinary regret, as it is a most beautiful colour and forms a most admirable *glaze*, but its use is absolutely fruitless. It is extremely evanescent under the mild influence of the most ordinary daylight, but a very short exposure indeed to bright sunlight will cause its total disappearance.

Italian Pink.—This colour in its composition is very similar to yellow carmine. It contains rather more alumina and less colouring matter, and is, as a natural consequence, less rich and powerful. In all its other qualities it may be considered as absolutely the same, being second of the set.

Yellow Lake.—We may consider this colour as the third of this set of lakes. It is, if anything, a still weaker preparation. It bears a very strong family resemblance to Italian pink, but in hue is somewhat more lemon.

Gallstone.—With this colour we may consider our list of yellows complete. Although it is the last, however, it is not *lasting*. The real gallstone is an extremely rich, deep-toned, and gorgeous yellow, but, like all such things so beautiful, is doomed to fade. It is most fugitive, so much so indeed, that it does not merit attention except as a warning lest we should unthinkingly use it. Exposure to light will soon destroy it. It is not easy to procure in large quantities, and consequently a substitute is often found to do duty for it, which is nothing more or less than our fickle friend, yellow carmine. The pigment is prepared from a calculus found in the gall-bladder of oxen.

The next set of colours to suggest itself to us is that of the *green* pigments. In this we find oxide of chromium, viridian, emerald green, Hooker's green, Prussian green, sap green, and terre verte.

Oxide of Chromium.—This pigment is a rather cold, sober (if I may be allowed the term), sage green. It is possessed of great depth of tone, and is opaque. Although dull in tone as suggested, its quality of colour is most agreeable. It mixes well with Chinese white, and the tints thus produced are most pleasing and grateful to the eye. Oxide of chromium would make a bad laundress, as it washes somewhat indifferently. I would recommend its use *sparingly*, as being a very dense and powerful colour its too frequent employment would be likely to result in a considerable heaviness of effect.

Oxide of chromium is prepared artificially by a dry process, and consists of the anhydrous sesquioxide. As to its permanence there is no doubt—we may look upon it as one of the most permanent pigments we possess.

Viridian.—This colour is often known as *French Veronese green*: it is a bluish-green possessing very considerable depth of colour. In its paler washes no colour can surpass it for clearness, and, generally speaking, there is no mixture of the ordinary blues and yellows which will produce at once a green so beautiful and durable.

Viridian differs from oxide of chromium inasmuch as it is a hydrated instead of an anhydrous sesquioxide of chromium, and also in its being transparent, whereas the latter is opaque. It is possessed of extreme permanence.

Emerald Green.—This is a most vivid colour, and wherever its use is necessary there is no combination of blue and yellow that can be made to do successful service as a substitute. It is rather difficult to work, and it must never be used in combination with any of the yellows of the cadmium family. Emerald green is not easily affected by exposure to light, but has an undoubted tendency to become darker in tone if submitted to the influence of an impure atmosphere. It is made of aceto-arsenite of copper prepared by a process of precipitation, and I think, everything considered, may be looked upon as the most durable of all the greens having a copper base.

Hooker's Green.—This colour may be said to be a mixed pigment, inasmuch as it is produced by an intimate combination of gamboge and Prussian blue. In use it is a very transparent and serviceable colour. There are two preparations of this colour, known as Hooker's green, No. 1, and Hooker's green, No. 2; and, of course, they differ considerably in hue. Hooker's green, in both hues, is possessed of that degree of permanence which we might expect it to have when we remember its constituent parts.

Prussian Green.—This colour, like Hooker's green, is also a mixed pigment, being a mixture of gamboge and Prussian blue, but with a very considerable excess of the latter pigment. It is consequently a very bluish-green and possessed of great depth and transparency. As in the case of Hooker's green, no more reliance can be placed upon it, as regards its permanence, than can upon its constituent parts. The most, therefore, we can say upon this score is that it is not more fugitive than gamboge or Prussian. This recommendation must, therefore, be taken for what it is worth.

Sap Green.—This pigment is an extremely transparent yellowish

green. As a colour I admire it greatly, but its reputation, I am sorry to say, will not stand investigation. This colour was originally a vegetable pigment, prepared from the juice of buckthorn berries, which, in addition to its unquestionably being fugitive, was also hygroscopic, and, as a natural consequence, likely to become mildewed. This preparation is not often to be met with now. The pigment at present to be bought as sap green is nothing more or less than an imitative green lake prepared from yellow lake and Prussian blue. This colour is mostly valued by the flower painter. Sap green is a most ineligible pigment, its beauty notwithstanding, owing to its lack of durability. It will not resist a lengthened exposure even to ordinary daylight.

Terre Verte.—This is one of the oldest pigments in existence. It is semi-transparent, and can be mixed without fear with other colours. It is a natural earth of a quiet bluish-green hue, its colour being derived from the presence of protoxide of iron. Like all colours of similar base, it is not a very bright or powerful pigment, but is a very durable one.

We have now come, safely I hope, to the end of the family of green pigments, and the next in natural order will be the blues. I do not wish my readers to have these, although the occasion may be somewhat propitious. Under this heading must be classed, for our immediate consideration, new blue, cerulean blue, Antwerp blue, Leitch's blue, and intense blue. Of course there are more blues than these, but we have already entered into their merits and demerits, and need only here mention their names *en passant*, viz., genuine ultramarine, French blue, cobalt blue, smalt, Prussian blue, and indigo. The first, therefore, to claim our attention is—

New Blue.—This colour is merely a pale variety of French ultramarine, and possessed exactly of the same qualities and properties. It may also be regarded as a rather good, and certainly inexpensive substitute for that beautiful and useful colour, cobalt.

Cerulean Blue.—This pigment, sometimes called *Ceruleum*, is a compound of the oxides of tin and cobalt, artificially prepared by a dry process. It is a comparatively modern pigment, and there is a vast difference to be found in the various manufactures of it, and great care should be taken to secure a really good one. It is possessed of a peculiar quality—of not appearing the same in hue by daylight and artificial light. By the former it may be described as a light greenish-grey blue, with but little depth or richness of colour. By the latter, peculiarly enough, it appears to be a fairly pure blue, tending neither to the green on one side, nor to purple on the other. In all other respects I do not think that cerulean blue possesses any very striking qualities. I have not found it over pleasant working, great caution being required when using it to avoid producing a chalky effect. I have always, too, found it work very indifferently.

Cerulean blue, as regards permanence, has rather a very good reputation, as it is considered well able to stand all exposure to light, but, like cobalt, an impure atmosphere will considerably affect it, and ultimately cause it to discolour. I consider it a far more useful colour to the scene painter, for whom all its qualities are more suitable, than the ordinary artist.

Antwerp Blue.—This pigment may be looked upon as a paler and at the same time less permanent variety of Prussian blue, and contains a rather large quantity of alumina.

Leitch's Blue.—Sometimes known as *Cyanine blue*, is simply a skilful combination of cobalt blue and Prussian blue, and possessing, as regards endurance, the properties and qualities which we might fairly expect to find in an admixture of these two pigments. Experiments have shown this colour to be very durable under rather severe exposure to strong light.

Intense Blue.—This pigment is simply indigo refined down by solution and re-precipitation. Many are of opinion that by this means it is rendered much more durable. On this point, at the moment, I do not feel disposed to give an opinion; but there is no doubt whatever that it is rendered much deeper and more powerful. In all other qualities it is similar to indigo, but possesses the rather unfortunate disadvantage of penetrating, to a considerable extent, the paper upon which it is employed.

With this colour we can dismiss the blues and pass on to the purple pigments. In this class we find the following pigments, viz., purple madder, purple lake, burnt carmine, Indian purple, violet carmine, and mauve. Taking them in the above order the first to claim our attention is—

Purple Madder.—As the name suggests, this pigment is a lake prepared from the madder plant, and is, I think, the only purple which may be considered durable. It is of a marone-purple hue, and possesses great transparency. It is remarkable much more on account of its subdued richness and beauty rather than for its brilliancy. To the water-colour painter it is a most useful colour, as by its use he

can secure the greatest depth of shadow and still avoid any unpleasant coldness of hue.

Purple madder, under all ordinary conditions of exposure to light, may be safely looked upon as practically permanent. It has been found that, even when exposed to direct sunlight, it resists its influences for a very long time, although in the long—very long—run it will no doubt fade. It may be looked upon as the most permanent of all the madders.

REDMOND BARRETT.

THE NEGATIVE IMAGE.

I.

THE possibility of improving the method of securing the photographic negative image must be a matter of permanent interest to all. Among the advances yet to be made in this direction, that of being able to take a picture that does not require development is, I consider, entitled to a front place. The isolation and facilities for commercial production of a sensitive body that will yield a visible negative impression with a short exposure in the camera, while causing the outside world far less concern than a measure of ascertained progress in orthochromatism, or photography in natural colours, would so thoroughly recast the economics of operative photography as to deserve being esteemed a revolution of the first magnitude. It is not improbable that before the second *desideratum* above-named has entered upon the period of gestation, the latent image will have become a reminiscence.

We are at present unable to obtain a perceptible darkening of the gelatinised silver haloids in the camera, except by carrying the exposure to great lengths. If we sink the qualification and only recognise the fact that the result specified is to be had as the inevitable effect of constant casuality, we may hold that the time required to produce this darkening is to be judged with the comparative exactitude by which we measure the duration of the exposure needed for the invisible developable impression; and experiment proves this to be the case.

But, although the precise relationship of the "prolonged" to the "normal" exposure is so distant as to render any detailed information upon the subject valueless, save as a curiosity, the darkening of silver bromide in the camera may be observed without difficulty. There are few who are not familiar with what is called solarisation: the appearance, upon development, of a positive instead of a negative. This unwelcome guest seemingly comes without rhyme or reason; but it is not to be doubted that its presence can be justified on scientific grounds, for it is producible at will by over-exposure. Further, by a sufficient prolongation of the exposure the phenomenon may be made to take the still more remarkable shape of a visible positive impression, appearing, when viewed by transmitted light, like the picture one might get by the development of a well-solarised plate. As a rough indication of the conditions under which the effect presents itself, the writer may mention that with the sun at its maximum power on a bright midsummer day, a lens of the rapid type, a film of the instantaneous description, and for subject a landscape, the normal exposure was multiplied a hundred and fifty times. Perhaps it should be remarked that these effects are of less interest from a pictorial than a philosophical point of view.

In regard to negative effects upon silver bromide in the camera, there is not the advantage of being able to speak with similar assurance. A note made very many months since records the observation of such a darkening upon a film of the slow series, the haloid of which was doubtless a compound. The results obtained were indecisive, and, unlike the positive effects above referred to, entirely vanished in the general reduction shortly after the plates were taken into white light for the purpose of being better scrutinised. The exposure given was seventy times the normal. A "successful" repetition of the experiments was not to be had, but, despite the failure, it is possible that results as marked as those of the inverse case above alluded to are to be obtained by a proper appreciation of the necessary conditions.

As it is only after light has acted for a lengthened time that the darkening in the camera is made manifest, so, in like manner, if a sensitive plate is held by the hand, either in bright or subdued light, a measurable period elapses before a change is observed to commence. The dark body so formed is, we must assume, chemically identical with that of the positive obtained in the camera; and no doubt the time that passes before the change is seen in the plate held in the light has a like relation to the exposure requisite for the mean darkening as that given to the plate exposed in the camera bears to the abnormal or prolonged exposure. In both instances, as indeed in all relatively similar cases, the time occupied to form the invisible

developable impression possibly stands in fixed proportion to the exposure that calls the visible darkening into play.

To go by analogy alone, there is every reason for looking upon the lower body formed by light of the bromide to be a definite chemical substance, having constant properties, composition, and reactions, and differing in several important respects from the original compound as distinctively as the iron proto-salts differ from the per-salts. Moreover, as the darkening obtained by prolonged exposure, the visible action of light upon the sensitive mixture, must originate largely in or upon invisible sub-salt, there arises the strong suggestion that in a separate state this substance would exhibit properties of considerable interest and value. Indeed, it may be found possible to isolate several combinations of silver and bromine.

The comparative facility with which the ordinary silver compounds are sensibly changed in the light has always, to the mind of the writer, seemed a finger-post to an era in photography when light, the great developer, would be allotted the functions now performed by auxiliary reagents. The results of certain experiments induced by the foregoing superficial data and reflections tend to strengthen a belief in the possibility of obtaining visible negative effects in the camera as easily as invisible results are at present had, a belief not now first expressed; and to these it is proposed to advert on another occasion.

THOMAS BEDDING.

PROCESS PRINTING.

It does not say very much for the boasted mechanical genius of this country that we are so far behind our compeers on the Continent, who turn out, it must be admitted, far better work in the various mechanical processes connected with photography than we have yet done, and whose general average of such work is also higher. True it is that few of our army of photographers, professional and amateur, have much knowledge of such work, but the same must have been the case on the other side of the water, where the perfection to which they have brought this class of work should put us to the blush. This is true of America as well as of Europe, as we have examples of the finest work which have their origin on the former continent. What can be the reason of it? Is it because of our system of extreme subdivision of labour, or what? I am induced to make these remarks from seeing and finding the extreme difficulty of getting such work well executed here.

It is not alone in photo-engraving, though that, one would think, should find its best exponents in the birthland of the art of mezzotint, and where by far the finest works in that style of art have been produced—witness the magnificent series of Sir Joshua Reynolds's portraits and others of his period, and those have been at least equalled by our cousins, Faeds and others of the present day. Can it be, as was remarked by an American cousin at the Paris Exhibition the other day, that we do not pay sufficiently well for the services of those who have made themselves masters of this kind of work? As he said, and he had been sent over specially on this mission, "We count no salary too high for the best talent, and don't consider ten, twelve, or fifteen pounds a-week dear for such service;" and he was speaking only on work for illustrated periodicals. We, he also said, have to send here, at present, for our best work.

So, again, with the processes on hardened gelatine, with Woodbury inventing and leading the way; with the exception of that one which bears his name, we cannot come up with printing inks to the results we see produced elsewhere. I, at least, have never yet seen one done here which would compare with a silver print from the same negative, but have seen such produced elsewhere so perfect that the most critical could find no objection to. Even the very inequalities of tone and finish which we sometimes suffer from in silver printing seem to be intensified in the mechanical print. This cannot be from want of skill, but only from want of application.

It may be as McGlashan, one of our best steel-plate printers, as well as a good photographer, once remarked, that the good workmen are too good; what we want is to raise a crop of woodenheads for this kind of work, men who would be trained to this exclusively. It would seem that it needs a continual series of editorial digs to get us out of the conservative groove into which most tradesmen are apt to fall, and remain there.

W. H. DAVIES.

EXPERIMENTS WITH BROMIDE PRINTS.

[A Communication to the Photographic Club.]

You will no doubt remember that at a meeting of our club the question of reducing bromide prints by treatment with old oxalate developer, followed by immersion in the fixing bath, was raised. The discussion originated from an experiment witnessed at the Eastman

Company's place, and several members stated that they had tried the process, some of them without success.

Mr. Bridge has kindly sent me some deeply printed bromide enlargements, with a request to investigate the subject.

I now beg to lay before you the results of the experiments which I have made, and at the same time to submit the prints which I have treated by the process under consideration.

The case in point may be stated as follows:—A finished bromide print is immersed in some old oxalate developer; it is then transferred to the ordinary fixing bath.

Does it suffer any reduction under this treatment?

I think it will be best to describe, first of all, the solutions used in the experiments.

Developer.—This had been long in stock and had been already used for developing several prints. It had been kept in a closely stoppered bottle, and was perfectly bright and clear. The colour was a bright yellow, and at the bottom of the bottle was a small quantity of the well known green crystals. Tested with litmus paper it was found to be very faintly acid.

Hyposulphite solution.—This was freshly made, and consisted of three ounces of the salt to one pint of water. A piece was cut out of one of the prints so as to embody both dark and light parts, and was then soaked for some time in clear water. It was then well drained and flooded with the developer for five minutes. After being drained again, it was transferred without washing to the fixing bath. So as to make the experiments under similar conditions, each print treated was left in the hyposulphite for fifteen minutes, this being, I believe, the average time allowed for the fixing of bromide prints. The dish was rocked from time to time.

A very perceptible reduction took place, as you can see by comparing the cut piece with the original print. There is also a modification in the colour of the print. The same process was repeated with another piece of the same print, the old developer being rendered acid by the addition of a few drops of acetic acid. As you can see, there is not much difference either in the amount of reduction or in the tone of the pieces treated by either process. Half of this portrait was flooded with the acid developer and fixed as above. Here, again, we have reduction, but there is also a very considerable amount of yellow stain. I did not attempt to remove the stain, as this might, even if successful, alter the tone of the print and make it less comparable with the others.

I next soaked a print in water, and blotted off the excess after the paper had become thoroughly limp. I painted over part of the picture with acid developer to see whether I could reduce it locally. I found some difficulty in getting the developer to take on the gelatine surface. The reduction is not very considerable, but is still perceptible. The action is not energetic, on account, probably, of the small amount of developer which the gelatine is capable of retaining. I have indicated the part of the picture acted upon by a line in pencil.

It seemed probable that a fixing bath which had been used for several prints might exert a reducing effect on pictures fixed subsequently. In order to test this I submitted part of a print for fifteen minutes to the action of the hyposulphite. Both fragments of the print were then washed together in the usual way, so that any alteration in tone which might be due to prolonged soaking should be put aside. You will notice a certain alteration in the part of the print treated by the contaminated hyposulphite. I then added one ounce of the old developer as above to the twenty of hyposulphite solution, and placed in the mixed bath a piece of a print; the reduction was rapid, and at the end of fifteen minutes the result is what you can see by comparing the tone of the reduced piece to the remainder of the picture.

As it is highly probable that the reducing effects observed are due to the presence of ferric salt in the old developer, I made a half per cent. solution of ferric chloride and immersed a piece of a print in it for five minutes. After placing it for fifteen minutes in the fixing bath the image had faded considerably, and there is no doubt that by repeating the process it could have been made to disappear almost completely. I have here two prints from the same negative, done on Anthony's bromide paper. The developer was compounded by mixing one part of iron with nine parts of oxalate solution, a trace of bromide being added. Fresh developer was used for each print, and both were washed in three acetic acid baths, and then in several changes of plain water. They were then fixed for about twenty minutes in a freshly made hyposulphite solution (three ounces to the pint). When finished they were very nearly identical in depth, and had the same amount of detail. After washing the prints thoroughly, one was partially dried and half immersed in the solution which had been used to develop it. After fifteen minutes of renewed fixing the immersed part had considerably faded. On examining the print you will notice how much

of the detail has disappeared, and also that in places the faded image is replaced by a yellow stain effecting the same shape as the detail which has been reduced.

From this result it would appear that the action is very powerful, as but little ferric salt would be formed in the developer after the production of one print. At all events, the necessity for careful washing after development becomes apparent, and I think I may add that the same ought to be done after clearing with acid.

A few years ago I published, in collaboration with Professor W. Spring, of Liège, a research on the acids of the thionic series.* We found that when dilute sulphuric acid is added to a solution of hypsulphite of sodium a certain amount of sulphuretted hydrogen is evolved at first, and trithionic acid is formed. If the addition of acid is continued, sulphurous anhydride comes off, as it is well known.

I mention this fact here, as there might be a possibility of either of the gases indicated having some influence on the print.

A. LEVY.

PHOTOGRAPHS OF THE RED END OF THE SPECTRUM.

IN November, 1875, I exhibited to the Society some photographs of the red end of the spectrum about A and a short distance below it, obtained on dry collodio-bromide of silver plates stained with aniline blue and given a momentary exposure to white light before being acted on by the spectrum. In these photographs, however, it was noticeable that under the influence of the red as well as of the blue rays the image of the spectrum was strongly reversed, i.e., instead of being a photographic negative it was a positive showing the lines as dark lines on a clear ground. The photographs now before you are on gelatine dry plates stained also with a blue dye, but they show no traces of this reversal in any part of the spectrum, and not only extend much further into the infra red region, but show infinitely better definition and greater dispersion in this part of the spectrum, owing to the employment of gratings in place of prisms.

The dye I have used for staining these plates is alizarine blue¹ (C₁₂H₇NO₂), the quinoline of alizarine. It is prepared from nitro-alizarine by heating it with glycerine and sulphuric acid, and is found in commerce as a paste insoluble in water, and only slightly so in alcohol. It dissolves in liquor ammonia with a greenish-blue colour. By mixing the paste with a concentrated solution of sodium bisulphite the dye dissolves, and when dried forms a dark purple powder, known as alizarine blue S, or anthracene blue. In this form it is readily soluble in water, the solution in distilled water being at first of a brownish orange colour, turning blue on exposure to air. By keeping a few days the colour forms a flocculent precipitate, and is then only partially soluble in dilute ammonia.

Examined with the stereoscope, solutions of the dye do not give a very marked absorption spectrum.

The plain orange solution of alizarine S in distilled water absorbs the violet, blue, and green up to about *b*.

The greenish-blue ammoniacal solution absorbs the red, orange, and yellow very strongly down to about D $\frac{1}{2}$ E, with a general lowering all over the spectrum. There are no distinct absorption bands. I do not find any marked difference in the absorption spectra of the ammoniacal watery solution of three samples of the dye in my possession.

I. Alizarine blue paste, from the Elberfeld factory, formerly F. Baeyer & Co.

II. Alizarine blue S, from the Badische Anilin and Soda-Fabrik.

III. Anthracene blue, from Dr. Schuchardt, of Görlitz.

In his work, *Practische Spectral Analyse Irdischer Stoffe*, Dr. H. W. Vogel gives two very different absorption spectra for the ammoniacal watery solutions of pure alizarine blue and of anthracene blue, also obtained from Schuchardt; the first agrees with my observations, but the second, which shows maximum absorption between D and E, does not.

The photographs now exhibited have, for the most part, been taken with No. II., but others have been taken with Nos. I. and III. The effect of all of them seems very similar, but further trials are required to ascertain which is best.

The plates that I used have been the ordinary commercial gelatine dry plates. Wratten's "Instantaneous" have perhaps given me the best results, but the "Ordinary" have also proved wonderfully sensitive under the action of the dye. The plates are stained by bathing them for one or two minutes in a solution of the dye in distilled water in

* "Recherches sur les Acides Tetra- et Trithioniques." W. Spring & A. Levy. "Bulletin de l'Académie Royale de Belgique," 2^e Série t. XLII., No. 7. Juillet 1875.

the proportion of one part of the dye to 10,000 parts of distilled water, with one per cent. of strong solution of ammonia added. The solution has at first a strong greenish tint, but this soon changes to blue, and I have noticed that after a time it again takes a greener tint.

With a small spectrograph on Dr. Vogel's principle, consisting of a Browning pocket spectroscope attached to a camera in front of a single element of a small Steinheil applanatic lens (the addition of this lens is, I find, a great improvement to the instrument as originally proposed by Dr. Vogel) the spectrum obtained on the stained plates shows very intense action through the violet and blue regions as far as *b*; from *E* to *C* there appears to be a minimum of action, and then it rises again with clearly marked bands of increased sensitiveness between *C* and *A*, strongest between *C* and *B* and *a* to *A*. Below *A* the sensitiveness quickly diminishes.

I have found the sensitiveness to red to differ considerably on plates prepared at different times, and have not yet discovered to what this is due. With a screen of deep ruby glass in front of the slit, the sensitiveness to red becomes very marked, and the maximum sensitiveness is found between *D* and *A*, the remainder of the spectrum being either cut off at *D*, or showing only slight traces of action from *F* to *H*, according to the length of exposure.

On a plate taken about 8.30 a.m. on the March 19, with the plane Rowland grating in the first order spectrum, using a deep ruby glass screen, exposing ten minutes, the slit being .02 millimetre, the sensitive action in the red commences just below *D*, and seems gradually to increase to *A*, then diminishing to about λ 8000, beyond which lines are distinctly visible beyond the *Z* group up to about λ 8400. Considering that these photographs have been taken without any special appliances for securing the transmission of the infra red rays, it is probable that with them a much greater extent of the infra red spectrum might be photographed on plates stained with this dye.

With the concave grating also, using a deep ruby glass screen, I have been able to obtain lines in the infra red region to about λ 8300 with much greater dispersion and distinctness than the plane grating will give. The photograph I have with me shows the spectrum from *C* to *A* and below. It is taken on a Wratten's "Ordinary" plate, a slow kind, which unstained would show no action beyond *E*. It is unfortunate that the sensitiveness of the plates falls off so much just below *A*, so that the infra red spectrum has not sufficient density to print well, although up to *A* the image shows too much density for the lines to print clearly. The various photographs, however, serve to show the value of the dye as a ready and simple means of photographing the spectrum from *C* to *A* with ordinary dry plates.

Using plates stained with a special preparation of quinoline blue (cyanine) and sulphate of quinine, Mr. J. C. Burbank has been able to photograph the infra red rays from *A* to λ 9900, or to about the limit of Captain Abney's latest map, which was prepared from photographs made on collodion plates containing a greenish form of bromide of silver specially sensitive to the infra red rays. I have tried cyanine prepared in this manner, and found, that though it is undoubtedly sensitive to the infra red rays, its maximum sensitiveness is between *D* and *B*, and between *B* and *A* its action is much weaker than that of alizarine blue.

The cyanine and quinine solution, however, is troublesome to prepare, and neither it nor the plates keep well; moreover, the dye is expensive, so that some more simple and more certain stain is desirable, and if alizarine blue, which chemically is allied to cyanine, can take its place for such observations it will be an advantage. I may mention that it has already been tried by Schiendl and Eder, but they do not appear to have recognised its great sensitiveness for the red rays, which is not so apparent with prism spectroscopes as with gratings, and requires the use of yellow or red screens to produce its full effect.

Dr. Eder has recommended corulein as a sensitiser for the red rays; but though it certainly is useful the maximum of effect is produced between *B* and *D*, while with alizarine blue it is between *C* and *A*. I have also found it uncertain in its action, but hope to make further trials of it with the gratings, as well as of a dye called galloxyaniline, obtained by the action of nitroso-dimethyl-aniline on tannic acid, which, also, I have found, is a strong sensitiser for the red rays.

I have also lately been trying a new fluorescent phthalein dye, recently introduced by the Badische Anilin and Soda Fabrik, called rhodamine (the phthalein of meta-amido phenol), which I thought might be likely to be useful in orthochromatic photography for copying coloured drawings, &c. It undoubtedly has capabilities in this direction, but, so far as I have tried it, seems inferior to erythrosine in sensitiveness for yellow. It is prepared by fusing phthalic anhydride with diethyl-meta-amido-phenol, and forms a reddish violet powder, very easily soluble in water, the solution being of a bright crimson with a strong orange fluorescence. It is not very soluble in alcohol. Acetic acid dissolves it, and the solution shows a very vivid scarlet

fluorescence. Ammonia produces no visible change. Dilute mineral acids slightly redden, but do not, as with the eosines, destroy the fluorescence of its watery solutions; on the contrary, they rather heighten it. Nitrate of silver precipitates it from the watery solution, but not readily; the brick-red precipitate is very soluble in pure water.

Examined in the spectroscope a strong watery solution absorbs the spectrum strongly in the blue, green, and yellow from *a* $\frac{1}{2}$ *D* to *F* $\frac{1}{2}$ *G*, though the only distinct absorption band with a weak solution is about midway between *D* and *E*.

Gelatine dry plates stained with a solution of rhodamine in distilled water at 1:10,000 with one per cent. of solution of ammonia, show two very marked regions of increased action—one between *G* and *F*, the other from *E* to *D*, strongest from *D* to *D* $\frac{1}{2}$ *E*. The photographs taken with the small spectrograph show a curious, but well-marked series of bands of increased sensitiveness in the parts of the spectrum where the action of the dye is most marked. The action of the yellow rays about *D* is quite as strong as, if not stronger, than on plates stained with the best of the eosine dyes, but for copying coloured pictures I have not found rhodamine with ammonia equal to erythrosine either with or without the yellow screen; further trial is, however, requisite.

The addition of a small quantity of nitrate of silver to the ammoniacal solution of rhodamine greatly increases the general sensitiveness of the plates, but does not seem to heighten the yellow sensitiveness, either with the spectrum or with coloured pictures, so much as it does with erythrosine.

It is, however, noticeable that plates stained with a solution of the dye containing acetic acid in place of ammonia appear almost as sensitive in the yellow as those prepared with ammonia, and give about equally good results for copying work. If, on further experience, this is proved and found to work with certainty, it will be of importance, because the use of eosine dyes in conjunction with ammonia for staining gelatine dry plates for orthochromatic photography has been protected by various patents. It is possible that further experiments with acid-stained plates in conjunction with the use of specially suitable yellow screens might result in a method of using this dye for orthochromatic photography which would be efficient and open to general use.

In photographing the spectrum with the concave gratings I have found the rhodamine-stained plates useful for the region immediately about *D*. On a plate I have with me, showing the *D* lines in a second order, seven lines can be clearly seen between *D*₁ and *D*₂, though eleven are sometimes visible to the eye.

Another new dye from the same manufactory, called *Nile blue*, which also belongs to the rhodamine series, shows considerable sensitiveness to the region between *D* and *B*, by the addition of ammonia; though not so much as alizarine blue. Without ammonia the general sensitiveness of the plate is much reduced, as Dr. Eder has remarked is the case of most blue dyes, and the image of the spectrum does not extend beyond *b*.

It is noticeable that the spectrum taken in the small spectrograph on plates stained with the ammoniacal solution of this dye shows numerous narrow bands of extra sensitiveness similar to those in the spectrum of rhodamine, showing that both dyes belong to the same group. These bands in the photographed spectra of the two dyes would be an interesting subject for further inquiry.

I have to acknowledge the kindness with which the managers of the Badische Anilin and Soda Fabrik have supplied me with samples of the dyes referred to.

J. WATERHOUSE, Colonel.

—Trans. Asiatic Society.

MONOPOLY AND PHOTOGRAPHIC TRUSTS.

MONOPOLY is a word of unpleasant sound to American ears. It is in direct conflict with our free-born ideas of equal privilege. Kings were used to reward their favourites with exclusive control in certain lines of business, with power to decide prices, limit the supply, and govern the distribution of the product, thereby extorting an exorbitant revenue from consumers. This monopolistic extortion was considered by the people in the nature of highway robbery on land, or piracy on the seas—being criminal injustice when inflicted and manhood degradation when submitted to. It being so well understood that the word monopoly has an aggravating sound to the ears of all freemen, the monopolistic robbers in the fair domain of honourable business nowadays evade the unpleasant sound by calling their combinations "Trusts." Yet as a rose by any other name is just as sweet, so monopoly by any other name is just as bitter to those who suffer from its extortions. And as the evil of our Southern slavery—which was the greatest monopoly of labour the world ever saw—was not

confined only to the slave who was degraded by submission, but injured also the owner, who, fed by the pride of unrestrained power, was made arrogant and haughty by his own tyranny, so the injury of trusts is not only to the people who suffer under their exactions, but successful monopoly naturally becomes arrogant and domineering in a way that, if carried to its logical results, must draw upon itself the same evil consequences that were brought by the tyranny of slavery, which grew more and more insolent in its exactions, until, in righteous retribution, its crimes were washed out in its own blood.

Knowing the inexorable laws of evil growth from unrestrained permission in the exercise of unjust power, it must be alarming to all who love liberty and equity to see the rapid growth of monopoly under the guise of trusts in our country, and excite many fears for the time, sure to come, when a fierce struggle between the forces of insolent monopoly and freemen battling for their rights will again desolate our land.

These strictures do not mean, however, that the writer is opposed to all associations for improvement of prices and the elevation of photography. He believes that association is not only useful but necessary, but association based on nobler principles and more humane methods than have actuated the trusts which are now sucking the life-blood of the country.

The rough labourer, when he finds a competitor who is able to do more work for less pay, and yet give better satisfaction, gets angry, and falls upon him and beats him, and drives him away or kills him. That is the power of muscle.

A. T. Stewart—a good representative of the monopolistic class—if a young man started in his line of business near him, would sell goods in that line at cost, or less, until the competitor was ruined or driven out. That was the power of money with unscrupulous greed.

Another class, with old-fashioned ideas of honesty, would endeavour to give better goods, use greater efforts to please, manage business with more energy and economy, and abide the result—often, indeed, lending a helping hand to a young competitor less capable, but bravely struggling, setting him in the right road, and bidding him God-speed instead of combining to crush him. Success in that kind of competition comes from the power of character and skill, and is the only kind that an honourable man in any business can take pride in attaining.

Let us hope, then, that the term "Photographic Trust" will never become familiar to our ears in connexion with such unscrupulous and infamous methods for crushing out opposition as have characterized the monopolising trusts that now threaten the peace and endanger the liberties of our country. E. K. HOGAN.

—Con. Number St. Louis Photographer.

NOTES FROM NEWCASTLE.

THE lantern demonstration, held under the auspices of the Newcastle Photographic Association, was a very successful affair. I heard of dozens, at least, being unable to get into the lecture hall, amongst them being several members. The only complaint I heard was at the short time allowed for each view or projection. The judges were Messrs. Allison, Spence, and Laws. It may not be out of place to mention here that the Society was fortunate in getting the services of three such men. Mr. Allison is an amateur and an expert in optical and lantern matters, and one of the best judges of what a lantern slide should be technically. Visitors to the Newcastle Royal Jubilee Exhibition will remember a splendid working model of the triple expansion engines built for the Royal Italian cruiser, *Sardagna*, by Messrs. Hawthorn, Leslie, & Co.; this was the work of Mr. Allison. Mr. C. J. Spence is also an amateur, and an artist of no mean skill; while Mr. P. M. Laws has officiated more than once previously.

I congratulate Newcastle's only medallist (this year's Photographic Society's Exhibition), I mean Mr. Lydell Sawyer. I had the pleasure of viewing privately most of these pictures, and consequently was fully prepared for the verdict of the judges. I should not be surprised to find in Mr. Sawyer a second "Robinson." In some notes of mine recently, I hinted that to view Mr. Sawyer's best work one should go inside. Strange to say, I had the same feeling with regard to his *Studies*, and I doubt very much whether Mr. Sawyer has not in existence a still superior work to any on the walls of the Pall Mall rooms. However, it is not for me to say anything further here—or elsewhere.

Mr. R. W. Weekes, late Hon. Secretary of Y.M.C.A. Photographic Club, leaves Newcastle shortly, having obtained a Whitworth Scholarship, and proceeds to London to pursue his studies at headquarters. Mr. Weekes is an electrical engineer. The Y.M.C.A. organ says of him:—"In his work with us, Mr. Weekes was all but ubiquitous. He was an active member of the bicycle club, tennis club, photographic club, a member of the general committee, a visitor, a steward, a committeeman of the Sunday afternoon Bible Class, the most active secretary of the open-air work, and a most indefatigable worker in connexion with our Sunday evening evangelistic services. Long though this list is, we believe that it does not

cover all Mr. Weekes's Y.M.C.A. work. And yet he found time to study so effectively as to gain a valuable scholarship."

The local Society's Council has made a move in the right direction by lowering the subscription to 5s. per annum, but something more must be done to make the Society in any way worthy of this large industrial centre. The same rules which may guide the members of the "Eatonswill Photographic Society" are out of place here. What Cardiff, Dundee, Derby, Nottingham, and Oldham are doing (amongst others) should be done in Newcastle, and not a year should be allowed to pass away without its "Exhibition of Photographs." This is, in my mind, of the most importance. At present, if we do not journey to London during the month of October, or thereabouts, we have no chance whatever of seeing the works of the leading photographers; and how much is learned by viewing the works of others is well known. The Newcastle Society wants less parsimony and more ambition.

D. D.

A CORNER OF CHESHIRE.

ON the borders of the palatine county of Cheshire, where it is divided from the neighbouring county of Stafford by the lofty ridge of Mow Cop, and at the foot of that eminence, stands one of the most interesting old houses in the kingdom—certainly one of the most genuine and complete relics we have left of the domestic architecture of mediæval times. Come with us, this late August day, on our photographic visit, and let us enjoy together a place we have long dreamt of and wished to see. The North Staffordshire Railway does not boast of much mileage, but it runs through a lovely district—always barring the potteries—and past many a place of note, famed for its comparatively modern attractions, such as Alton Towers and Trentham, or for their more ancient and still greater interest and picturesqueness, in such places as Gawsworth and Little Moreton, or Old Moreton Hall, as it is more commonly called. To the last-named, then, if your tastes lie in the same direction as our own, let us wander and dream away the happy, sunny day—we say dream, though we mean to do a good day's work, for do not such places stir up the imagination, carry one back to far distant times, and set one a-dreaming?

We leave the train at Mow Cop Station, and a walk of a mile and a half over pleasant fields brings us to our destination. On our way we have had peeps of the old hall through the trees to heighten the sense of coming enjoyment. But here we are; after passing the end of an ancient barn and through the gate, Old Moreton Hall stands revealed in all its antique beauty—a vision of the times of old. We stand admiring and spell-bound—it is like some scene of enchantment, "some fairy palace of the days of old romance." For colour and broken outline it cannot surely be equalled. Look at the lofty gable with its ornamental oak and plaster work and its great windows overhanging the entrance gateway, the dark gateway so rich in carving; look at the flat-arched Gothic bridge spanning the sullen waters of the moat, the only approach or entrance; look at the numberless gables with their carved pendants, the great ivy-covered chimney, and the whispering willow beyond the bridge—you never saw anything finer! We draw near the bridge and look through the gateway into the courtyard beyond—it is like a peep into fairyland; we enter the quadrangle, and find ourselves surrounded by fresh beauties; nothing could exceed the wonderful effect of the north side of this courtyard, where the architect seems to have lavished all his powers to produce a miracle of lightness and strength, of use and beauty.

The first impression we get is that the building is nearly all windows, so many and so large are they; where there is no glass there is dark oak richly moulded or formed into quatrefoils and other devices, and filled in with creamy-coloured plaster. Two of the bays, of two storeys in height, are each formed of five sides of a decagon, differing in size, and surmounted by gables. The upper windows overhang the lower, and the lead work forms divers geometrical patterns. The doorway leading into the banqueting hall is, perhaps, the most elaborate piece of workmanship in the building—a mass of exquisite carving. All this great pile is of oak and plaster, none of it later than the time of Elizabeth. There are no restorations, so-called, to annoy the artistic eye, but all is toned down and mellowed with age, and the mind would have little difficulty in peopling the place with its former occupants. "Oh, for the revelation of fair forms, of the scenes of successful or sorrowful love, of the brideals and the burials, of the poetic dreams and pious aspirations, that have warmed or saddened these old halls through the flight of ages!" And yet dilapidation is there, soon to be followed by decay if some loving hand does not see to it, for in our rambles about the old rooms we noticed that some of the beautiful lattices were broken away, leaving the wind and rain free ingress.

Before we commence work let us look inside at these quaint, old rooms, first ascending the rude staircase on the south leading to the ball room, as it is called. This room is of great length in proportion to its width, being seventy-one feet by twelve feet; the open timber-work roof, rising to seventeen feet, is very elegant, and is ornamented with oak and plaster quatrefoils. Oak timbers have been placed across to act as tie-beams at some more recent date to prevent the thrust from pushing out the sides, which are considerably out of the perpendicular. The builder must have had a passion for light, for one end and the whole length of each side of the room is a continuous line of windows, the lead

work and small panes of which show a wonderful variety of intricate patterns. These long lines of windows are interrupted only by the door by which we enter on the north side, and by the room adjoining on the south side, which projects over the entrance gateway. This room, like the long gallery, is panelled with good old English oak, and has a highly ornamented fireplace bearing the heraldic shield of the Moretons quartering those of Macclesfield, and surmounted by the Moreton crest. On either side are large figures of Justice and Mercy. Descending, we now cross the courtyard, and entering by the porch—so suggestive of Prout—find ourselves in the banqueting hall, a spacious apartment, showing signs of present occupation, though, with the exception of the massive oak table running down the centre, the furniture and other accessories are inharmonious and out of place.

A spiral staircase, with steps of solid oak, ascends in one angle; at the opposite one, passing the foot of the principal staircase, we enter the parlour, oak-panelled, as all the principal rooms are, and with a deeply panelled oak ceiling. This room is lighted by one of the great bay windows we noticed in the courtyard on our first entrance; the other belongs to the banqueting hall.

We have no time to note all we see, and we come out into the courtyard again with a mixed recollection of coats-of-arms, quaint carvings, antique panelling, and deeply recessed windows of great beauty, wherein the sunshine comes lovingly, as it did centuries ago, glorifying the heraldic blazonries, and casting their rich hues on the bare floors. Crossing to the opposite angle of the courtyard we come to a small doorway leading into the chapel—a sad scene of desolation, dirt, and damp; this is the gloomiest part of the building we have yet seen. There are a number of texts in old character on the plaster of the chancel, but we will not stay to attempt to decipher them. The east window is of five lights and pointed, and the size of the chapel proper is about twelve feet by nine, though the entire structure is thirty feet long.

We shall not enter any more of the doorways on this eastern side, for they lead to nothing particularly interesting, and we must beware of the mastiff here who strains at his chain, and barks in a very ferocious and menacing manner whenever he sees us in the courtyard. Besides the banqueting hall and another room or two on the ground floor on the north side, the farmer tenants occupy a part of the south side as kitchens, &c. We are not invited to see the bedrooms, with those glorious overhanging and curious windows, which we read "are rendered additionally interesting by the names and inscriptions traced upon the panes by former occupants and guests. On one of them is written 'Jonath'n Woodnoth's' and 'Marie Woodnoth's,' with the date 1627, and beneath is the following couplet:—

'Man can noe more know weomen's mind by kaire,
Than by her shadow hede ye what clothes shee weare.'

Jonathan Woodnoth was the heir of Shavington, and married Mary, elder daughter of William Moreton, of Moreton, but what made him so spiteful against womankind is a mystery that is likely to remain for ever unsolved."

Now, we will go outside again, over the bridge, and commence exposing our plates, having regard to the shifting shadows, in the intervals exploring the moat and the garden, and noting when such-and-such views may be best taken. We make our mid-day meal from our wallets while we photograph in the long gallery and the adjoining room. We also make a few notes of the curious emblematical figures with their quaint mottoes at either end of the gallery, and don't omit to copy the following inscriptions carved in bold relief on one of the beautiful windows in the quadrangle below:—

GOD IS AL IN AL THING
THIS WINDOWS WHEIRE
MADE BY WILLIAM MORETON
IN THE YEARE OF OURE LORD MDLIX
RYCHARDE DALE CARPENTER MADE
THIS WINDOWS BY THE GRAC OF GOD.

Well done, Rycharde Dale! Thy hand and thy brains found something to do, and thou didst it with all thy might! The lovely doorway adjoining is doubtless also the work of thy skillful hand, from the dragons in the spandrels and the exquisite zigzag ornamentation to the spiral pillars forming the doorposts; a clever "carpenter" truly wert thou, and time has dealt lovingly with thy name and work by adding a new grace and beauty in the rich colouring he has spread over this creation of thine. Thy earnestness and devoutness are here truly testified, and who can doubt that thou wert a sincere follower of One Who was Himself the son of a carpenter. We feel grateful to this man who wrought so successfully three and a half centuries ago, and to his patron, William Moreton, for the great treat we have had, and for the charming pictures we hope to have when our plates are developed. Thanks to platinotype, this thing of beauty may now become a joy for ever.

A short history and description of the place and we have done. In the Domesday Book we find mention of the Ville of Rode, then divided into

* The above quotation is from Croston's recent work, and it is given with some variations in an account of Old Moreton Hall, by E. Walford, written in 1865. Croston also mentions other inscriptions. These have all disappeared however, for since writing this article I have paid a second visit to Little Moreton on September 12. I got admission to the bedrooms, and on inquiring of the present tenant of the house where I could find these inscriptions, was told that she had never seen them, though she had lived there twenty years.

the two manors of Moreton and Rode. The Conqueror granted the Earldom of Chester to Hugh Lupus, and he distributed the lands amongst his followers. The manor of Moreton was held by knight service, and gave its name to the family who possessed it. From the time of Henry III. the estate continued in strict male descent until the time of Sir William Moreton, Knight, Recorder of London, who died childless in 1763. One of the Moreton's married the daughter of Sir Andrew Brereton, by whom he had, with other issue, a son, William, born a year or two after the accession of Henry VIII. He probably began the erection of this manor house on the site of an earlier building, his son, John Moreton, who died about the end of Elizabeth's reign, completing it.

This old manor house with its garden occupies about an acre of ground, and is entirely surrounded by a moat. It stands close by the road leading from Congleton to Newcastle, on a sandy plain in the south-east corner of Cheshire, and is about four miles distant from the former town. The buildings on the south or principal front are lofty, and the long gallery or ball room, running along the whole length, is much narrower than the storey below it. The ancient bridge and entrance gateway are in the centre of this frontage; an old stone horse block stands within the gateway, where also are doors communicating with small rooms, one of them, probably, the porter's lodge. The best general views are from the south-east and south-west. Outside the moat, at its south-west corner, is an artificial mound of uncertain origin and use, which affords a good standpoint, and embraces more than any other view; a similar mound of smaller size is at the north-west corner within the moat. We have already attempted to describe the courtyard with its surrounding buildings; none remain on the west side; the east side, saving the chapel, we did not explore.

We are indebted to our friend, James Croston, F.S.A., for some particulars in our short account of this jolly old house; and those who would know more about it will find an exhaustive and excellent historical description in his interesting work entitled *Historic Sites of Lancashire and Cheshire*.

Our fourteen plates are all exposed and our traps packed up and we start off on our return journey by Astbury, casting many a lingering look behind. The sun shines brightly on the chequered walls of the old pile as we look our last farewell; a field of corn in sheaves makes a good foreground, while the eminence of Mow Cop forms a fine distance to the scene. But, alas! all our plates are spent. We have time to look over the church at Astbury—where so many of the Moretons lie at rest—a good example of the later Gothic period, the clerestory windows being of unusual size. We shall not tarry here, but get a glass of stout at the neighbouring inn and then finish our walk to Congleton, admiring as we go the distant hills which stand out boldly in the light of the westerling sun.

The Convention of 1890 is to be held at Chester. The country is full of old halls and manor houses, and we look forward to a rich treat, feeling at the same time that no place can surpass in interest to the artist or photographer the ancient moated manor house of the Moretons.

RICHARD KEENE.

THE VESEY CLUB AND THE BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE visits last week of the Birmingham Photographic Society to the Vesey Club, and the reading of technical papers on the various processes of photography by Mr. W. S. Horton, Mr. W. J. Harrison, F.G.S., Mr. E. H. Jaques, and Mr. E. C. Middleton, having resulted in an important step being taken towards carrying out a valuable project, which has for some time been under the consideration of the Birmingham Society, namely, to preserve by means of photographs current records of everything throughout the county of Warwick of archaeological, ethnological, and scientific interest. The Vesey Club have consented to appoint a committee to act with the Society in carrying out the proposal. It is intended that the county should be mapped out into areas, and amateur photographers throughout the county invited to take individually a small portion of country, and secure views of every object of interest within that area. The Vesey Club will issue a circular asking proprietors, authorities, and all interested, to render assistance, and arrangements will be made for copies of the whole or part of the series of views to be afterwards on sale. It is, of course, contemplated taking the views in uniform size, and having them reproduced by processes of a permanent character. At least two complete series will be set aside for permanent preservation and public reference, one to be deposited at the British Museum and another in Birmingham. Other sets will probably be retained by the Birmingham Photographic Society and the Vesey Club.

Mr. W. J. Harrison, Vice-President, and Mr. J. H. Pickard, Hon. Secretary of the Birmingham Society, are taking the greatest interest in the subject, and Mr. J. B. Stone, on behalf of the Vesey Club, has offered to render every possible assistance in carrying it out.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday next, October 22, at eight p.m., at the Gallery, 5A, Pall Mall East, when the apparatus now on view at the Exhibition will be explained.

Foreign Notes and News.

HERR ALPERS points out in a recent number of the *Photographische Correspondenz*, that gelatine plates require a much longer exposure when employed for photographing interiors than do wet collodion plates. He recently photographed an interior by means of the latter process, exposing for three hours, and afterwards desired to reproduce this same interior by means of a gelatine plate, at least ten or fifteen times more sensitive than the former. He expected that an exposure of half an hour would suffice. On developing, however, it appeared that scarcely any result had been obtained. He finally found it necessary to expose for five hours. The author explains this as follows:—"Bromide of silver," he says, "is much more sensitive to strong rays of light than is the iodide, but is not more sensitive towards feeble rays than is the latter. This also explains why the negatives of gelatine portraits are generally harder than collodion negatives." In reproducing interiors with windows situated in front of the objective, Herr Alpers finds it a very good method to cover them with red tissue paper, which he removes a few seconds before the exposure is ended.

HERR VOOZL, jun., says, in the *Photographische Mittheilungen*, that the complaints made of hydroquinone and pyro developers often turning brown are traceable to the employment of impure sodium sulphite. He has found that the best sodium sulphite deteriorates in about three days when exposed to the air, oxidising and losing its rates of crystallisation. When the sulphite is pure it is a crystalline powder, and will produce double the effect of that ordinarily supplied.

THE last general meeting of the "Friends of Photography in Berlin" was necessarily rendered a rather melancholy reunion owing to the recent death of Dr. Robert von Helmholtz. As was feelingly pointed out by the President, Dr. Vogel, in the course of his address, the deceased Professor was not only widely admired for his eminent scientific attainments, and loved for his amiable disposition, but was especially appreciated by the members of that Society, which he had assisted in founding and which he had always energetically supported.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,976.—"A Dish for Developing Photographic Plates." B. ACRES.—Dated September 23, 1889.

No. 15,020.—"Apparatus for Rocking, Lifting, and otherwise Manipulating Photographic Plates during Development and other similar Processes." J. PUMPHREY.—Dated September 24, 1889.

No. 15,025.—"Improvement in the Apparatus for Furnishing Mounted Photographs and the like by the Vertex Burnisher." A. McDONALD.—Dated September 24, 1889.

No. 15,163.—"Improvements in Photographic Cameras." A. D. LOMAN.—Dated September 26, 1889.

No. 15,164.—"Improvements in Photographic Shutters." A. D. LOMAN.—Dated September 26, 1889.

No. 15,263.—"Improvements in Method of and Process for Producing Coloured Impressions, Lithographs, or Zincographs by Aid of Photography." Communicated by R. Schorr. W. BRIDLEY.—Dated September 28, 1889.

No. 15,292.—"Improvements in Shutters for Photographic Apparatus." Communicated by R. Kandler. Complete specification. N. BROWN.—Dated September 28, 1889.

No. 15,451.—"An Improved Lock for Photographic Dark Slides." G. REWICK.—Dated October 2, 1889.

No. 15,530.—"Improvements in and connected with Camera Stands." R. W. BORD, H. S. NOBLETT, and F. T. CANTLE.—Dated October 3, 1889.

No. 15,583.—"Improvements in Photographic and other Dishes." F. H. FROEDMAN.—Dated October 4, 1889.

No. 15,651.—"Improvements in Photographic Printing Frames." W. J. LAXCASTER.—Dated October 5, 1889.

No. 15,714.—"A New and Improved Shutter for Use with any kind of Photographic Apparatus." C. HODDLK.—Dated October 7, 1889.

No. 15,844.—"Taking Photographs by a Telescopic Extension Camera." J. CORLETT.—Dated October 9, 1889.

No. 16,106.—"Improvements in Films for Photographic Purposes." Communicated by F. Crase. J. S. FAIRFAX.—Dated October 12, 1889.

PATENTS COMPLETED.

AN IMPROVED APPLIANCE FOR VIGNETTING PHOTOGRAPHS.

No. 15,376.—ARTHUR HAMMOND GOODALL, Rydal Cottage, Elms-road, Dulwich.—September 7, 1889.

In the method hitherto used for producing vignettes, an aperture is first cut of a suitable size and shape in a piece of card or other opaque material, and the edge of the aperture is then serrated (i.e., notched like a saw) with a pair of scissors.

My invention consists of an instrument somewhat the shape of a pair of railway ticket clippers, by means of which the said serrating or notching is accomplished in a more convenient and satisfactory manner.

The instrument as above stated is made on the principle of clippers, such as are used by railway companies to clip railway tickets (i.e., in an upper-cutting jaw worked by a handle, fitting into a lower jaw also worked by a handle, which said lower jaw has a piece stamped out the size and shape corresponding to the upper-cutting jaw.

In my invention I prefer to use only one cutting jaw as specified, though two or more might be used, and be altered in shape and graduated. In my invention the piece cut out from the lower jaw is V-shaped, and when using the instrument the length of serrates or notches can be varied at will from one-sixteenth to three-quarters of an inch in length as specified. When not in use the jaws of the instrument are kept apart by a spring between the handles as specified.

The use of the said spring is controlled by a stop as specified. The handles are curved upwards to give room for the knuckles, and so prevent the substance forming the vignetting shape being torn or creased.

The advantages of my invention are:—1. The time taken to produce a vignetting shape is reduced considerably less than a quarter as compared with the present method. 2. The angle of serrates or notches formed by the instrument in the vignetting shape being regular, a practically perfect gradation is produced in the print. 3. Any size vignette can be cut rapidly with equal perfection. 4. The original shape of the aperture of the vignetting shape is preserved. 5. Long and short serrates, or notches, can be cut regularly. 6. The handles being bent, additional serrating if required can be done without removing vignetting shape from printing frame. 7. In case any part of a negative is especially dense, one long cut or more can be made regularly or not as required. 8. Two or more vignettes can be cut at the same time. 9. Never requires sharpening.

IMPROVEMENTS IN PROJECTING LANTERNS.

No. 12,913. HERBERT CHARLES NEWTON, 3, Fleet-street, London.—September 21, 1889.

THE object of the present invention is to facilitate the projection on to any ordinary screen of objects which, from their nature, must lie in a horizontal position, and are incapable of occupying the ordinary position occupied by slides in projecting lanterns.

Hitherto the projection of horizontally placed objects has been effected in the following manner:—

The beam of light from the lantern is received upon a mirror placed at an angle, so as to reflect the beam vertically. A simple horizontal lens receives this beam, and converges it through the object, also placed horizontally, in an upward direction on to the focussing lens situated above it. The image is then received upon a second mirror, and thereby reflected on to the screen.

This arrangement has the disadvantage of being tedious and difficult when it is desired to show a horizontally placed object amongst a number of objects which need not be placed horizontally, and is also objectionable on account of the loss of light which the multiplicity of the mirrors and the situation of the lenses involves.

With the view of obviating these objections, I propose to employ a pair of ordinary dissolving view lanterns mounted one over the other, but the upper one I hinge to the lower at its back part, so as to make it capable of tipping backwards, and projecting an image in an upward, instead of a horizontal direction. A single mirror is employed to receive the image, and reflect it on to the ordinary screen.

The claim is:—A projecting lantern hinged to its base in the manner described, so as to be capable of projecting an image either horizontally or vertically at will, and the combination therewith of a single mirror, or its equivalent, for reflecting an upwardly projected image horizontally on to a screen.

IMPROVEMENTS IN AND IN THE MANUFACTURE OF PHOTOGRAPHIC PRINTING FRAMES.

No. 15,901. CHARLES TOMLINSON, Soho Iron Works, Oldham Road, Rochdale.—September 21, 1889.

My invention relates to the photographic appliances well known under the designation of printing frames, and has for its object to improve the construction of such frames, and, at the same time, to facilitate their manufacture. An ordinary printing frame consists, in so far as the frame proper is concerned, of two wood side pieces connected together by two shorter and thinner pieces, which I will term end pieces. The side pieces are rebated upon the edges which face each other when the frame is put together, the end pieces being equal in thickness to the ribs produced upon the side pieces by the rebating. The four pieces are usually or sometimes fitted together so as to form a slot and tenon joint, and the front inner edges of the frame are subsequently bevelled. In some cases the pieces have been bevelled before the frame has been put together. According to my invention I cut the side pieces from strips which have been bevelled and rebated, and the end pieces from strips which have been bevelled. I subject the side pieces to the action of cutters which simultaneously remove portions from each end so as to form a rebate equal to the thickness of an end piece, the inner face of each rebate being shaped to fit the bevelled edge of an end piece. The distance apart of the cutter spindles determines the length of the aperture in the frame. When the frame is glued together the bevelled edges make a mitre connexion at each corner. The corner joints are further secured by means of nails, pins, screws, or rivets. The end pieces are not so much weakened as in the ordinary construction hereinbefore described, and the cost of production is lessened.

PHOTOGRAPHIC CLUB.—October 23.—Subject, *The Ideal Camera*. Nominations for officers for the ensuing year and notices of alterations in the rules: must be given in at this meeting.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 22.....	Great Britain (Technical).....	5A, Pall Mall East.
" 22.....	Bolton Club.....	The Studio, Chancery-lane, Bolton.
" 23.....	Photographic Club.....	Anderton's Hotel, Fleet-street, E.C.
" 24.....	Burton-on-Trent.....	The Institute, Union-street.
" 24.....	London and Provincial.....	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 10.—Mr. J. Hay Taylor in the chair.

A camera and stand, sent by Mr. Ramsden, of Leeds, was shown to the members. The camera was much admired for its lightness and the closeness with which it could be packed. The double dark slide was so constructed that the plates could be inserted and removed, without the turning of any buttons, by pressing under a spring catch at one end and letting them take into another catch at the other end. The handling of the plates was effected by leaving spaces in the frame at the centres of the long sides for the fingers to enter and lay hold of the edges of the plate.

Mr. W. E. DEBENHAM thought this plan open to the objection that light from the lens would strike upon the inside of the back of the slide and some of it be reflected up a little way on to the plate on being exposed, and so cause fogging. With some subjects, such as a dark interior, where a long exposure would have to be given, there might, at the open part of the frame, be the image of the sky through a window, and some fogging on the back plate through long-continued action of reflected light might be expected.

Mr. A. HADDON recognised this liability, but suggested that it might be prevented by having the black paper which was used to separate the plates cut with projecting semi-circles to fit the open spaces in the frame.

Other members thought that if the difficulty were one which would arise in use, the maker, as a practical photographer, would have provided against it.

Mr. L. MEDLAND showed a die for cutting the papers used as masks for lantern slides. The die represented half the circumference of the mask, and the paper was, therefore, folded previous to cutting. At first a wood block was used to cut upon, but lead was found to be much better.

Mr. J. TRAILL TAYLOR said that at an establishment where zinc etching of the higher class was produced a valuable block was recently found to be destroyed in a way which appeared inexplicable until it was discovered that a domestic animal had had access to the place in which the block had been stored.

A flexible tube for gas made on a new principle, of brass, and exceedingly strong, was exhibited by Mr. Callow.

This being one of the winter season "lantern nights," slides were shown on the screen by Messrs. Medland, Atkins, Hooper, Hastings, and Freshwater. Those by Mr. Hastings had been developed with eikonogen, and their tone and brightness met with due appreciation, especially a sea scene at Brighton, the negative of which had also been developed with eikonogen.

CAMERA CLUB.

THE first "Thursday evening" meeting of the session for technical discussion was held on the 10th instant, when Mr. W. ASBURY GREENE read a paper on *Detective Cameras*. Major J. F. Nott occupied the chair.

The chief part of Mr. Greene's address was directed to deprecating the offensive use of the hand camera for detective purposes by photographers. He referred to cases in which photographs had been taken under circumstances which must plainly and rightly have given offence to the person photographed. There was a very great danger here to the amateur's good name, and he thought the Camera Club should be to the fore in expressing an opinion on the point. Groups and individuals must be taken without the knowledge of those photographed, but it was a matter for the exercise of each worker's good feeling, and one in which some chivalry should be enforced by every means in our power.

The meeting showed enthusiastic and unanimous agreement on this point. Some discussion ensued, and was taken part in by Mr. Shipton, who described his stereoscopic hand camera, and by Messrs. Stroh, Shew, Samuels, Crouch, Fitzpayne, Davison, Beck, Cembrano, England, C. Wollaston, Ferrero, and others.

A large number of hand cameras were shown and explained, including Messrs. Shew's camera with roller slide, by the lecturer; the Key camera, by the Platinotype Company; Mr. Crouch's hand camera; the Facile, by Mr. Hindley (Mr. Fallowfield); three cameras of Messrs. Marion and Co.'s, namely, the Krugener and the Parcel camera in two forms, explained by Mr. D. P. Rodgers; Mr. Samuels's cameras; Mr. Beck's long-focus hand camera; roller slide and other cameras, by Messrs. Robinson, of Regent-street and Dublin; one constructed by Mr. Rushton; Messrs. Watson's camera; that introduced by Mr. Abrahams; and the new camera invented by Messrs. Swinden & Earps, two amateurs in Liverpool, which has recently received the Pall Mall medal award. Another camera was described by the Hon. Secretary, being one in which fifty plates somewhat under quarter-plate size were stored and worked. Great interest was taken in the very complete collection of apparatus. The ingenuity shown and the study and work given in the matter of hand cameras speak well for the vitality of this branch of photography.

A vote of thanks to the lecturer concluded the evening.

On Thursday, October 24, there will be the monthly lantern exhibition at the Club, when slides by Mr. T. M. Brownrigg and others will be shown. Meeting at eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 11.—Mr. W. England (President) in the chair.

After the reading of the annual report the CHAIRMAN alluded in feeling terms to the retirement, owing to continued ill-health, of the co-Secretary, Mr.

March. Bearing in mind that it was the first year of its existence, the Society was in a prosperous condition, both in regard to finance and numerical strength. He further announced that an exhibition would be held on January 10, and hoped the members would unite in endeavouring to make it a success.

The rules were then discussed and amended.

It was agreed that in future the annual subscription should be 10s., with an entrance fee of 5s.; lady members to be charged half fees.

The ballot for the election of officers was then proceeded with. The following gentlemen were elected:—*President*: Mr. Charles Bilton, B.A.—*Vice-Presidents*: Messrs. G. F. Blackmore, E. W. Foxlee, Dr. F. H. Low, and Walter Colls.—*Council*: Messrs. Charles Winter, W. Rickford, T. S. Hazeon, J. Hyatt, H. Power, T. B. March, C. Garner Richardson, Charles Whiting, G. E. Varden, and J. D. England.—*Auditors*: Messrs. Henry Selby and Leslie Selby.—*Hon. Treasurer*: Mr. Lionel C. Bennett.—*Hon. Secretary*: Mr. John A. Hodges.

Votes of thanks to the officers terminated the proceedings.

All future meetings will be held at the Addison Hall, W., on the second and fourth Fridays in the month.

Intending members are requested to communicate with the Secretary, Mr. John A. Hodges, 87, Chancery-lane.

Next meeting on Friday, October 25, at eight. Address by the new President, Mr. Charles Bilton, followed by exhibition of slides in optical lantern. Members are requested to bring slides. Friends are invited.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

OCTOBER 4.—The President (Mr. F. W. Edwards) in the chair.

Mr. Tollet was elected a member.

The Treasurer (Mr. H. Banks) has placed at the disposal of the Committee a silver medal for competition at the exhibition to be held in January, 1890.

The PRESIDENT delivered an address on *Lenses*, illustrating the uses and capabilities by sample prints taken by the various lenses. Amongst them was one of some machinery, the negative of which had received ten hours' exposure. The meetings will in future be held on the first and third Fridays in the month.

Subject for next meeting, October 18, *Lantern Slide Making*.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

OCTOBER 9.—Mr. S. S. Partridge (Vice-President) in the chair.

Mr. F. PIERPOINT delivered a lecture on *A Trip up the Thames from Oxford to London Bridge*, illustrated by slides from negatives taken en route.

IPSWICH PHOTOGRAPHIC SOCIETY.

OCTOBER 8.—Mr. J. C. Wiggin in the chair.

The subject of the evening was *Lantern Slides*, opened by a paper from Messrs. Cash and Pringle, which they illustrated by a number of slides exposed chiefly to magnesium ribbon of varying lengths, from one to twelve inches, and developed with various developers. They also exhibited and explained the working of a lantern for illuminating negatives by magnesium ribbon for reduction in the camera, made according to the instructions given in an editorial article in THE BRITISH JOURNAL OF PHOTOGRAPHY some two years ago, and which they had found very useful.

Mr. F. W. Woodcock also exhibited slides made by him.

Mr. Wiggin exhibited Blair's patent camera, feather-weight slides and tripod, and two frames of lantern slides.

The next monthly meeting will be November 12, for which the *Illustrated Boston* slides have been secured.

SHEFFIELD CAMERA CLUB.

OCTOBER 11.—Dr. T. H. Morton (President) in the chair.

A number of pleasing views obtained by the members at the late excursion to Conisborough were exhibited, including several taken by Mr. Taylor with a Rouch's detective camera.

Mr. H. J. HARDY, F.C.S. (Hon. Secretary), read a paper on *The Chemistry of Photography*. The lecturer said that photography was a subject of vast proportions, and might be conveniently divided into two sections—one embracing technical art, and the other science. He thought the art side had been made more prominent, but we should not allow a scientific discovery to degenerate into a purely empirical art. Many of the industries have lost or remained stationary by working by rule of thumb. Art ought not to outstrip science, and the branches of photography would be advanced by the scientific aspect. The action of light on certain bodies produced a physical or chemical change, sometimes both. The action of light on sulphur effected a change in the crystalline structure, but no chemical action; in others a disassociation of the constituents is effected, as in certain salts of silver; chemical changes or decompositions also take place uninfluenced by light. Examples of photochemical action on the salts of silver, iron, gold, also chromates and bitumen, were described and the formulae traced on the blackboard. The theory of some changes in haloid salts forming the photographic image were as yet obscure, but the researches of Captain Abney and others were tending to their elucidation.

A discussion followed, in which the President, Mr. W. Gilley, and Mr. E. Howarth, F.R.A.S., took part.

DERBY PHOTOGRAPHIC SOCIETY.

OCTOBER 8.—The following were elected officers for 1890:—*President*: Captain W. de W. Abney, C.B., R.E., F.R.S., &c.—*Vice-Presidents*: Messrs. C. Bourdin, R. Keene, and T. Scotton.—*Committee*: Messrs. F. Cooper, J. A. Cope, C. B. Keene, E. J. Lovejoy, R. L. Warham, and R. Woods.—*Auditors*: Messrs. F. Hyde and J. Riches.—*Treasurer*: A. B. Hamilton.—*Hon. Secretary*: C. J. Chadwick, Sydney-villas, Mill Hill-road.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

OCTOBER 10.—Mr. W. J. Harrison, F.G.S., in the chair.

Mr. W. L. Hipwell was elected a member.

The Hon. Secretary read the award of the Judge, Mr. G. Baukart, for the prize for the best three pictures (one upright) taken at the Dovedale excursion, which was given to "Ilford Ordinary," and on opening the sealed envelopes it was found to be Mr. E. C. Middleton.

The remainder of the evening was devoted to a discussion on *Lenses and their Uses*. The subject was introduced by Mr. Walter Griffiths [this will appear subsequently].

On Wednesday, the 9th instant, the Vesey Club, Sutton Coldfield, invited the Birmingham Photographic Society to a special meeting of their Club. A number of members attended, and Messrs. Horton, Harrison, Jaques, and Middleton, gave papers, &c., epitomising the several developments of photography, viz., Daguerreotype, collodion and gelatine emulsion, &c., paper printing, and photo-mechanical processes. A pleasant evening was spent, and a resolution was proposed—"That the Vesey Club approve of the suggested photo-survey of the county of Warwick, and would be willing to aid the Birmingham Photographic Society in the way of recording geological, botanical, or other scientific matter of interest, and by using its influence in carrying out so desirable a project."

The Mayor of Sutton and Vice-President of the Vesey Club, Mr. J. B. Stone, J.P., gave a *conversazione* in the Town Hall, Sutton Coldfield, on the 12th instant, at which he exhibited a portion of his large collection of photographs, 15x12 and upwards, of American and Continental views, supplemented with a number of photographs from the members of the Birmingham Photographic Society and others.

A lantern display was given by the Lantern Committee of the Birmingham Photographic Society, Mr. E. H. Jaques showing his Norway series and Mr. J. C. Fowler the Society's slides.

Some two hundred and fifty friends and members were present, and the entertainment was much appreciated; and the Mayor remarked that the two Societies might work together with mutual benefit in the cause of science.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

OCTOBER 7.—Mr. G. A. Bull in the chair. The report of the Secretary for the past year showed that an innovation was the Saturday night reunions, which were well attended during the winter months; much useful information being thereby brought before the notice of young beginners by means of the magnesium flash-light experiments, demonstrations in development, the showing of apparatus and novelties. During the past year seventeen new members have been enrolled, while five have withdrawn, leaving a total of sixty-eight. Twenty ordinary meetings of the Association have been held during the year.

The following officers were elected for the ensuing year:—*President*: Mr. G. A. Bull. — *Vice-Presidents*: Messrs. S. Wells and I. Turley Lewis. — *Committee*: Messrs. R. S. Armitage, T. Carmell, Dr. W. T. Crew, Mr. Marriott, Messrs. A. Pickard, T. S. Piggia, J. Spray, M. Tugnet, G. E. Smith, G. E. Williamson, H. A. A. Wigley, W. Towers. — *Hon. Treasurer*: Mr. B. Sturges Dodd. — *Hon. Secretary*: Mr. P. E. Knight.

THE SOCIETY OF FRIENDS OF PHOTOGRAPHY IN BRESLAU.

THE above Society has developed a considerable degree of activity during the past year, holding no less than seven general meetings during the summer. At one of these, which took place in June, it was determined to arrange a special complimentary meeting in honour of Professor Schirn, the newly elected President of the Society, and this was accordingly the character of the last meeting.

The technical portion of the sitting took the form of a number of interesting debates, which were illustrated by experiments and exhibits. Both hydroquinone, elkonogen, and Dr. Werner's universal developer, were much discussed, but, nevertheless, a number of members excited some interest by stoutly maintaining the oxalate developer to be superior to them all.

Prof. Dr. HERMANN COHN and Prof. Dr. LEONHARD WEBER read papers which excited considerable interest. The former gave a description of his rhomboid camera, and the latter exhibited some photographs of lightning, which he had taken on the morning of July 2 last. Instead of keeping the camera stationary when these photographs were taken it was given a shaking, oscillatory motion; by this simple means light is thrown upon the duration of the flash. A rapid flash will, of course, appear as a sharp line even when the camera is in motion, while flashes that pass slowly will produce a band crossed by lines corresponding to the bright points in the flash. The result was to show that one of the flashes continued for nearly half a second continuously and uniformly bright from end to end; another flash took up about the same length of time, but during the first tenth of the period three sudden increments of intensity displayed themselves, which appeared on the plate as three parallel zigzag lines.

The membership of the Society has increased considerably during the last few months, the number now being seventy-four.

Correspondence.

✽✽ Correspondents should never write on both sides of the paper.

NUKTIGONIA AND DAYLIGHT DEVELOPMENT.

To the Editor.

SIR,—If your correspondent, Mr. Hanson, will refer to your issue of February 1, 1889, on page 77 he will find a method of developing without the aid of a dark room was demonstrated by me at the meeting of the

Manchester Photographic Society held in January. My first experiments, some ten years ago, was with ferrous oxalate, but I soon discovered that the plate could not be examined out of developing solution. I then made dishes with yellow glass bottoms, designed with a well on one side to receive developer when held vertically, and with a yellow glass cover I was able fairly well to watch development. It was, however, rather difficult to judge the fine detail.

By the process given on page 77 of this year's BRITISH JOURNAL OF PHOTOGRAPHY, the film is stained a deep ruby by the dyed water before development commences, and during development the plate can be lifted out and examined. I advise care in not exposing the plate to too strong a light. If daylight, let it be subdued borrowed light, or gaslight some distance from it. The stained film, with washing after fixing, will be colourless. —I am, yours, &c.,

JOHN SCHOFIELD.

Heaton Mersey, near Manchester, October 15, 1889.

THE CARDIFF EXHIBITION.

To the Editor.

SIR,—Owing to a printer's error in our catalogue, we find that our list of awards in same is not correct. In Class 16, No. 10, please substitute Mr. A. Nicholson as winner of the silver medal in place of Mr. H. E. Brown.—I am, yours, &c.,

G. H. BEDFORD, Hon. Secretary.

Cardiff, October 16.

Exchange Column.

. No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

I will exchange a cabinet portrait lens, by Millet, for two flatted backgrounds, interior and exterior.—Address, G., 7, Hillside-villa, Hornsey, N.

Wanted, half-plate camera and lens or detective set, in exchange for Clinton cocca-wood flute and Nicholson's tutor.—Address, J. R. HILDER, Matlock Bath.

Will exchange quarter-plate camera, by Shew, with case, three double slides, lens, and stand, for half-plate portrait lens by good maker.—Address, W. R. FAIRBY, Harrold, Bedford.

Wanted, quarter-plate detective camera; exchange, gas bag, safety jet, pressure board, safety retort, and purifier, &c.—Address, J. W. COPELY, 162, Carr-road, Sheffield.

I will exchange 12x10 camera, swing back, Ross' lens, and one double slide, for lathe, five-inch centre, six-feet six-inch bed.—Address, E. A. CARNELL, 24, Moorgate-street, Nottingham.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, 1888 complete, and five volumes incomplete, for half-plate camera and slide.—Address, F. M., 67, Trintalgar-road, Old Kent-road, S.E.

THE BRITISH JOURNAL OF PHOTOGRAPHY for 1884, 1887, 1888, with others; also ALMANACH and Year-Books. Wanted, pneumatic time shutter, burnisher, or cameo press.—Address, MANAGER, 6, Prospect-terrace, Hounslow.

I will exchange whole-plate camera with slides and lens, an exterior and a plain background, balustrade, cabinet burnisher, and two chairs, for 24x18 portable camera with backs.—Address, ARTIST, 39, Goldsmith-street, Nottingham.

Exchange, three slide slips (paper), one paper vignette background, one landscape ditto (linen), rustic stile, and rapid rectilinear lens, eight-inch focus. Want pneumatic shutter.—Address, W. C. CRYEER, 39, Highgate Hill, N.

Wanted, half-plate camera with double slides or short-focus cabinet portrait lens, in exchange for a Gem and Victoria camera. Takes thirty-six Gems or nine Victorias on one plate.—Address, J. B. SMITHSON, Photographer, Leyburn, Yorkshire.

Answers to Correspondents.

. Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

J. Holloway, Cheltenham.—One photograph of Miss Amy Coleridge and Mr. Kenneth Black. Five photographs of Miss Amy Coleridge. One photograph of Miss De Silva. One photograph of Mr. Maria Harvey.

E. E. Hibling, Malden.—Photograph of F. W. S. Cornwallis, M.P.

G. F. Blackmore, Hammersmith.—Photograph entitled "The Silver Lining."

M. STAPLETON, J. C. B., MEALY, and others.—See sub-leader in the present number.

F. LAWS.—For articles on the dusting-on process, see pages 417, 433, and 449 of our last volume.

- S. S. S.—We are quite familiar with the picture; it is an ordinary chromolithograph produced in Germany.
- LUX (Manchester).—Commence by studying Ganot's *Physics*, which will prove the keystone to the other branches.
- B. UNTHANK.—Refer to the recent articles on *Economy in the Printing Room*; they give all the information sought for.
- R. JORDAN.—There is no English edition of the work published. The German one can be obtained through a foreign bookseller.
- A SUBSCRIBER.—Even if you tone and fix by one bath it is better that the prints should have a final treatment in fresh hyposulphite solution.
- M. WARNE.—Filter the solution and try it. If it does not then work well, add some carbonate of soda and sun it for two or three days. This will probably set matters right.
- A. METHVEN.—For such subjects no very great advantage would be gained by adopting orthochromatic photography. Slow plates are better for this class of work than rapid ones.
- W. E. DAVIES.—The yellowness in the examples sent is caused by imperfect fixation. Either the "hypo" solution was too weak or the time of immersion too short. The short washing was not the cause. We have not tried paper of the brand mentioned.
- G. JONES.—The object of the special mounting is to enable the front lens of the combination to be used as a landscape lens. The front portion, after the hinder portion is removed, is screwed into the flange, a diaphragm being inserted at the outer end.
- F. S. SPILLER.—It is impossible for us to say by what process a print was produced simply by seeing the paper from which the image has been cleaned off. If we had seen the print before it had been tampered with we should have been in a position to form an opinion.
- C. W. HARRIS.—In the solid double dark slides mentioned the plates are inserted in a moveable partition which slides in a recess provided for it. We have not yet seen the *Cabinet Gallery of Celebrities*, but when we do we shall probably be enabled to guess at the process employed.
- W. S. CARPENTER.—The collotype is not a patented process, and the patent for the Woodburytype process has long since expired. Several patents exist for photo-mechanical printing, however, but the most successful workers in this direction keep the methods they employ as strict trade secrets.
- E. MEARS wishes to know where he can obtain some of the Causon paper, which was said some years ago to be so well suited to photographic purposes. —The paper in question is not at the present time being manufactured. The manufacture of Causon photographic paper ceased many years ago.
- X. Y. Z.—Apply to the Platinotype Company. Mr. F. W. Edwards, 87, Rellinder-road, Peckham, will possibly give you lessons in platinotype printing. Ceramic photographs are produced by Mr. Walery, Regent-street, Mr. Faulkner, of Baker-street, and Mr. Tunny, of Edinburgh. Examples may be seen at their establishments.
- COLOUR.—A knowledge of both water and oil colouring is exceedingly useful to a photographer. It is difficult to advise you as to which is preferable without knowing the kind of business you follow. Oil painting is best adapted for large work, and water-colour for small; but either is an acquisition.
- LANDSCAPE.—Messrs. Negretti & Zambra have the sole right of photographing in the Crystal Palace and the grounds; therefore you will not be permitted to take photographs of the extinct animals without their consent, and it is very doubtful if that would be granted. Possibly, however, the firm would take the negatives for you as a matter of business. Write them.
- H. L. MOREL.—If you exhibit a portrait to the annoyance of the sitter we imagine you can be restrained by injunction from one of the superior Courts. Of course, apart from the legal part of the question, you have no moral right to use any portrait you have taken in the ordinary course of business for purposes of your own. Doing so against the wish of the customer is an unwise proceeding under any circumstances.
- J. R. CARDWELL.—We cannot give the formula by which the commercial plates mentioned are prepared, as the makers have not published it. Several excellent formulae for emulsions, and the methods of preparing them, have appeared in past *ALMANACS*, and you cannot do better than refer to them, as we cannot afford space to repeat what is so easily referred to elsewhere. With any formula it is very doubtful if good plates can be manufactured at the price mentioned.
- S. J. B., anent the recent article referring to the chromotype process as being a "neglected one," says that one reason why it has become so is that the tissue could only be obtained by those who paid a heavy fee to use it.—This was the case, but it was well known that any ordinary commercial carbon tissue would answer quite as well. The difference was only in the tint, and this was approached very closely by some of the tissues which any one could obtain in the market.
- P. M. PRINTER (New South Wales).—Judging from the examples sent, the failure appears to be due rather to manipulation than formula; therefore, without seeing the working it is difficult to advise. It would seem, however, in the collotype that the inking was at fault. Either the thick ink was too thin or the thin ink too thick, so that it becomes partially removed in the second inking. As no description whatever is given of the method of procedure, it is impossible to give a definite opinion. Send further details, and we will endeavour to assist you. Thanks for kind offer.

- G. B. BRADSHAW.—We are not acquainted with the work of the maker named, and, further, are not aware of the terms upon which he conducts his business. See conditions for exchanges.
- R. HENDERSON says: "I shall feel obliged if you will give me an answer to the following question in your inquiry column:—I engaged an artist to paint me a number of large dioramic pictures, all landscapes. Some of them are from my own photographs and some from his own sketches. Can I legally copy the pictures, either with a camera or on canvas, or does the artist hold the copyright? May say that I found everything, also studio to paint in, the artist only supplying the labour."—Unless there is an agreement to the contrary the copyright is vested in the author of the work. The artist retains the copyright in his work, while the photographer retains it in his photographs.
- D. C. J. says: "One or two photographers I know make it a rule to mount all their portraits—that is, their customers' portraits—on mounts stamped 'copyright.' If one of these portraits is brought to me to copy, shall I render myself liable to any penalty, I knowing quite well that the pictures have not been registered, as they are ordinary sitters' portraits?"—If no copyright exists there is none to be infringed, hence there can be no penalty. We know that some photographers habitually mark their customers' portraits "copyright," but it is an illegal act. It is quite as illegal to mark anything copyright when it is not copyright, as to mark a thing as patent when it is not patented. The penalty for doing this is very heavy.
- J. BARTON writes: "If in your 'Answers to Correspondents' you will give 'Young Operator' some advice as to the taking of large heads, from three and a half to four-inch vignettes, shall feel deeply grateful; have tried with Dallmeyer cabinet lens stopped down, but the result is not at all satisfactory to self or employer: must they be lighted differently from ordinary work?"—Large heads require careful lighting, though not differing from small ones. As a matter of course, in the larger size, any errors in lighting become more conspicuous than they would be in a smaller one. We should scarcely expect that you would get satisfactory four-inch heads with a cabinet lens, unless it be of much longer focus than usual. See Mr. Dallmeyer's paper read at the recent Convention.
- FRYOLINE writes: "I have, up till lately, had most capital results with the acetate of soda toning bath, but now somehow I cannot get one to work right at all. I have mixed fresh ones and likewise different strengths, also kept one a matter of months before using, but of no avail. The trouble is that they (the prints) after a space of three-quarters of an hour take the colour of a most miserable, dirty red; if I continue the toning the result is a mealy bleaching takes place round the edges. I may add that I have tried new gold and also a fresh sample of soda (acetate), but still failure—can you explain the trouble? Could you give me a formula for a bath to tone about two sheets at a time (I like the purple tones), also advise me as to what paints to get for colouring landscapes? I enclose print fixed but not washed. All prints turn out the same."—The fault in the print forwarded is that it is very much over-toned. Had the print been removed at a much earlier stage, it would doubtless have been of a good tone. The bath was not at fault; any other would have yielded a similar result with the same treatment. See sub-leader. Ordinary water-colours, such as those sold by the artists' colourmen.

THE new catalogue of Mr. J. R. Gotz, 19 Buckingham-street, W.C., differs from many others in this respect, that it contains only such specialities as are manufactured by himself or are imported by him, and for which he holds the sole agency. Almost naturally the first place is given to the Aplanatic series of lenses by Suter of Basle, a series that is growing both numerically and quantitatively, and particulars concerning some of which we have on former occasions made our readers aware. Such shutters as the "Volnte" and the "Wing" also find place, together with his patent camera; the bromide and orthochromatic plates of Vogel and Obernetter; the chloride and bromide papers of Drs. Obernetter and Just; and various papers of the ferro-prussiate, ferridcyanide, and ferrogallie class.

SPIRIT PHOTOGRAPHY—A CHALLENGE.—From the report of the Spiritualistic Congress at Paris we learn that the subject of spirit photography has been prominently brought forward at this convention. The Secretary-General, speaking of certain spirit photographs taken by Captain Volpi, says:—"In his experiments, impartially carried on for five years, Captain Volpi took every necessary precaution. He has arrived at such results that true spirit photography cannot be imitated by any of the means at present known. This is due to the action of a special modification of the light made by the apparition, a modification of such a nature that Captain Volpi has offered five hundred francs to the photographer who succeeds in imitating one of his spirit photographs by any fraudulent means whatever. Many photographers have tried; all have asserted that the phenomena cannot be imitated."

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1538. VOL. XXXVI.—OCTOBER 25, 1889.

TONING BY PLATINUM.

It will be remembered that in our issue of April 12 of the present year Mr. Lyonel Clark published a method of toning by platinum salts, in which quite a new departure from any previous system had been made.

Chemically speaking, it consists in employing platinous instead of platinic salts. Artistically, it yields prints of a rich black, yet which at will may partake of quite warm tones. As regards the time involved in the operation very few seconds indeed suffice to effect the toning.

Those who were present at the Camera Club on Thursday last week and witnessed the successful demonstration of the process given by Mr. Clark could scarcely fail to be struck with the general efficiency of this method of toning. The prints, which were on plain paper, in contradistinction to albumenised paper, were considerably over-printed, so as to ensure a generous amount of silver being in the image formed in the printing frame.

Pending the publication of Mr. Clark's lecture, we may here state the hypothesis upon which he based his experiments. Chloride of platinum, or that substance by whichever of some other names it is known, is acid, and the free hydrochloric acid attacks the silver image; if neutralised it refuses to tone, being in this respect unlike gold. It has, therefore, to be acidified by some other acid, remaining still in the platinic state. Having certain deductions strengthened by Captain Pizzighelli's statement that silver is an equally good reducer of the platinous salts as iron, he printed on ordinary plain salted paper, washed it to get rid of the free silver, then laid it down on a plate of glass and brushed it over with the ordinary solution recommended by Mr. Willis for developing with the cold bath platina process. The red of the silver image changed to platinum black with the same rapidity as does the iron-coated paper of the Platinotype Company.

It is not pretended that the image formed by substitution of platinum for silver possesses stability equalling that of the platinum process of Willis, as it, in common with gold-toned prints, succumbs to destructive agents, such as chlorine, which have no appreciable effect upon pure platinotypes; but it possesses certain advantages *sui generis*. Among the chief of these may be mentioned that of observing in the reduced silver image the progress of the printing, which affords facilities when any double printing is to be performed on one sheet; another advantage is, that whereas with the ordinary platinum process the image is developed at once to that tint known as the platinum tone, with this it may be arrested at any stage between the red of the silver and the black of the platinum. We have spoken of the rapidity with which the toning was

effected when the demonstration in question was given, but such rapidity is not necessarily a concomitant of the process, for by keeping the solution colder than was the case when this demonstration was given, and possibly also somewhat weaker, there is no doubt that the progress may be rendered sufficiently slow to admit of the action being stopped whenever desired. The ordinary silver printer has nothing to unlearn, as everything up to the toning is effected in the usual way, only this being noted that the printing has to be carried deeper than usual.

After we publish Mr. Clark's lecture we shall probably have more to say anent this new method of toning.

NEGLECTED PROCESSES.—COLLODION TRANSFERS— PHOTO-CRAYONS.

THE term "collodion transfer" is now usually associated with cheap so-called club portraits—cold and inky in tone, and generally wretchedly coloured in oil colours. The process, as most of our readers are aware, consists in making a transparency by wet collodion on glass, and then transferring the film on to gelatinised paper. Bromide paper has now, however, generally superseded this process for cheap pictures.

The usual type of collodion transfers were, as just mentioned, of an unpleasant cold tone and very inartistic. But this was not the fault of the process itself, but of its workers. For, as a matter of fact, it was, and is, in skilful hands, capable of yielding excellent results. The late Mr. Jabez Hughes employed it extensively, and, if we mistake not, the greater number of the enlargements issued from his establishment were by this process. There was no unpleasant tone in them, as they were all of a rich, warm black. This, we believe, Mr. Hughes obtained by toning the image with a chloride of platinum, or of palladium, according to requirements. As the enlargement in this process—as in the case with bromide paper—is made direct from the negative, and not through an intermediate transparency, the utmost possible sharpness is secured.

The collodion transfer process—long before it was applied to enlargements—was somewhat extensively employed, by one house at least, that of Mr. Disderi, as an expeditious means of producing large numbers of prints for publication. During the period of the "Carte mania," Mr. Disderi issued many thousands of portraits by this process, and excellent they were. The paper employed by him was, however, somewhat different from that employed more recently. It was a surfaced paper, similar to that used in lithography, and this gave the prints a far better appearance than those on plain gelatinised paper.

The photo-crayon process was one introduced and patented by the late Mr. Oliver Sarony about twenty years back. In principle it was somewhat analogous to the collodion transfer process, except that the film, instead of being transferred, remained upon the glass. But, in this case, the image had to be very much thinner; indeed, quite a phantom one when viewed by transmitted light. Usually the enlargement was made about fifteen inches by twelve, and always vignettted. After the thin transparency was finished it was varnished, and then backed up with rough drawing paper, usually tinted, such as that used for crayon drawings. Upon this backing paper were some sketchily hatched lines, either made with a black crayon or printed upon it by lithography. The chief claim in the patent, it may be mentioned, was for the production of the hatching by lithography. This hatching was very slight, and could be done in a minute or two. It was put on the paper in such a position that it would show just where the figure was vignettted off, and nowhere else. This was all the hand work there was upon the picture.

Photo-crayon pictures were framed in the same style as crayon drawings, and although they had really no hand work upon them, they had, when good, all the appearance of highly finished crayon drawings. No one would for a moment suspect that the image was on a glass plate. We remember well when Mr. Sarony showed his first examples at a meeting of the Photographic Society, many of the members present would scarcely believe they were actually on glass until one or two of them were taken to pieces. When this fact is mentioned it will be fully realised that the pictures were very effective, while they cost little, or no more, to produce than the common collodion transfers; indeed, the photo-crayon was beyond question the best process for obtaining an artistic and effective enlargement at a small cost, and in this respect it is not yet surpassed. Although so cheaply produced, the usual sum obtained for the pictures was two and a half guineas, and they were regarded as good value for the money. Some artists we know realised large sums for two or three seasons by their introduction. In this method, it will be noted, the paper was not in optical contact with the image. If it were, the drawing-like effect would have been entirely absent. Sometimes a little flesh colour was stumped on that portion of the paper beneath the face with good effect.

With qualities such as those above described the question with most people will be, "Why is it that this process has to be classed amongst the neglected ones?" One of the principal reasons is this. The pictures soon got into ill repute on account of many instances of fugitiveness. It required considerable skill to produce the pictures of the proper colour direct, for it was necessary that the image should be of a warm, black tone, which was not easy to secure in the development alone, but it could be most readily obtained by toning with mercury, the plan recommended by the introducer. However, in the way this method of toning was usually employed the image proved evanescent when long exposed to the light; but the pictures were permanent enough if left untoned; so they were if they were toned with gold or platinum. We have several examples by us now that were toned with gold which are all as good as when they were first produced, notwithstanding that they are nearly twenty years old.

The process, as it used to be worked, necessitated a knowledge of the wet collodion process, and considerable skill in its manipulation, but there are other methods by which the pictures could be produced. We have seen some very effective

photo-crayons done by the carbon process, the image being developed on glass. But this method necessitates the making of a transparency and also an enlarged negative.

If photo-crayon pictures were required at the present time, the simplest way of producing them to most operators would be with the Eastman transferotype paper. With this paper the enlargement would be made in the ordinary manner, keeping the image rather thinner than usual in the development and of a somewhat warm, black tone. After fixing, the film would be transferred to a glass plate, and there allowed to dry. All that then remains is to back the picture with the hatched drawing paper and frame it. The work is then completed. By this method very effective pictures could be produced at a minimum of cost.

MR. WALTER GARDINER'S paper, read at the British Association meeting, gives us quite a new aspect of nature printing. It might be said that "every schoolboy" has made photographs of leaves by printing on sensitised paper with some pretty leaf as his negative, a piece of a broken window-pane his probable printing frame, and has, at times, varied his results by using a piece of lace in lieu of the leaf; but in Mr. Gardiner's process the leaf itself is the "sensitive paper," and his method of printing involves a process of development. Under the action of light, starch is formed in the leaves of a plant, and the well-known reaction of starch and iodine forms the leading idea of the development. If a plant (preferably one with thin leaves) be placed in the dark overnight, and then brought out into the light next morning, the selected leaves being covered with a sharp negative, starch is formed when light is transmitted, and in greatest quantity in the brightest areas. Thus a positive in starch is produced which is capable of development by suitable treatment with iodine. Mr. Gardiner showed that, by suitable washing and treatment with a soluble silver salt to produce silver iodide, a permanent print might be obtained.

THE annoyance of the continual offensive odour given off by unsuitable indiarubber tube connexions attached to gas burners, &c., owing to the permeation of the gas through the wall of indiarubber, is too well known to need description, and many ways of preventing it have been devised. Mr. Fletcher's plan of, in effect, fitting two tubes one within the other, with a coating of tin foil between to arrest the osmose of the gas, is well known; but such tubing is not so readily purchasable as the ordinary kind, and is rather costly. If red rubber of the heaviest make is used a considerable time elapses before the gas is perceptible to the organs of smell; the usual thin rubber with coiled iron wire inside is most objectionable. A plan for treating flexible tube, published in the current number of the *Chemical News*, seems to be of great promise. It consists in the use of concentric tubes separated, not by metal, but by water.

THE method of construction is as follows: "A length of small rubber tube is drawn through another tube of equal length but of greater diameter; each end is finished with a small length of glass tube fitting the smaller tube; one end is bound off with cord, then the space between the inner and outer tube is filled with water, or any liquid required; the other end is then bound off. By this means a water-jacketed flexible tube is easily constructed."

WHEN conversing the other day with Mr. A. L. Henderson, who has just returned from his trip to the antipodes, he informed us that both in Australia and in New Zealand landscape photography has acquired a very high degree of excellence. This he thinks is to be attributed in a large measure to the singular purity of the atmosphere.

"LA NATURE" last week gave an illustrated account of a new application of photography: the photographing of Newton's rings and other phenomena of diffraction not capable of reproduction by the ordinary agency of the camera and lens. By using a lens of $f/4$ rapidity, with

isochromatic plates, and dispensing with a reflector, eight to ten minutes sufficed to obtain a good negative when the source of light was M. Carie's monochromatic sodium lamp. This illuminator is made by placing perfectly dried chloride of sodium at the bottom of a vessel fitted at its upper part with an exterior gas jet, and provided with an interior jet, through which the gas gains admittance, shaking up and carrying forward the dry powder as it is injected through the inner jet. An illustration is given of the same class of results when obtained by a thallium light. It is stated that the duration of the exposure is only one-thirtieth of that required with the sodium light. It is pointed out that by means of this method of photography it is possible to measure the relative lengths of the light waves of the two substances, and generally of other wave lengths.

THE proceedings of the Astro-Photographic Conference which sat last month in Paris are not yet published; but among the points decided by the Permanent Committee the following will be found:—Plate glass only must be used for the plates; the make of plate or mode of preparation is left to the astronomer, but the same kind is to be employed for the chart and the catalogue, the grating or network to be used with both series. At the same time, a series of standard plates will be prepared by the Paris Observatory, and the time of exposure must be so adjusted as to compare with these standards, *bureau* being established for comparing the plate when the Observatory staff cannot accomplish it. The dimensions of plate are to be 160 millimetres square, the size of the field being two degrees square, and an overlapping of five minutes being decided upon.

It may be worth while in this connexion quoting the opinion of Dr. Elkin, of the Winchester Observatory, Yale College, upon the value of photography in astronomy, based upon his examination of already recorded observations. He arrived at the conclusion that the smallness of the probable errors he had found were "convincing proof" that in photography we had a means of investigation for micrometric work which was at least equal to any existing method as regards magnitude, and far surpassing other methods in "ease of measurement and output of work."

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

No. IV.

ELLIOTT & SON (No. 403), *Mrs. Alice Shaw*.—An enlarged portrait of the "whistling lady." This work is not the outcome of one plate, but is a very noteworthy specimen of photographic ingenuity. Three negatives have been utilised for the picture, and the interest is increased by the uniformity of tone and colour which has resulted.

R. H. Lord (No. 438), *Try Again*.—A large picture, 24 × 20, of an interior filled with details of an old-fashioned large living room; the housewife is attempting to run some cotton through a needle, whilst the good man, resting after work, with a glass in hand, addresses the good wife in the title "try again." This picture has been carefully studied for detail, the two figures having been taken on separate negatives, and is a noteworthy example of design so far well carried out. But the thought arises, If photography can be used to depict the ordinary every-day life, why should it not also attempt the beautiful and occasionally more poetic aspect? Without doubt it can do this, but the more ambitious the design, so the greater must be the artistic faculty which conceives, arranges, and then secures the photographic resemblance. Hence this picture, which is an excellent scientific record of facts, stops there; in fact, it is too literal. It wants the glamour of much of the detail being kept back from so prominently asserting itself. Now, as this can be done, here arises the necessity of artistic capability and culture, so as to master the conditions necessary for the production of a picture by photography.

Ralph W. Robinson (No. 482), *Grace*.—A picture where a higher sentiment has pervaded the attempt to photograph emotion—a grandmother saying grace at table with her granddaughter. The position of the old lady is very good, but the child should not have looked at her; it disturbs the repose which would have better suited the subject, and there is also a repetition of some of the square lines of the com-

position which do not aid the sentiment. This exhibitor appears to have given all his energies to the excellent series of portraits of the R.A.s, which must overbalance any little shortcomings in this attempt at a good subject.

Adam Diston (No. 524), *Memories*.—This is a very small photograph, containing much of this exhibitor's low tones in treatment which latterly have pervaded his work, and this is strengthened by the photograph being surrounded by a very wide gold frame, the light upon which also increases the gloom of the prints; so that whilst fully appreciating the attempt to raise photographic art, which this exhibitor has always done, we hardly sympathise with the present study, which does not, after all, appeal so much to our sympathies as it does to our reason to know why these memories should be associated with so much darkness. The combination of lines and study of detail have been very carefully thought about, but the result scarcely justifies the presentment of such a subject in so gloomy a tone.

William Parry (Nos. 543, 580, and 587).—These are very good photographs of steam warships in motion. No. 587, *H.M.S. Victoria*, is also a picture where thought has been exercised at the precise moment when the vessel was in a good position to make an effective rendering; this will be evident when the light and dark portions of the vessel, together with its background (a bridge), are studied. The smoke from a vessel (not seen) helps this good effect, so that, besides being a very perfect record, it also evinces thought and design at the right moment, when the combination of objects conduce to form a very charming picture.

A. Donald (Nos. 566 and 571).—Two 10 × 8 pictures, evincing a thoughtful study of position. No. 566, *Who's That?*—an old housewife sitting at her fireside turns on the intruder and puts the question in the title. Here there is shown great attention to the combinations of form, in the good arrangement of position, and the lines of the drapery. The same remarks will also apply to No. 571, *Where's my Specs?* In this picture the good wife, standing at a table, is searching her basket for the specs, which have got up to her forehead. In these two photographs, which possess the valuable attribute of the subjugation of the background (with accessories) to the figures, the attention fixes upon the faces of the women, which is just what art endeavours to realise.

T. M. Brownrigg (Nos. 19, 42, and 44).—The first picture is a figure study of an old foreign country woman ninety years old sitting and engaged in plying a distaff; the position is very easy and well arranged, but why such an intensely dark background? This, with some rambling bits of light running over the other parts, rather interferes with an otherwise well-arranged study. Nos. 42 and 44 are *Scenes on the Dart*, which contain the usual good work of this careful manipulator; but the choice of natural arrangement is not quite so successful as could be wished, as there are certain straight lines in the landscapes which interfere ungracefully with the composition; also the general effect would have been increased if some more powerful bits of dark could have been produced.

F. Whaley (No. 47), *Your Turn Next, Sir*.—This is a large composition picture, 24 × 18, from two or more negatives, the arrangement of which has been very carefully thought about, and the play of light and dark effects judiciously arranged; but what a subject!—a barber shaving a customer, whilst five others await their turn for hair cutting, &c. We have again and again referred to the great necessity that exists for raising photography above its normal capacity for facsimile work. And here we have a pictorial realisation of an event which should always be kept in the background. A vast amount of skill and aptitude for design is here shown which should be employed upon better subjects.

Lyddell Sawyer (Nos. 52 to 56, and 82 to 86).—The whole of the ten exhibits, the work of this clever photographer, show very distinctly a good capacity for art work, especially in the choice of position of figures, as also in several pictures where ships form the main point of interest. These various subjects deserve praise alone for the indefatigable industry shown in bringing each picture to an artistic point and a photographic production. In every one of these pictures there is life, and they all have been chosen with possibilities of near, midway, and far-off studies, which give these remarkably bright scenes the notion of having been photographed from paintings.

More we cannot say in their praise, but (and it must be alluded to) the brush work reveals weak spots, which, if absolutely necessary, should be done by some one who can mingle the two in better harmony.

G. West & Son (Nos. 57, and five other *Yacht Studies*).—These pictures are each shown in a separate frame, a great improvement upon the mixed condition of past exhibits—it shows great command of the means used to be able to photograph under such conditions. At the same time, we think they do not form so pictorial a series as hitherto have been seen, for the beauty in the real thing consists in contrast between the sails almost in the water and then nearly upright again, or a decided movement one way or another, which these photographs do not give. Hence we think the limits of horizontal sailing have been reached, and richer effects may be secured from yachts not quite subject to such strong winds.

Abel Lewis (Nos. 49 and 80).—The first is a *Young Lady with Violin*—a very effective picture, being almost full length; but why place the violin in position for being played upon, whilst the bow is turned down at rest on the figure?—two opposite positions, which a violin player would never assume. Also the powerful shadow of some of the forms on the wall are not pleasant, being ugly in form and dark in tone. The second (No. 80) is very good in treatment, with one exception—the left arm, with the hand not seen and the elbow on the wall, forms a distinct right angle with the other arm, which is very nicely posed. Despite these serious objections, the pictures, nevertheless, show a decided advance in treatment; there prevails a bright and sunny tone about these exhibits which raises them far above the beaten track.

B. Gay Wilkinson (Nos. 100, 102, 103, and 104).—Four pictures, completing the series sent in by this exhibitor—two of which, having been awarded a medal, have already been noticed. All these possess very much of the good qualities referred to in the chosen pictures for award, but in these we have some existing conditions which, when not overcome, do not help the artistic result; we mean the coming forward of background trees, which utterly repel any attempt to subdue them. These conditions were not in the two pictures alluded to, so they have fortunately (guided by taste) escaped the evils which dark foliage is subjected to.

D. R. Clark, M.A. (No. 123), *Wires and Weans Ashore*.—A peculiar good effect has been produced in this picture by the brightness of the lights, which very clearly suggest a burning hot sun. Whether this effect has been produced by design or not, the result is very good, and opens up many possibilities of good effect being obtained under the control of taste. The picture is very well made up, especially in the arrangement of the figures, whose dark dresses have assisted the result, to which much merit is due.

W. J. Stillman (No. 130), *Temple of Concord, Sicily*.—This is one of several photographs by this well-known exhibitor, whose efforts towards making Grecian architecture familiar from the realistic point of view have here met with most signal success in this picture, which is an enlargement, but so rich in possible detail, that there would seem no limit to a much larger scale. It is in pictures of this class that photography stands out pre-eminent, and to this exhibitor, with his great experience in classic ground, much praise is due for bringing before those who cannot visit the originals such truthful, but at the same time, so artistic a representation of Grecian architecture.

Richard Keene (No. 161), *Old Moreton Hall*.—This is one out of five photographs of this remarkably picturesque building; but this particular exhibit is full of quaint detail, which has been exceedingly well managed for an effective result. It is in pictures of this class that photography, guided by skill and experience, does so much good in perpetuating bygone architectural romantic buildings.

W. Dillworth Howard (No. 172), *Italian Lake Views*.—Two small photographs, but possessing a distinct individuality. They appear to have been taken at early morn, or under a condition of slight mist, the result being two very charming pictorial bits, where photography shows that, by judicious treatment, a really picturesque result can be obtained.

Colonel W. L. Noverre (No. 180), *Ships, &c.*—On rough drawing paper. There are three studies in this frame of vessels, clouds, &c. The paper prepared by the exhibitor for photographic work is very

curious, inasmuch as, whilst showing an exceedingly coarse surface, it permits straight line to be given in all integrity. We hardly think the subjects chosen do full justice to the possibilities suggested, as a subject with more pronounced form might produce more effect. At the same time, if single lines can be rendered, it follows that any others must be good. Two of these photographs are pictures, and derive much value from the process, which at the moment is the exhibitor's own preparation.

THE APPARATUS.

To be so light and portable as it is, the $8\frac{1}{2} \times 6\frac{1}{2}$ "Gem" camera of Messrs. Sands & Hunter is very rigid. Its bellows body is conical in shape, and it has a variety of movements conducive to the comfort of amateurs, for which class it is constructed. This firm also exhibits another camera, the "Imperial," which is constructed mainly for tourists, having an unusually great range of focus. Either the back or the front can be placed at any part of the baseboard and firmly clamped there—no small advantage when one uses a lens of very short focus, the range of which would be interfered with by a projecting baseboard. Their well-known instantaneous shutter, so long associated with the firm, together with a threefold tripod stand and magnesium lamp, are also exhibited.

In the "Blair" camera, exhibited by Messrs. Fry & Co., an opportunity is afforded of examining the ingenuity and workmanship of American camera makers. The extension-piece of the transatlantic firm is a useful addition to a camera, as it forms an adapter, which converts any camera into one several sizes larger. It consists of a conical-shaped box, the smaller end of which fits into the camera like a dark slide, while the plate of increased dimensions finds accommodation in a slide in the larger end of the adapter.

The portable camera of Mr. William Scorer evinces ingenuity and careful workmanship. It has a circular front, fitted eccentrically, so as to bring the lens opposite any part of the plate.

To John Atkinson, of Liverpool, the founder of the present house of that name, belongs the honour of inventing a camera and plate box, which we rather imagine has been re-invented and patented by not a few since it was first invented and shown at a meeting of the London Photographic Society on January 8, 1857. It consisted of a grooved plate box, from which the plates could be passed in succession into the camera through an aperture, which was closed during exposure and reopened to allow of the plate being returned to the plate box, which was then slid along until the next plate in the series stood opposite the opening in the camera, when it in turn was made to pass in, either by dropping or, if of large dimensions, by being pushed. Perhaps the most elegant of all the cameras and reservoirs made on this principle was the little French Jumelle, which was constructed for military purposes, and held sixty plates, the mere act of applying the plate box to the camera effecting the opening of the shutters of both reservoir and camera by automatic action, and closing them by that of separation. Those specially interested in this class of instrument will find an article descriptive of it, with drawings and a record of experiments with it, in a former volume of this JOURNAL, that for 1869. The camera there described is still in our possession.

This same principle is applied in two cameras of foreign make now in the Exhibition, one of these being small and of the "hand" class, the other about half-plate size. They are exhibited by Mr. Oscar Scholzig. We are unable to name the maker, but the ingenuity of construction is undoubted.

The case of Messrs. Marion & Co. is not large, but it is replete with objects of novelty and utility. First of all, we may say that, not enclosed in the case, one of the graduated woollen backgrounds lately introduced by this firm, and spoken of at the time in these pages, is shown. There is a flat-folding dark-room lamp, which, judging by externals, seems as if it would prove a useful companion to a photographic tourist, who is often put to his wits' end as to how to discharge and recharge his plates from the dark slides. Samples of Developoids and packets of Eikonogen are also shown. Their "Perfect" camera is shown, fitted with one of Voigtlander's new wide-angle Euryscopes, a lens which we have already characterised as one which with a large aperture covers a wide field. Their other exhibits are a camera with repeating back, suitable for studio or field; a

camera case for making transparencies; Greenall's shutter, which opens and closes in the centre, and another new metal shutter.

Messrs. J. F. Shew & Co. exhibit "Eclipse" cameras in quarter and half-plate size; reducing and enlarging apparatus; flash lamp; and stands made in bamboo.

A specimen of Mr. S. D. McKellen's newly modified detector is shown. This style is now made in sizes up to whole plate. The detector gives either instantaneous or prolonged exposures, the conversion from the one condition to the other being easily effected.

URANIUM-GOLD PRINTING.

THE following is a description of an original method of printing from the negative that is at once simple, pleasing, and inexpensive. As it is by ferric agency that the "place is prepared" for the reception of the compound that forms the ultimate image, the process may reasonably be termed an "iron" one. The few details here presented take no claim to be considered exhaustive, and should rather be regarded as designed to elicit the ideas and attract the experiments of others.

The rationale of the process may be thus stated:—Suppose paper coated with ferric oxalate to be exposed to light behind a negative, there is formed a positive impression, chiefly in ferrous oxalate, which will easily reduce and be replaced by certain metallic compounds, as, for instance, gold and silver, and probably others. Thus we can obtain silver pictures by direct chemical substitution, as well as by printing out in the chloride or development. Among the important compounds that ferrous oxalate is powerless to reduce may be classed those of uranium. But if to a per-salt of this metal in solution there is added a small quantity of gold chloride, and the combined solution is washed over the ferrous picture, a ready deposition takes place. The gold, while being itself thrown down, carries the uranium with it, and becomes intimately united therewith to form the final positive image. The portions of the picture that were not affected by light have no reaction with the "developing" solution, and are thereby dissolved away, leaving only a surface of plain paper.

In the practical working of this method of printing the following are to be provided:—Paper coated with ferric oxalate, nitrate of uranium, chloride of gold, hydrochloric acid.

Iron per-oxalate is employed in several processes, but as the greater number of persons who handle it are ignorant of the facility with which it may be prepared, a convenient method of making a small quantity due to Pizzigubelli and Hubl is subjoined.

Dissolve two hundred grains of per-chloride of iron in four ounces of water, heat to boiling point and add hydrate of sodium, about one hundred grains will be required, until an alkaline reaction is indicated. Wash the precipitate with warm water, and when it is neutral to test paper, free it from nearly all the water by squeezing it in a clean piece of linen. The reddish-brown mass of ferric hydrate should now be placed in a flask, or other suitable vessel, about a hundred grains of oxalic acid added to it, and the vessel set aside in the dark for two or three days. The greenish-brown solution of ferric oxalate obtained at the end of that time should be filtered, and the amount of acid and iron therein contained determined by analysis. The solution should exhibit a decided acid reaction; if such is not the case a few crystals of oxalic acid are to be added. The solution is unstable, hence it is inadvisable to prepare more than sufficient for immediate needs.

The quantity of sensitive solution to be taken for coating the paper should be in the proportion of one grain of ferric oxalate to each square inch of surface. The sensitised paper will not deteriorate for several weeks if shielded from damp and light; if it is desired to preserve it for longer periods, the addition of a grain of mercuric chloride to each ounce of ferric solution before coating the paper is said to exercise a preservative effect.

When the dried iron paper has been exposed in contact with the negative and the characteristic ferrous image obtained, it should be floated upon a solution compounded in the following proportions:—

Nitrate of uranium	15 grains.
Chloride of gold	1 grain.
Water	1 ounce.

After the desired depth of deposition has been obtained the picture should be passed through plain water followed by immersion in dilute hydrochloric acid, 1:100, again treated with water, and finally allowed to dry.

The tone of the picture should be deep blue-black, and the image should not be deficient in vigour and balance. The proportions of the salts given above may be varied largely; the addition of more gold ensures a corresponding increase of the purplish element in the colour

of the print; its diminution tends to the predominance of the cold black of deposited uranium. The greater the quantity of gold taken, the more rapid will the reduction proceed. The appreciation of the points immediately enumerated will place in the hands of the experimentalist every power to modify the colour of the picture and to restrain or accelerate development.

As nitrate of uranium may be purchased at a lower rate than the silver salt, and the quantity of gold employed need not, on the whole, exceed the average taken for toning albumenated of silver prints, the comparative cost of the little process I have sketched could be ascertained without difficulty: I do not think it would exceed that of any silver process at present in favour.

THOMAS BEDDING.

COLOURED PHOTOGRAPHS.

XI.

IN our last paper having, I hope, advantageously conquered the blues, we started on the consideration of the purple pigments. These form a most beautiful set of colours remarkable alike for their richness and depth. Having treated purple madder to a sufficient extent, we will now follow on with purple lake, burnt carmine, Indian purple, violet carmine, and mauve. To continue:—

Purple Lake.—This colour may be considered nothing more or less than a species of crimson lake, but with a purple tinge, and all its properties, generally speaking, may be set down as similar to it. It is transparent, and possesses very considerable power and depth, and may be accounted a very useful colour for shadows. As regards durability we know crimson lake to be a very dangerous colour to employ, and, indeed, every effort should be made to avoid its use as much as possible, while much more cannot be said for purple lake; nevertheless, the latter has considerable advantage over the former on this score, still it would be reckless to secure any of the leading effects in a picture by the aid of such an unstable medium. I think with this we can dismiss purple lake, and pass on to—

Burnt Carmine.—As the name signifies, this pigment is obtained by partially charring or burning carmine; as a result, however, we have a very magnificent reddish purple possessed of extreme richness and depth. This process of charring the original carmine, although producing a very beautiful colour, does not seem to alter in the least its durability. We must, therefore, look upon carmine and burnt carmine as one and the same colour as regards permanency.

Indian Purple.—This pigment is in colour of a very deep tone—a rather cold and subdued purple. It is very much to be regretted that this colour shows a considerable tendency to blacken if submitted to the ordinary conditions of exposure. It is prepared by precipitating the colouring matter of a combination of cochineal on a base of oxide of copper.

Violet Carmine.—This pigment is a beautiful and brilliant bluish-purple, and possessed of more than ordinary richness of colour. It fades when exposed to light, and is apt to blacken. It is prepared from the root of the *Anchusa tinctoria*.

Mauve.—This colour is a lake prepared from aniline, and owing to its shiftiness should only be used for temporary purposes; indeed, it would be the extreme of folly for any water-colour painter to use it at all, so rapid is its disappearance. It is by far the most fugitive of all our modern water colours when submitted to the test of ordinary daylight; indeed, if you wish to remain in a state of confidence with those around you when you have this colour in your box you should keep the lid shut, if you don't you certainly will miss it. With this disreputable colour we have arrived at the end of our list of the purple pigments. The next series to claim our attention is the browns. No doubt you have met in life very worthy specimens of this somewhat large family.

Under this heading we will have to consider Rubens' madder, bistre, burnt amber, Cologne earth, warm sepia, and Roman sepia, these, with brown madder, Vandyke brown, and sepia (friends we have met before), complete the list.

Rubens' Madder.—As its name suggests, this colour, like brown madder, is a preparation of the madder root. It is much brighter in tone and more russet in hue than brown madder. Like all the colours having a madder base, it may be considered practically permanent under the ordinary conditions of illumination, exposure to ordinary diffused daylight having virtually no effect upon it. In short, its various properties are much the same as we know brown madders to be.

Bistre.—This colour is a powerful citrine-brown, and is possessed of much clearness; it is very useful in treating architectural subjects on this account. Under the ordinary conditions of exposure it may be considered durable but not absolutely permanent. As I say, under

ordinary conditions it is all right, but it must be confessed that exposure to bright sunlight will cause it to fade very considerably. It is prepared from the soot of wood fires.

Burnt Umber.—This colour is produced by calcining raw umber; the raw earth having undergone this treatment becomes much deeper in tone as well as more russet in hue. Burnt umber will be found to wash well and work easily. To these latter good qualities, also, may be added one more, though "last not least," under all conditions of rational exposure it is eminently durable.

Cologne Earth.—This colour, as originally made, was a native bituminous earth, but latterly this pigment has been produced by calcining Vandyke brown. This method of producing Cologne earth has its advantages, and among others, quite apart from the fact of its very close resemblance to the old Cologne earth, includes the quality of greater durability.

Warm Sepia.—This pigment may be looked upon as a mixture. Sepia—the ordinary colour bearing that name—is a powerful dusky brown, possessing extremely fine texture, and when warmed, by mixing with it browns of a reddish hue, becomes what is known as warm sepia. If kept from a very strong light it is practically durable, but exposure to strong sunshine will cause it to fade very considerably. It is transparent, works and washes well, and is extremely clear in its pale washes.

Roman Sepia.—This pigment, like warm sepia, is also a mixture, but instead of having an ingredient of a reddish hue, has one of a yellow tendency. From this point it closely resembles the other sepias in all their leading qualities.

With this we may safely conclude that we have treated on all the various colours to be found included under the heading of the Brown Pigments. The next set will be the *citrine* and *olive* pigments. Among these will be found brown pink, raw umber, and olive green.

Brown Pink.—This pigment was originally a lake prepared from Persian berries, but was not very remarkable for its durability. As this quality is so essential, it is only natural to suppose that efforts should be made from time to time to better the various suspected products at our command. In this manner the latter-day brown pink is a product of quercitron bark, and one which possesses considerably more stability than the old colour did. I do not wish it to be understood that this says very much for it, all the same as in truth its reputation must be set down as very varying. This is naturally influenced to a very considerable extent by its composition and manufacture, as well as by the severity of the test of exposure to light to which it may be subjected.

Brown pink is a very fine citrine colour, possessing considerable richness and transparency, and also works well with the brush. Under the direct rays of the sun, I may here state, both these varieties are unquestionably fugitive, and this remark applies with greater force to the product prepared from the Persian berries than that which is produced from the quercitron bark. It is needless to say that exposure to the fierce rays of the sun is not a likely one to which pictures of merit, not to say works of art, would be submitted. It would only be courting destruction to treat them thus. I may, therefore, state that there has been considerable evidence from time to time to prove that both varieties of this colour are to an extent durable when only exposed to a judiciously moderated daylight.

Raw Umber.—This pigment is produced from a natural earth or ochre, deriving its colour from the presence of the hydrated oxides of iron and manganese. The finest specimens of this colour come from Cyprus, and are often styled "Turkish" or "Levant Umber."

Raw umber is possessed of a very fine brownish citrine colour, and has a tendency somewhat to darken as time rolls on, and is semi-opaque. If measured by ordinary conditions it may be considered durable, but if unduly exposed to the fierce rays of direct sunlight it has been found, after lengthened exposure, to fade slightly.

Olive Green.—This colour, sometimes known as *Devant's Green*, is a mixed pigment, and is possessed of a fine deep olive colour and sober richness. As is the case with all compound pigments, the degree of permanency of the individual colour may be approximated by duly considering the claims upon durability held by the original colours, whose combination produces the olive green under notice. As a general rule, I think it will be found that this colour, like many others, leans more to the advantage of being beautiful than the virtue of being permanent. Although there is no denying that strong sunlight will have an undoubted effect on and destroy much of the beauty of this erratic colour, there is strong reason to believe that under moderate and careful conditions, namely, exposure to ordinary *daylight*, at least some of the many varieties stand fairly well.

With this we conclude the citrine or olive series, and make our final advance upon the last few colours that form the grey and black pigments. When we have given these few remaining colours their

due consideration, we will have completed a more or less exhaustive inquiry into the qualities of nearly all the pigments to be found in a water-colour painter's box. The colours forming the series which we may term grey pigments are few, only three in number, viz., ultramarine ash, neutral tint, and Payne's grey.

Ultramarine Ash.—This pigment is a valuable pale azure-grey colour, variable somewhat in its degrees of intensity, but as regards its permanence ever the same. It is a very useful colour in obtaining several of the most delicate atmospheric effects. It is prepared from the *lapis lazuli* after the richer blue has been extracted.

Neutral Tint.—This is a compound (if I may be allowed to say) shadow colour, being of a cool neutral tone. It cannot be considered as permanent, as exposure will considerably weaken it. A means, however, of preventing this is to mix a small quantity of ultramarine ash with it. This simple addition will add considerably to the durability of this otherwise very useful colour.

Payne's Grey.—This is a very similar compound colour to neutral tint. On close observation this pigment will be found to be more lilac in hue, but in all other qualities and properties it entirely resembles neutral tint. With this our grey series ends, and we will at once hasten to finish our analysis of the colours by considering the black pigments. Under this heading will be found, ivory black, lamp black, and blue black.

Ivory Black.—This pigment is the richest and most transparent black we possess, and when properly made is extremely durable. In its paler washes it will be found to possess a somewhat brownish hue. It is produced by charring ivory, as may be supposed from the name.

Lamp Black.—This pigment is a most useful colour. It is a black of very fine texture and great power. It is scarcely so transparent as ivory black, nor is it quite so intense, but it has the advantage of not being so brown in its paler washes. Owing to the natural power of this colour, it should be used with caution, its inherent density, if injudiciously used, is more than likely to give a general feeling of heaviness to our picture. It is prepared from the soot of burning resinous matter.

Blue Black.—As a black this is perhaps the most useful to the landscape painter. It is possessed of less density than either ivory black or lamp black, and is naturally less likely than either to give a sooty effect where such would be most undesirable. It is prepared by calcining vine twigs.

At last we have come to the end of our analysis, and I have no doubt you will say that you are "very glad," and "it is quite time," and such-like. I beg to say, however, that no one of my readers will be more pleased than your humble servant. It is a horrid task to go all through such a long list with little of interest to lend it a charm. I feel sure, however, that in the main it is worth the trouble. It has cleared away all the obstacles before us, and we can now attack our work, feeling sure we know something of the means we are using to gain a fixed result. All of this may not appear necessary for "mere photographic colouring," but my object is to show that really first-rate work can be produced on photographic base, and how to do it. As I have often said (and this will prove before it is finished), photography can be a great help to the *real artist*, but to the *incompetent* one it is a most exacting task master.

REDMOND BARNETT.

THE WHOLE DUTY OF THE PHOTOGRAPHER.

III.

"Fools rush in where angels fear to tread."

THIS is a true proverb, and I am about to exemplify its truth by rushing on to that dreadful battle field called art criticism. On this grim field there is one little corner especially reserved for those who have dealt with photography. The space is small, but the fight was hot and many have fallen; poor little pigmies most of them, who have shattered themselves in vain against the rocks of ignorance, folly, and prejudice. It must be confessed that the aspect of the victims on this ground moves one rather to laughter than to tears. To come down from this stilted rhetoric and write plain English, I am about to venture to speak of "art in photography," and I reckon that there are few departments of literature where folly has so long reigned supreme, and in which deeper misconceptions of truth have prevailed.

As I have said before, all men are artists in so far as they endeavour in their lives to surpass the purely animal existence. The majority in this country are what we may call negative artists, and devote their energies to the development of ugliness and the final destruction of all sense of beauty. Of such are School Boards, Science and Art Departments, and well-nigh all the mechanism of education, both higher and lower. Would a man acquire a feeling for what is

beautiful and seek to make his environment a fit habitation for a rational creature? He must learn not only outside the schools, but in direct opposition to what is taught there.

The term "art in photography" is a false one; it should rather be the position of the photographer in relation to art, for the less does not include the greater.

In the greatest of all temples, where are performed the rites of the worship of beauty, the photographer has a place among the celebrants, and although not the first, neither is it the last nor without value. The question which I wish to answer to the best of my ability is, What is the nature of the function assigned to photography in the temple, where is its niche, and how is it filled? The first place must for ever be reserved for the artist in the narrower acceptance of the term, not the narrowest, however, for by artist I do not mean only the person who makes pictures or statues, but include also those who design rooms and buildings, or gardens or towns. Why all these should be classed as mere craftsmen under the name of decorators, builders, gardeners, &c., is a question I have never been able to fathom.

The photographer's function, we must confess, is that narrower one of making pictures, and even within that there are many restrictions. "Know thyself" includes all human wisdom, and applies to small as to great, and not less here than elsewhere. Let the photographer know what he can do and *what he cannot*. The latter I should call even more important than the former; let him study his limitations and submit to the laws of the higher powers. The first and greatest limitation is colour; the compulsion to render in monochrome not only loses the colour itself, but destroys also most of the finer and subtler detail of light and shade. Nothing in the world is more wonderful or more beautiful to the eye that can see it than the deep glow of sombre colour in a dark shadow. Will photography ever render this? That we shall learn to reproduce colour in some fashion I do not doubt, though the triumph seems still far off; but it seems too much to hope that all the marvels of subtle colouring of a sunlit landscape can be rendered without the agency of what we call the genius of the artist. Looking into the shadows of pictures which appear at first sight mere blots of darkness, one may often distinguish the most astonishing mixture of rich colours—red, green, blue, and purple in wonderful combination. Let not the photographer altogether despair of one day doing justice even to such shadows as these, for there are two cases—either the colours are veritably there in nature, in which case they may be copied, or they are not there, and the artist's representation is purely conventional, as happens often enough. In this case it may be reserved for the photographer to teach the artist, as he has done once or twice already.

The second great limitation to which photographers have to submit lies in the impartiality of the lens, which stupidly insists on representing whatever is in front of it, so that an otherwise perfect picture may be ruined by the branch of a tree or some obtrusive bit of wall. Some photographers there are who yield to the temptation, very strong under such circumstances, to improve nature with an axe: of this, perhaps, the less we say the better.

It is very amusing and not a little instructive to hear artists discussing the pictures they have in view: "Yes, that would make a picture if you put in some foreground;" or, "That hillside is too low, I must put some trees on it;" or, again, "I am going to put a cottage and a cart of peats into that hollow;" thus improving the surface of the earth with a most lavish hand. This is right, too, for one of the greatest of all the follies uttered under the name of art criticism is the dogma that the function of the artist is to represent exactly what he sees. On the contrary, his duty is to make our environment beautiful, and one of the ways in which he does this is by the making of pictures. The inquiry whether the picture is accurate is entirely irrelevant; let the maker of maps and diagrams attend to his own business. It is true that the artist does always represent things which are, or have been, in the world, but he combines and groups them to please himself. Consider a sufficiently familiar instance—a scene being enacted before me while I write. A woman is driving a herd of cows to milking, not without a free use of stick, stones, and profanity. The scene is in its way a beautiful one, well worthy of any artist; how may it be represented? A photographer, with all his paraphernalia of rapid lens, quick plates, and shutter might wait a lifetime before he could get the cows and their driver properly grouped so as to make a picture. The painter has no such trouble. After studying the scene several times he should have learnt by heart the attitudes and grouping natural to both herd and driver, and then he can transfer them to canvas. It may happen that exactly what he represents never was to be seen; still, his picture gives a truer and deeper idea of the whole than a representation, however accurate, of the scene at any one moment. The artist has

idealised, has shown, in truth, more than the ordinary eye could discover, and therein lies his highest purpose—that of idealising life and interpreting for less fortunate men the higher levels of beauty. The photographer must for ever remain one of the crowd, reverently admiring this higher land to which he can never attain, for he must represent what he sees at any moment, though I consider all the devices of double printing, and composites, and cloud negatives, perfectly warrantable, and in judicious hands valuable. These are, at the least, only partial remedies for the want of the power to eliminate, and each mechanical aid of this sort brings with it in its train a new collection of technical errors of application to be added to the already numerous artistic errors natural to the imperfect man.

So much, then, for what photography cannot do; now to indicate some of its peculiar powers, and in what directions it may legitimately claim to rank as a fine art. Clearly in the accurate representation of form and detail the photographer is easily first. He should then devote his attention, as much as possible, to depicting objects which depend chiefly on their shape, or outline, or fineness of detail, for their beauty. In the representation of light and shade, although he is at a disadvantage, he is not to be despised; and, lastly, the quickness of his operations may enable him to seize on many fleeting effects too transient for either brush or pencil.

The most beautiful photographs I ever saw were of bare trees covered with ice crystals; but leafless trees at any time are a perfect subject, and one to be had, too, in winter, when times are bad and sitters few and far between. Winter also is the season at which trees will stand for their portraits. When they are in the pride of their summer garment a group of a dozen babies is not so restless as a tree. Time after time I have watched the leaves for ten minutes or longer and detected no movement. Exclaiming, "Now is the time!" I went for a camera, but before I got it planted a gale had arisen, and the trees did not mean to be still again for a month. Such events are trials, and the photographer is far from patient under them. He seems to think that because his exposures take only a few seconds, therefore he ought to be able to make pictures at the rate of one every few minutes. There could not be a greater mistake. Let him consider the ways of the artist and be wise. We do not see artists endeavouring to produce a picture every hour of the day, or every day in the year; on the contrary, they usually spend many days in pottering about looking at points of view, and sometimes making little sketches to see how things will look in a picture before bringing out a large canvas and beginning to work on it. If the artist produces in a fortnight or so one picture which is really a thing of beauty he rejoices. Much more, then, the photographer with his severer limitations if in a similar time he can produce one photograph really worthy to be called a picture. Of course, on the way to this result he must have many failures, and I would urge upon him to destroy freely. Do not let bad or indifferent work go out into the world to degrade the name of the art. Keep a high ideal in view from the beginning, and march towards it courageously through paths strewn with broken glass.

COSMO. I. BURTON.

ELECTRIC LIGHT LANTERNS.

WITH the introduction of the house to house supply of electricity in London, and other large cities and towns, the use of the electric light will no doubt be considerably extended, not only for general illumination, but also for special purposes, such as projection work, enlargements, &c.

Previously, as far as the optical lantern was concerned, very few—outside large institutions, such as the Royal Institution, the Society of Arts, and some of the universities and colleges—could use this light, for to get a satisfactory result it meant a great outlay for plant, consisting, in the case of one of the institutions named, of a gas engine, dynamo, secondary batteries (to ensure steady supply), and the lamps, in all about 700*l*. Now the whole thing is altered, and any private individual or school can utilise the current at a nominal cost. Central burning arc lights can be obtained to give 1000 candle power for special purposes, such as using high-power projection microscopes, micro-polariscope, &c.; but at the present moment I propose dealing with the incandescent form of lamp, which is easy to use, and will give satisfactory results for moderate-sized rooms. All who have seen the ordinary incandescent electric light lamp will remember the illuminating filament is elongated and covers a large area—a factor the very reverse of what is required for illuminating an optical system. The light should be approaching that of a point in order to get satisfactory definition and illumination, an area of light of half an inch or so diameter being suitable. With large area of light the rays pass through the lenses from so many points that they come to a focus

at other places than the axis of the optical system, and therefore give indifferent illumination or definition. In order to meet the wants of scientific men and the large number of people who use optical instruments, Professor Fleming, of University College, London, designed a filament that gives all the light in a suitable circumscribed area, and at the same time a brilliant and satisfactory luminant of 50 or even 100 candle-power. It is done by crumpling up the filament in a grid-iron form, so that while the necessary length is obtained to get a long line of luminosity, it is at the same time all concentrated. This is known as the "Focus" lamp.

I had occasion to experiment with one when asked by a captain of a mail vessel if an electric light could be fitted to his enlarging lantern, so that he could use it on board ship for the amusement of his friends or the passengers. The globe of glass (exhausted of air) which contains the filament is about three and half inches diameter, and this was found to be most readily adapted by mounting it in a brass gibbet-shaped arm or rod, the end of which fitted in a stand attached to the ordinary lantern tray. A circular hole in the stand with a clamp allowed of the vertical or lateral adjustment of the lamp, and so the light was readily got central. On connecting it up to a local electric light installation (one of the best in London), it was found to give a satisfactory disc up to ten or twelve feet. Certain points of improvement suggested themselves for a lantern with which to use this light, and Dr. Fleming, to whom the report was made, designed, and instructed Mr. J. H. Steward, of 406, Strand, to make a lantern that should enable photographic and other slides to be shown conveniently, and, at the same time, permit of numerous scientific projections to be made, illustrative of magnetism, electricity, fluids, &c., for it can be either used horizontally or vertically, the front lens, of large diameter and medium focus, having an adjustable mirror that will reflect the rays in the desired direction. In form it is an oblong box with three sides closed, with the exception of ventilating holes and any special door or opening that may be required; and the fourth side composed of hinged doors opening in sections, so that any part of the apparatus can be readily got at. Grooves are placed down the inside, and into these are slid the mounts containing respectively the stage, condenser, &c. The lamp is mounted on a moving base worked by rack and pinion from outside, and the objective is fastened by a brass flange to one end of the mahogany body. Every possible adjustment can thus be obtained, and by means of the various grooves any distance from the lens can be arranged for. The objective slides out of the rack front complete, so that another focus objective can be used quickly if desired. Levelling screws are supplied for both vertical and horizontal work, so that delicate experiments with the galvanometer, &c., can be performed. While the focus lamp can be used in any large-size lantern body, it is better to have one specially made, so that the necessary arrangements for ventilation may be allowed for, the heat generated by the lamp requiring special facilities for the ready change of hot for cool air inside the lantern.

Although, in my opinion, the light will never supersede the lime-light for lantern illumination where compressed gas can be obtained, it supplies a want, and will be a great convenience to many for trying slides, enlarging purposes, and for lecture demonstrations on a scale sufficient to suit an audience of one hundred or two hundred persons. One of these lanterns was shown at the last *soirée* of the Royal Society, and considerable interest was taken in it, as well as in other electrical exhibits of a scientific nature by Dr. Fleming.

G. R. BAKER.

PHOTOGRAPHS, PLAIN OR COLOURED.

By rights, the title of this paper should be *Coloured Photographs*, but as a series of articles are appearing weekly under this title, I will vary it a little for distinction sake. I do not suppose, since photography became popular, there has been a more debated question than this of coloured photographs, or one that has branched off into so many side issues, starting with the legitimacy of calling a photograph a photograph when it has been subjected to the manipulations of the colourist or hand work generally. At one time, if hand work could be detected on a photograph, even if it required the aid of a magnifier, it was disqualified as unfit to compete with its untouched brotherhood. Then, again, pictures were admitted for competition with others if a great part of their *artistic* beauty depended on hand work, so long as it was skilfully hidden.

Now the question arises, What is a coloured photograph? It will scarcely do to say in reply, off-hand, that it is one that has received a certain amount of artist's work in addition to the chemical and undoubtedly legitimate work of the light itself, because this would at once land us in a difficulty, for without doubt the majority of nega-

tives can be vastly improved by it, and I cannot see why any distinction should be drawn between this and colour applied at some other stage. Coloured work, although it may be in monochrome, if applied to the negative or to the resultant prints is a mere matter of degree. When all is said, the photograph will owe some of its beauty to something independent of the effects of light. A negative so doctored will produce a print that will enter unchallenged into almost any competition, whereas if a fraction of the amount of work is put on the print its doom is sealed. A clever draughtsman could make a negative almost entirely by hand work, innocent alike of camera or lens—pinhole or otherwise—that would pass muster as an ordinary negative, and a copy from it might claim to be an untouched photograph simply because the positive copy had escaped the damning (*sic*) touch of brush or pencil. It is all very well to say that it is perfectly understood what a coloured photograph is, but this is just the point of which, in my opinion, there is considerable doubt; if it is right to exclude work improved by brush or pencil in one stage, I cannot see why it should not in another. Take the choicest work of any good photographer, and it will be found that the negatives, at any rate, have been pencilled or papered, or rubbed down or strengthened up, or something or other that the light had no part in the effecting this in landscape work. In portraiture it is infinitely worse. The original is so worked on, that if the camera was a sentient thing it would not know its own offspring. The retoucher, if he has an eye for the beautiful, more or less idealises the, may be, commonplace figures he has to work on; and the more he idealises without actually losing the likeness, the more is his work appreciated. Purists may hold up their hands in horror, but it is a fact all the same, and a portrait not worked on and smoothed up is considered coarse and unfinished. Merely touching out defects or softening exaggerated lines is not sufficient, although it is somewhat difficult to say where the line is to be drawn and as to how much shall be done or left undone. That very elastic phrase, "Only just sufficient," depends on who does it and who says it, and may either mean a tremendous lot of work or very little indeed, according to circumstances.

Now, again, when we begin to argue about truthfulness, we see a coarse, wrinkled, spotty epidermis "made up" with powder and *cosmetiques* into a blooming childhood quality for the special behoof of the photographer; retouching is done on the *subject* here, and possibly does away, in a great degree, with the necessity for it on the negative; but it is just as misleading, as we do not get a true representation of the original as generally understood, the colour being applied at the beginning instead of the end of the process. Very few have that Cromwellian force of character to prefer the warts, and I think, for the sake of the community at large, it is a very good thing they don't. We have only to go through an old album of portraits, or, I should rather say, an album of old portraits, side by side with one of modern good work, and then decide which style we prefer, even as bare remembrances of the personal appearance of our friends.

People we like we involuntarily idealise in our own minds, and prefer the refined, if incorrect manner of representing them, apart from any idea of exaggerated improvement; in fact, it is very seldom, to speak broadly, that we notice *slight* defects or imperfections in those with whom we associate. How many, for instance, could, without hesitation, say what was the colour of the eyes of a friend (unless of a particularly intimate one) from recollection, or unless they were particularly striking eyes? This actual ignorance of facts and defects has much to do with the popularity of retouching; they are unnoticed in the person, and probably only brought into notice by the close criticism usually bestowed on photographs. Most people can call to mind a remark of this character: "Dear me, your nose is all on one side!" or, "One eye is larger than the other!" or, "The mouth is wrong!" or some flattering speech or other that may be perfectly truthful; but the defect is not realised until the photographer has done his work. If by any brush or pencil skill faults are made less noticeable, it, in my opinion, is better for everybody. It is very true that retouching may be carried to such excess that it becomes positively hideous—all the natural texture of the skin done away with, and the photograph, instead of looking like a copy of a human being, looks more like one of a wax doll or a marble bust; it neither adds beauty or conveys a pleasing impression; it does not have the effect of idealising, but destroys any beauty that may exist: and here I think we must draw the line as to retouching or colouring the negative.

We now advance a stage, to the print, for with every care bestowed on the negative a little retouching on the prints for the reduction of the intensity of too strong lights, and the removal of some altogether, greatly increases the artistic qualities of the picture. A mass of shadow broken up by small brilliant spots of light generally gives an unpleasant effect, and necessitates the use of colour for their removal. The untouched picture looks crude and unsatisfactory compared with

a print that has undergone this colouring, or call it by some other name—spotting, if preferred—the result is the same; the effect of the picture is due to hand work, and not to pure photography. I am quite aware that when coloured work is talked of, photographs upon which many varied colours have been applied is usually indicated, or photographs on which the photograph is absolutely invisible; it is a mere matter of degree (and, perhaps, the first indication of the existence of a photographic base is its fading or discolouration). In such cases would it not be better to drop the word photograph entirely, the photograph being as practically hidden as is the charcoal sketch of the painter? in fact, it in many cases only serves the same purposes, and disappears as the colour is laid on. It is quite misleading to call such a production a coloured photograph; although custom has accepted the definition, the sooner the same authority discards it the better.

So much, then, for what a coloured photograph should not be; as to what it should be is, I take it, another matter, and may be fairly described as a photograph in which the chemical image is *not* hidden by applied colour, but is in evidence throughout the work. In such cases there could be no doubt as to the existence of the photograph, but as to whether it was improved by the colouring is another matter—tastes differ; but I think any picture exceptionally good passing under the title of a coloured photograph will be found to show no evidence of the photograph itself, but merely of the work that has been put on it.

EDWARD DUNMORE.

LANDSCAPE ART.

It is rather in the nature of a compliment, at least I feel it so, that the rather irate "F.B.," on page 674 of this JOURNAL, takes exception to a casual expression of mine on this subject, as it shows that the remarks have been read carefully, if not appreciatively.

That expression, which after all is only one of opinion, is, "But it is perfectly patent to all who choose to look that it (photography) has quite revolutionised the landscape art, not only of this country, but of Europe, with perhaps the single exception of Holland and the Low Countries"—a sufficiently wide assertion. And as he puts his view in the form of a question, "It would be interesting, indeed, to learn in what way the landscape art is for a single instant revolutionised by photography?" the question might be very fairly and shortly answered in the Scotch fashion by asking another.

Where was the landscape art of Europe before its advent? Should we look for it in Italy, which must be looked upon as the birth home of modern art? and how many landscape artists has the modern Italy produced? Is landscape art to be found in the works of, say, Salvator Rosa, with his magnificent dreams of impossible mountains, gorges, and trees; the passes inhabited by goats and picturesque brigands drawn with great power and vigour, and dashed off with what appears to be the skill and rapidity of the scene painter? or are we to take the truths of nature which photography teaches from the landscapes and cattle of Rosa da Tivoli, whose works may be taken as coarse sketches of sheep and cattle with the landscape thrown in as a make-weight? The landscape backgrounds of such of the great Italian masters as I have seen are, while beautifully painted, utterly untrue to nature, whether we take them from Titian or from Raffaele, from the Bellini or Domenichino or Tintoretto, and they are invariably subordinate to the rest of the subject, which may be, and no doubt is, right enough; but they are purely from the artist's imagination, and put there merely to help the composition either by its form or its colour, and rarely even for its suggestiveness, to say nothing of the truth to nature. Among the more modern men, Canaletto and Guardi, with their almost photographically correct architectural views of Venetian subjects, may be quoted as about the only exceptions in Italian landscape art, for even the comparatively modern Swaneveldt is no true landscape artist; but since the advent of photography, Italy is beginning to have a taste for, and is creating a school of, landscape art.

Where can we find in Spanish art anything of the truth of this art of landscape? Velasquez, Ribera, Murillo, Zurbaran, were all great artists, but they, together with all the long catalogue of names and work which Sir William Stirling Maxwell, the greatest authority on the subject, in his two volumes, treat landscape as if of no account in picture making. Indeed, it would seem that before the advent of photography no one ever thought of reproducing landscape in art; but now we have Spaniards whose work will compare favourably and take rank with any of their contemporaries.

Germany, in its early artistic stages, with Albert Dürer as the greatest of its exponents, while great as an artist, admirable in draughtmanship, and almost unique in conception, shows the same want of feeling for this department of art. A beautifully drawn

flower, a few pebbles, or a tuft of grass in the foreground, with the slightest indication of the distant landscape, are abundantly often there to show, not want of capability, but rather the absence of appreciation or contempt for those beauties of nature of which his skill could so lovingly represent when he chose or it suited his purpose; for Dürer was a man who made his art subservient to his high imaginative power. I cannot call to recollection any school of German landscape art which is not of the very modern type, and doubtfully good at that.

The art of the Northern nations—Russia and the Scandinavian countries—is, like our own, the creation of a much more modern period indeed, but the creation of this century, and so within the memory of the generation of still living men; and coming to that of France, with probably the exceptions of Joseph Vernet and Claude Lorraine, all the historic painters have gone for what is (I think) erroneously called high art, and it may be added as typical of the nation of interminable miles of battle pieces. Vernet's pictures are, in many instances, beautiful works of the painter's art; but, like those of Claude, he subordinated nature to the imagination of the artist, and in the desire to improve the unimprovable they created grand conceptions and effects which never existed, save on their own canvases.

It does seem to me that the primary consideration of the landscapist should be to represent as truly as may be, with the limited means at his command, the varied scenes of those aspects of nature which affect his peculiar susceptibilities, and through this to excite the same or similar feelings in those who see and enjoy his work. I also hold it may be wrong that the painters of the, to us, rather unpicturesque countries of Holland and Flanders (speaking generally) tried to do this, and succeeded better than those of any other of the art-practising countries, and that none came nearer to that truth than such men (among many others) as Albert Cuyp, Ruysdael, Hobbima, and David Teniers; and if the landscape art of this country has been indebted to any, it is to the influence of such men.

In this country our artistic susceptibilities were later, in point of time, of being evoked, and our painters very probably from their surroundings, both physical and literary, seem to have taken more appreciatively to the representations of the sea-girt isles with their many beauties than to the high art of the Continent. This they did at first crudely enough; but it must be admitted, even by "F.B.," that in this department have been the greatest triumphs.

What does Dr. Wolcott—"Peter Pindar"—say in criticising the exhibitions of the first years of the Royal Academy of London? to so great a man as Gainsborough he gives this advice:—

"To mind his landscape, have the modest grace
To see there sometimes nature's tints despised,
I wish them more attended to and prized."

And of another, and the principal landscape painter of the period:—

"And Louthborough, whom heaven so wills
To make brass skies, and golden hills
With marble bullocks, in glass pastures grazing,
Thy reputation, too, will rise,
And people, gaping with surprise,
Cry, Monsieur Louthborough is most amazing!"

But without going into the history of English landscape art and coming to our more immediate times, one remark may settle the matter. Did not Turner see the inherent untruth of the landscape art of Claude, and to prove his views produced the famous *Liber Veritatis* in rivalry to the *Liber Studiorum*? and yet, with all the beauty and attempted truth of the *Veritatis*, we see through the education which photography has so widely spread and insensibly given to every student and every individual, that Turner fails almost as much as does Claude. This is where photography is teaching, if it has not taught, how to represent truly instead of untruly. If this is not revolution it is perilously near it.

And coming down almost to the present date, allow a quotation from the editorial columns of this JOURNAL, page 288, of 1886:—

"The Royal Academy Exhibition is now open. Although the Exhibition may be said to be below the average of previous years, there are many pictures which should be studied by photographers. Several of the pictures, both portrait and landscape, bear strong evidence of having been painted, wholly or partly, from photographs. Many painters, although they profess a contempt for it, are largely indebted to photography for many of their pictures. Others, on the contrary, make no secret of it that they employ photographs to assist them in their work. Indeed, several well-known landscape painters now possess a photographic outfit and profit by its employment, and, what is more, they are not ashamed to own it. The more credit to them."

The second count of the indictment is, that I have in the same article further stated that "several of the most famous names in art circles are not content with either copying early (?) (*i.e.*, I might

have said their own earlier designed works) "but carefully drawn designs by the use of our art, but go much further than that, and get the same reproduced on the canvas or the panel prepared for painting." "I deny," he says, "the truthfulness of the assertion that an artist exists," &c.

But still, denial notwithstanding, the statement is one of actual fact and literal truth. Two, at least, of different pictures by one of the first rank of living artists, produced in the way described, were sold by me for upwards of 300*l.* a-piece: one of these was to a gentleman reputed to be one of the best judges in London, and I know he has a fine collection, having seen it; the other was sold here for a similar sum, and to an equally capable judge.

These are not the only instances of living artists, they could be multiplied quite easily were it either expedient or desirable; but it will be easily understood that with living persons it is not wise to use names or dignities.

In the case of deceased artists it is different, and as both parties in the case to be quoted are now dead no harm can accrue. The late Mr. —, of the Montreal *Herald* or *Gazette*, was a lover of the fine arts, and used to come over to this country once a-year on a holiday, and he generally bought a picture or two. On one of these occasions he, instead of buying what might be on sale, left commissions for at least half a dozen of pictures in oil. Two of these were to be from the brush of the late Samuel Bough, R.S.A., one of the best landscape painters, English or Scotch, then living. The subjects selected had been previously executed, and were engraved also, of a small size; the subjects of both were landscapes and figures. The price was to be, writing from recollection, 120*l.* a-piece. The artist grumbled very much over the price, but as they were to be used for an exhibition on the other side he agreed, swearing he'd be — before he'd be at the trouble of drawing them at the price, so he employed me to photograph and print them on canvas. The size was about thirty-six inches on the base line, and as at the time I had no bath of the size necessary, they were made with bromide emulsion from transparencies, using the lantern and the limelight. If I recollect—well, the exposure was about a quarter of an hour. The result was perfectly good, and the printed canvases were delivered within a few days.

This, I think, should satisfy "F.B." of the facts; and all who know Mr. Bough know the contemptatory fun he used constantly to poke at photographers and photography in public and private. I hardly expected at this time of day to have my veracity called in question. Opinion and judgment are very different. W. H. DAVIES.

A PHOTOGRAPHIC BLUE-BOOK.

BLUE-BOOKS are so intimately associated with matters parliamentary, that it would seem at first sight almost an anomaly to speak of a Blue-book as in any way connected with photography. While the Blue-book of our legislators is in all sincerity plentiful enough, copies of the work which form the subject of the present communication are rarely to be met with. We presume the regulation Blue-book takes its title from its outside covering; but here the reverse holds good, the contents themselves forming a series of blue impressions.

Book collecting is more or less a disease, and a somewhat incurable one. Book hunting, as a famous namesake of my own, Mr. Andrew Lang, refers to it, is a genuine sport. The two things are by no means synonymous. Book collecting is one thing, and it may be extensively and expensively indulged in without any of the sport to be obtained when a veritable hunt for a coveted and scarce volume is entered upon. The volumes we are here dealing with are the results of a hunt which has been pursued for several years; in fact, continued so long as almost to doubt the possibility that the quarry would ever be successfully "run to earth." In an article on *Photography without the use of Silver*, which appeared in the *THE BRITISH JOURNAL OF PHOTOGRAPHY*, December 9, 1864, and contributed by the illustrious Henry Fox Talbot, we find the writer saying:—"We know that some photographic processes are permanent; for instance, the cyanotype of Sir John Herschel, by which process a lady some years ago photographed an entire series of British seaweeds, and most kindly and liberally distributed the copies to persons interested in botany and photography. The whole of these prints remain unaltered after the lapse of several years."

It was these observations of Talbot's which first brought the existence of such a work before my notice, and although it is many years ago since they were written, I had never been able to come across any photographic friend who had either heard of or seen the book. It seems, however, that the late Mr. Robert Hunt had possessed the work (whether he had received it direct from the author or how he had acquired it I have no means of knowing), but be that as it may, it

is sufficient for our purpose to state that the volumes we now possess are from the library of Mr. Hunt, and were bought last spring by a London dealer, from whom I acquired them. The fact that they have been at one time in the possession of Mr. Hunt adds a further element of interest. Whether we regard the work from a photographic or from a natural history point of view, the volumes are certainly unique in character. Our interest in these "Cyanotype impressions" is, as can be readily understood, mainly photographic. The two volumes may be described as large quarto, are neatly bound in half calf, and bear on the outside the title, *British Algae*.

Opening the first volume we find the initial page has the title, *British Algae*, Vol. I., printed in white on a blue ground, obviously the lettering had in the first instance been printed on a white sheet of paper with ordinary ink and then used as the negative. The following page has the inscription, "Photographs of British Algae—cyanotype impressions." The third page explains the purport of the work, and is evidently in the handwriting of the producer. We give it *in extenso*.

"The difficulty of making accurate drawings of objects so minute as many of the *Algae* and *Conferve*, has induced me to avail myself of Sir John Herschel's beautiful process of cyanotype to obtain impressions of the plants themselves, which I have much pleasure in offering to my botanical friends.

"I hope that, in general, the impressions will be found sharp and well-defined, but in some instances (such as the *Fuci*) the thickness of the specimens renders it impossible to press the glass used in taking photographs sufficiently close to them to ensure a perfect representation of every part; being, however, unwilling to omit any species to which I had access, I have preferred giving such impressions as I could obtain of these thick objects to their entire omission. I take this opportunity of returning my thanks to the friends who have allowed me to use their collections of *Algae* on this occasion.

"The names refer to Hervey's *Manual of British Algae*. I have taken the tribes and species in their proper order when I was able to do so, but in many cases I have been compelled to make long gaps from the want of the plants that should have been next inserted, and in this first number I have intentionally departed from the systematic arrangement, that I might give specimens of very various characters as a sample. A. A."

The fourth page takes the form of a dedication:—"To my dearest father this attempt is affectionately inscribed."

Then follow 190 plates of the various specimens reproduced, each one having its botanical name affixed.

The second volume contains 107 plates, to which there falls to be added 80, which have apparently been put in as an appendix, making in all 187. The number of plates in the two volumes is therefore 377. In a note at the end of Vol. II. are the following remarks:—

"Should any of the plants which are omitted, or of which the impressions are from poor specimens, be obtained, a supplementary part may at some future time be added to this work.

"II. P., September, 1859.

A. A."

The foregoing fixes the date when the last of the impressions were secured, and this shows us that they have so far had a thirty years' existence. Whether Talbot had an actual copy of the work before him when he wrote the article we have quoted from we know not; but the freshness and brightness—nay, in some cases, the vividness of the prints would make one almost believe that they had been but recently reproduced. This will serve to convey to the reader how far the permanency of the cyanotype process may be relied on; but before passing on to consider it in detail, it will not be without interest to refer to the paper on which the prints have been produced. In this matter we have only the original water marks to guide us, and although many of the sheets do not show any mark, still we find a very large number bearing the impress of I. Whatman, Turkey Mill, and the years of manufacture are the following:—1843, '45, '46, '48, '49, and '51. There are one or two sheets which have as their water mark, C. Wilmot, 1840.

In the editorial article of *THE BRITISH JOURNAL OF PHOTOGRAPHY* ALMANAC for the current year a very exhaustive account of iron printing will be found, and by referring to what is there said regarding ferro-prussiate and blue prints, the *modus operandi* to be followed in producing cyanotype impressions is made sufficiently clear. The process is one which dates back pretty considerably in the annals of photography. In 1840, or thereabouts, Sir John Herschel demonstrated that light acted on the more highly oxidised iron salts known as ferric, reducing them to a lower state of oxidation (ferrous), and as these reduced products manifest with certain reagents a different series of reactions from what the original substance gives, the action of light is rendered evident in the most pronounced manner. The production of these cyanotype impressions is due to the fact that

while the highly oxidised salt of iron gives no reaction with red prussiate of potash (potassium ferricyanide), the reduced or ferrous salt gives the formation of a blue product, a substance similar in character to ordinary Prussian blue. As is generally well known, paper serving to give blue impressions is to be had commercially, and is largely employed in engineering and other establishments for the purpose of reproducing line drawings. There are two modifications of such paper, the one similar in character to the impressions in *British Alga*, giving a white line on a blue ground; while in the other the lines are reproduced in blue, and the ground remains clear.

The remaining point to be considered in connexion with our volumes of cyanotypes is, Who has been the author of them? I regret that so far I have not been able to find any one who could afford me the necessary information, or could suggest a clue where it might be possible to learn something regarding the authoress. That it was a lady amateur we have the evidence of the paternal dedication. The only thing relating to an address are the initials, "H. P.," at the end of Vol. II. It would be very satisfactory if more details were forthcoming. It is quite clear that only a very few copies could have been prepared in the first instance; in fact, the labour entailed in producing only one copy must have been enormous. We leave it to the readers of the JOURNAL to see if further information be not obtainable. In the meantime, we can only interpret the somewhat mysterious initials "A. A." as Anonymous Amateur. Wm. LANG, JUN., F.C.S.

LENSES.

[A Communication to the Birmingham Photographic Society.]

We propose having a little talk this evening about photographic lenses. It is comparatively easy to talk without saying anything that is to be profitable, and my difficulty is to tell you something you do not know. But I do hope the discussion I shall endeavour to start will bring out some practical knowledge for diffusion among us. That is my object in accepting my present position. I propose to leave out, as far as circumstances will permit, the theoretical and scientific aspect of the subject, which only interests its few, and treat as well as I am able of the practical side of it, that is, the knowledge and use of lenses, in which we must all be interested. At the same time, I strongly recommend all photographers to learn what they can of the theory and principles of photographic optics, as they will the reader grasp the intentions, capabilities, and use of their lenses. I am not going to attempt much history of lenses either, but will speak of them as I find them.

To commence with, I may perhaps point out where a photographic lens differs from any other. If I take a simple spherical lens, such as a magnifying glass, and attach it to a camera, then turn it to some brilliant object, I see fringes of colour around the lights, prismatic colours of course. If I take a picture with it I obviously fail to get sharp outlines, besides finding numerous other ills from spherical aberration, &c. Most of these faults were studied and corrected when telescopes came to be made, long before photography was known. The colour, or chromatic aberration as it is termed, was got rid of by making each lens of two kinds of glass cemented together, one counter-balancing the opposite errors of the other, and so telescopes became greatly improved. I have felt obliged to mention the telescope lens, because the photographic lens is in a sense the outcome of it. The lens I have now described may show a very satisfactory image upon our ground glass, but attempt to take a picture with it and you will find it all out of focus. Strange to say, it is found there may be a chemical and a visual focus, and that the two quite differ. I have no doubt Daguerre found this difficulty, and had to ascertain how far to move his focussing screen to get at the chemical focus. A photographic lens has to be corrected to make the two foci coincide, and I mention this chiefly because plenty of lenses are knocking about to-day where this has been very imperfectly performed, much to the detriment of the lens and the mystification of the tyro. We have got as far now as what is called a single lens (the compound of two pieces of glass). It is now so well understood and simplified that I now can pick up a very decent half-plate photographic lens, an unmounted meniscus, that can be bought in quantities at eightpence each, quarter-plate a shilling. It is such as you find in cheap cameras, and in skilful hands will produce pictures difficult to distinguish from those produced with expensive lenses. It was observed that these lenses, while giving most excellent results in landscape pictures, when applied to straight lines, such as architecture or machine drawings, gave very decided distortion at the margins. When the stop was at the front of the lens the distortion was barrel-shaped, that is, coming in at the corners, while when the stop was at the back of the lens the distortion was pincushion shape, that is, extended at the corners. These faults were got rid of by employing two lenses at varying distances apart, with a stop between them. This form is called rectilinear, and other names with a similar meaning. You will here observe that the stop is in front of one lens and behind the other; this may be why one corrects the other, though I have never observed it in print.

The two lenses forming the combination are often exactly alike, hence the term symmetrical. This form of lens gives us straight lines, hence the term rectilinear. But it has another advantage also, it admits of a

larger stop than a single one does to attain the same depth of focus; though for all its advantages it is frequently inferior to the simple single lens in producing pictorial effect. A portrait lens is one of this combination form, working with extra large aperture, often $f/4$, but it is not a symmetrical, the two lenses are quite different. A wide-angle lens is also a similar form, but to make it cover a plate large in proportion to its focus the lenses are placed closer together, and a smaller stop becomes necessary to give depth of focus, so that wide-angle lenses are not so quick as the ordinary rectilinear, seldom working above $f/11$. However, they are often indispensable for working at short distances, which they do by virtue of their short focus; but as they give an exaggerated appearance to perspective, should never be used when a long-focus lens would do the work. To those who have never done so it is worth while to note what angle means in respect to lenses. I will attempt an illustration on a half-plate. From corner to corner a half-plate measures about eight inches. Many of you possess half-plate lenses of eight inches focus; now we will see what angle they include. If I draw a line from two extremities of our plate to the lens, so, and now note how many degrees of the circle that includes, we have the answer. There are 360 degrees in the circle, and as our diagram shows us a segment exactly one-eighth of a circle, the angle of lens is forty-five, which is practically an admirable one. The widest angle lens I have yet met with is four inches focus to the half-plate; we shall find its diagram shows just a quarter of a circle, which is of course 90° . Wide-angle lenses are usually about 70° to 80° , which would be about five to six inches focus for the half-plate. The angle of a lens has a very direct bearing upon the artistic side of the question, the nearer it assimilates to our own eyes, the truer the effect. I hope we shall hear something about this in the discussion.

And now a few words about stops or diaphragms. Lenses without stops are like heads without brains—you can do very little with them. A stop has various effects upon a lens, mostly beneficial, though I don't wish to convey the impression that the more stop the better, else the cap would be the millenium; on the contrary, I would rather say the larger or the less stopping the better. The margin of a lens is of necessity more inclined to faults than the centre, and a stop acts beneficially in interfering with those faulty rays. It does not effect this by cutting them off, else the same thing might be done by reducing the diameter of the lens itself; but a stop properly placed "turns the rays in the way they should go," and that is sufficient for us to-night. True, stopping down diminishes the light, which is generally the reason for using the largest stop you can. Undue stopping down also makes detail too sharp for most artistic senses. The position of the stop should invariably be determined by the lens maker, and if found to be at fault—such as giving flare spot—should be returned to that individual for correction. Stops are, or should be, marked f so-and-so. For the benefit of those who may not understand the exact significance of those marks I will explain it.

The figure on the stop refers to the diameter of the aperture in relation to the focus of the lens; thus, if we take our half-plate eight inches focus rectilinear and look at the largest stop, we find it marked $f/8$, and on applying a foot rule find that the aperture measures one inch, so that $f/8$ means an aperture one-eighth of the focus of the lens. If you look at the $f/16$ stop, you will find it measures half an inch, or one-sixteenth of the focus length. The great value of this notation is that, practically speaking, $f/16$, or any figure on one lens, requires the same exposure as the same figure on any other lens, thus giving us a ready means of comparing and adjusting over-exposures. Theory also steps in and says that as you increase or diminish the stop the amount of light admitted amounts to the square of the difference, or, in plain language, $f/8$ being twice the diameter of $f/16$, only requires one-fourth of the exposure, or $f/32$, being only half the diameter, requires four times the exposure. In practice I have found that $f/32$ would be over-exposed with four times the exposure of $f/16$, but we must not rush off to blame theory for that—no doubt the philosophers are right in the main, but there are often disturbing influences. I want to know whether any one else has observed the same thing.

Before concluding, I would say that there are several modifications of the foregoing lenses being made now, such as a single lens, with a comparatively wide angle, and a symmetrical doublet working with as large an apparatus as $f/6$, the Euryscope. These lenses are invaluable for special purposes, but are not so universal as the others. I have a triplet lens here; this lens is an arrangement of three achromatics, all of different size and focus; it is perfectly rectilinear, and a splendid lens for most purposes, copying in particular, but it has one great drawback to modern ideas—it is very slow. It dates much earlier than the rectilinear you are so familiar with, and in its day was the best lens to be had.

During the last year or so quite a flutter has been caused among us by the discovery of an entirely new glass, known as "Jena." It places quite a new power in the hands of the optician, and great things have been prophesied. Whatever it may be destined to become, we have not heard quite so much of it lately, and I have not yet seen a specimen myself. I think we are now ready to look for the "moral," and seek an answer to the question, "What lens shall I buy?" That is a very awkward question to be asked. If we are asked "What lenses shall I buy?" the answer is comparatively easy. We have got into the subject sufficiently to-night to see that to satisfactorily accomplish all round work several lenses are wanted, and, as a matter of fact, professionals and all amateurs who can command them employ several lenses to their cameras.

The usual, and I've no doubt the best advice to the one lens man is to buy a rapid rectilinear, or one of the same class, for I should like it to be understood that there are at least half a dozen first-class makers turning out a similar lens, and the qualities of all are so much alike that it takes a much cleverer man than I am to detect the difference. The young beginner with a cheap set invariably has only the single lens to work with, but while he sticks to ordinary landscape or groups, his disadvantage is far more imaginary than real. In fact, as already shown, he may often have an actual advantage. I have necessarily only been able to give a rough outline of my subject, but if its scantiness enables you to commit it the more surely to memory, my efforts will not have been in vain. It is the desire now that you should ask and raise questions, and what I cannot answer others amongst us may. I look forward to the discussion so raised being of far more value than my little paper.

WALTER GRIFFITHS.

LEWES AND SUSSEX PHOTOGRAPHIC EXHIBITION.

LIST OF AWARDS.

Division A.—Class 1. A. H. Webling, silver medal; P. Morris, bronze medal.—Class 2. E. I. Baker, silver medal; W. P. Marsh, bronze medal.—Class 3. Mayall & Co., silver medal; no award of bronze medal.—Class 4. W. & H. A. Fry, silver medal; E. I. Baker, bronze medal.—Class 5. W. P. Marsh, silver medal; no award of bronze medal.—Class 6. A. E. Slater, silver medal; no award of bronze medal.—Class 7. No entries.—Class 8. A. H. C. Corder, silver medal; A. H. Webling, bronze medal.—Class 9. W. & A. H. Fry, silver medal; no award of bronze medal.—Class 10. W. & A. H. Fry, silver medal; E. I. Baker, bronze medal.

Division B.—Class 11. S. Norman, silver medal; A. H. C. Corder, bronze medal.—Class 12. No awards.—Class 13. E. J. Bedford, silver medal; S. Norman, bronze medal.—Class 14. S. Norman, silver medal; D. Blagrove, jun., bronze medal.—Class 15. E. J. Bedford, silver medal; no award of bronze medal.—Class 16. P. Morris, silver medal; J. J. Holloway, bronze medal.—Class 17. P. Morris, silver medal; A. H. C. Corder, bronze medal.—Class 18. J. G. Braden, silver medal; no award of bronze medal.—Class 19. E. I. Baker, silver medal; Mrs. T. H. Cole, bronze medal.

Division C.—Class 20. E. Hammond, silver medal.—Class 21. S. Norman, a bromide enlargement, value 2l. 2s.—Class 22. S. Norman, silver medal; E. J. Bedford, bronze medal.

Foreign Notes and News.

THE difficulties by which the application of photography to the heavenly bodies is surrounded—a subject which gave rise to some interesting discussion in the pages of this JOURNAL a few weeks ago—have received fresh illustration from the unsatisfactory result of the most recent attempts to improve on the previously existing photographs of the moon. The photographs in question were taken at the Lick Observatory, California, where the perfection of the apparatus and the skill of the operators naturally gave rise to the expectation that the results would greatly surpass anything hitherto obtained. Dr. Meydenbauer, of Berlin, however, to whom they were submitted for examination, maintains that no improvement on the smaller photographs of 1865 is apparent. A German contemporary gives the following explanation of this extremely disheartening result:—"Every telescope," it states, "when in position, is subjected unavoidably to small vibrations about its point of suspension, and the larger the instrument the more this is the case. The great lenses of a large telescope do not perfectly preserve their form in all positions; the glass, in spite of its comparative rigidity, being subjected to flexions which spoil the sharpness of definition of the image for photographic purposes. These evils do not make themselves so strongly felt with smaller instruments; hence the comparative excellence of the earlier photographs."

THE publication is announced of a new work by Drs. Franckel and Pfeiffer, on the photo-micrography of bacteria. The treatise in question has been composed under the direction of Dr. Koch, the celebrated authority on bacteria, and will probably become a standard work on the subject.

DR. VOGEL devotes an article in the *Photographische Notizen* to the rivalry subsisting between professionals and amateurs; the jealousy frequently felt for the former by the latter he regards as ungrounded, since professional interests are by no means interfered with by amateurs. He points out that nowhere are there a greater number of musical amateurs than in Germany and Austria, and that, nevertheless, professional musicians earn more in those countries than anywhere else. The large number of amateurs causes music to be more widely appreciated among the public, since to be oneself a performer enables a person the better to estimate the value of any music he may hear.

THE *Photographisches Wochenblatt* will in future be edited by Dr. Meethe, of Potsdam, well known for his researches in philographic optics. He has for years been an energetic member of the Society of Friends of Photography, and of the Union for the Promotion of Photography.

DR. J. SCHNAUSE recommends making trial of anthrarobin as a developer. This body, which was obtained by C. Siebermann through reducing alizarine by means of ammonia, is a yellow-brown body which has a strong absorbing power for oxygen when in alkaline solution. It is not soluble in water, but dissolves readily in alcohol, alkalies, and glacial acetic acid. One would, of course, select the alkaline solutions for experiment.

HERR E. KIEWNING recommends the following method of forcing when employing iron oxalate as a developer, among its advantages being that one thereby avoids the necessity of counting drops inside the dark chamber:—Pour one to two drops of fixing soda solution on to a plate, and immerse this plate in about sixty cubic centimetres of the oxalate solution for one to three minutes; then add twenty cubic centimetres of iron solution thereto. The result is surprising! Under-exposed plates come out quite free from cloud.

HERR LIESEGANG, in a recent number of the *Photographisches Archiv*, gives an interesting account of some experiments which he recently undertook with a view towards rendering images visible at a distance by means of the electric current. The principle of the apparatus with which he experimented is as follows:—The reduction of various salts of silver, and also copper, give rise to electrical currents, and conversely electrical currents under certain conditions can bring about the reduction of these salts. Professor Liesegang arranged a copper plate provided with a coating of copper salts in such a way that an image focussed on it by means of a lens gave rise to currents at different points, varying in intensity with the degree of illumination of that part of the image. These currents being conducted to a second plate, and there similarly distributed, cause reductions of the salt, coating the plate corresponding exactly to the reductions which originated the various currents; that is to say, an image the exact analogue of a photographic image is produced at an indefinite distance from the original object, and this image illuminated and projected on a screen permitted the success of the experiment to be exhibited to an audience.

THE difficulties which have hitherto largely impeded the accurate measurement of the co-efficient of expansion of bodies at high temperatures, the accurate knowledge of which is frequently of considerable importance in the arts, have, according to *La Nature*, been practically solved by the assistance of photography. The principle involved is, of course, the comparison of the photographic images of the body at two or more different temperatures. M. Le Châtelier, who was the first to employ this method, states that by its means accurate measurements down to 0.01 millimetre can be obtained.

AN application of photography, from which the study of clinic medicine is likely to derive considerable advancement, has recently been pointed out by Dr. Eder's organ, the *Photographische Correspondenz* of Vienna. This journal remarks that instantaneous photography has been employed for some time to illustrate works in psychosis and neurosis, and suggests that its employment in hospitals in all phases of illness would enable the exact appearance and peculiarity of the various classes of symptoms to be as it were stereotyped, in a manner which would not fail to be of the highest value as an assistance in diagnosis.

THE Russian photographers are likely to have a brilliant time of it if the accounts recently published of the experiments in gas making from the Caspian petroleum prove correct. For, according to reports, this petroleum gas possesses five times the illuminating power of ordinary gas, is perfectly smokeless, and so white and pure that it may be employed in photography. Surely here is happiness at last to be able to take portraits all night without fear of being blown to pieces by dangerous flash-light powders.

A NEW use for, or rather application of, photography to controlling, namely, the fidelity with which a General's orders are executed in the field, is reported from Belgium. As the occurrence throws an amusingly naive side light in the army discipline of that pugnacious little kingdom, it may be interesting to English readers. A number of photographers followed the movements of the troops, awaiting, with their usual praiseworthy perseverance, favourable opportunities for obtaining instantaneous views. The General in command, observing the labours of the photographers, requested to be permitted to inspect the result, when, to his astonishment, he discovered that the positions taken up were anything but those which he had ordered. That the efficiency of the manoeuvres

was not thereby impaired, and that the General would, but for the aid of photography, have failed to make the discovery in question, are facts which the Belgian papers permit us to divine, though they discreetly refrain from making such a distinct avowal.

Our Editorial Table.

ILFORD "ALPHA" LANTERN PLATES.

SAMPLES of this new plate reached us just when preparing to make some lantern transparencies, and we have had every opportunity of giving them a thorough trial. They possess this advantage, that not being of an exalted degree of sensitiveness the room does not require to be rendered so dark as with others, hence one can see the more readily what he is about. We imagine that they are branded by the makers rather slower than they deserve. For example, they say "the exposure required for a negative of ordinary density will be about three minutes at a distance of six inches from a fish-tail gas burner." We found that an exposure of two minutes proved ample. Possibly our gas is better, or the burner is larger. The development recommended is as follows:—

No. 1.

Hydroquinone	80 grains.
Bromide potassium	15 "
Sulphite soda	1 ounce.
Water	to 20 ounces.

No. 2.

Soda hydrate	30 grains.
Water	20 ounces.

For use take equal quantities of each. After development the manipulations will be the same as for negatives. The longer the exposure, the warmer the tone. A properly exposed plate requires about the same time in the developing solution as an ordinary Ilford plate.

Adhering to these directions we obtained in every instance fine warm tones, with great purity in the lights and depth, without opacity in the shadows.

THE CONVENTION GROUP.

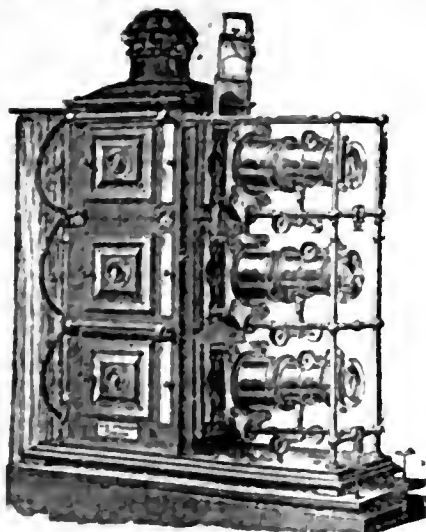
By FRISER GREENE.

To produce a group comprising eighty-three figures on a plate of very large dimensions, each figure perfect and a capital likeness, is no easy task, more especially when it is considered that the subjects are photographers, whose reputation as either sitters or standers by no means equal the average mass of subjects by which they make their own reputations as artists. Mr. Greene has done his work cleverly and well, and we much prize the goodly result of his efforts. He prints them in both platinum and silver.

THE "PREMIER" TRIPLE LANTERN.

By J. H. STEWARD.

This apparatus has been designed and constructed to give the greatest possible rigidity to the fronts, with facilities for all necessary adjust-



ments and centring of lenses of various foci; also for extra convenience in using the same. It is a departure from the plan in

general use for some years past of supporting the front from the stage only. It will be seen from the accompanying illustration that there is a supporting frame in front which permits of connecting the rack bars with it, and the rising screws and clamps in the attachment make an absolute certainty of the adjustment for true inclination to get coincidence of discs, there being a lateral as well as vertical movement. It, therefore, can be thoroughly relied on to retain its truth.

The "Premier" system is also applied to the Biunial. Mr. J. H. Steward, 406, Strand, is the patentee and maker of this admirable instrument.

INTRODUCTORY LESSONS IN QUANTITATIVE ANALYSIS.

By JOHN MILLS and BARKER NORTH.—London: Chapman & Hall, Limited.

This manual presupposes a knowledge of qualitative analysis, or that branch of chemistry by which we ascertain the constituents of which a body is composed. The whole principles are entered upon, and numerous examples given. The manual will be invaluable to the young chemist.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,492.—"An Improved Trough for Use in Washing Photographic Prints, Photographic Negatives, and the like." P. ELLIS.—Dated October 18, 1889.

SPECIFICATIONS PUBLISHED.

No. 16,755.—"Magic Lantern Slides, &c." ADAMS.—Dated October 19, 1888. Price 6d.

No. 17,298.—"Photographic Shutters." GRIMSTON.—Dated October 19, 1889. Price 8d.

IMPROVEMENTS IN PHOTOGRAPHIC SHUTTERS.

No. 17,298. GEORGE SYLVESTER GRIMSTON, Claremont, Glenluce-road, Westcombe Park, Greenwich, S.E., Kent.—September 28, 1889.

THIS invention has for its object the improvement of instantaneous or time shutters for photographic purposes, and consists mainly in the construction and arrangement of the releasing and detaining mechanism; and is applicable to those shutters which have a reciprocating action of the sliding shutter, and also to those which have a revolving action of the shutter, and can be applied to those shutters which are situated outside the lens combination as well as to those which are used within the lens combination.

In applying this invention to a reciprocating shutter, in which the reciprocating action of the sliding shutter is caused by the revolution of a crank or similar device actuated by a spring, I use a crank plate or disc, to which the sliding shutter is attached in the usual way by means of a crank pin. On the edge of this crank plate are placed notches or detents for holding or detaining the sliding shutter, two notches for holding it when set ready for action and one for detaining it when fully open. This latter notch can be used for holding the sliding shutter when fully open for focussing. These notches will be hereinafter called Nos. 1, 2, and 3, according to the order in which they come when setting the shutter ready for use. These notches engage with a pin on a lever connected with a pneumatic pump or other device for actuating the lever the pin on the lever being kept up against the disc when the lever is in its normal condition by means of a spring. From notch No. 1 to notch No. 2 a thin strip of metal, forming a guide, extends round the outside edge of the aforesaid crank disc, and at such a distance from it as to allow of the said pin passing freely between it and the disc. This strip leaves off just short of notch No. 1, and has its end there slightly turned up towards the disc. Notch No. 3 is just beyond notch No. 2 (these two being diametrically opposite on the crank disc to notch No. 1), and has its edge at the same distance from the centre of the crank disc as the outside of the aforesaid metal strip.

The action is as follows:—If it is desired to give an instantaneous exposure the crank disc is turned round until the pin on the said lever engages into notch No. 3; on disengaging the pin from this notch the disc begins to revolve, and the said metal strip comes between the pin and the disc, thus preventing the pin from engaging into notches Nos. 1 and 2. Consequently the disc performs a complete revolution, opening and closing the sliding shutter. If now it is desired to give a lengthened exposure the crank disc is turned round until the pin on the said lever engages into notch No. 2. On disengaging the pin from this notch, the pin pressed by the said lever endeavours to force itself farther away from the disc, but is detained by the said metal strip, which, as the disc revolves, delivers the pin into notch No. 1, which thus holds the sliding shutter open until a second pressure on the lever releases the pin, when the disc completes its revolution and closes the shutter. If before the pin is delivered into notch No. 1 by the said strip there should be any pressure on the said lever, the end of the strip being turned up as aforesaid prevents the disc from revolving when the pin reaches this turned-up end until such pressure is relieved, when the pin is delivered into notch No. 1 as aforesaid. In order to diminish the shock or jar when the said notch No. 1 hits against the said pin the lever is mounted on a spring, thereby acting as a buffer.

In applying this invention to a revolving shutter the said disc forms the shutter, having an opening in it for giving the exposure, the notches and strip being arranged in the same manner as for the reciprocating shutter hereinbefore described.

It will thus be seen that when the apparatus is set for an instantaneous exposure one pressure on the lever causes the shutter to open and close rapidly, and if set for a lengthened exposure one pressure opens it, and it remains open until the second pressure releases it and the shutter closes.

Claims:—1. In photographic shutters the arrangement and combination of

the notches 1, 2, 3, and the guide 1, for giving an instantaneous or prolonged exposure, substantially as hereinbefore described and illustrated by my drawings. 2. In photographic shutters the general combination and arrangement of parts, substantially as hereinbefore described and illustrated.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 28.....	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 29.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 30.....	Photographic Club	Anderton's Hotel, Fleet-street, E.O.
" 31.....	Burnley	Bank Chambers, Hargreaves-street.
" 31.....	Halifax Photographic Club.....	Mechanics' Hall.
" 31.....	Liverpool Amateur	St. George's-crescent North.
" 31.....	Oldham	The Lyceum, Union-st., Oldham.
" 31.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

OCTOBER 22,—Technical Meeting—Mr. John Spiller (Vice-President) in the chair.

The display and explanation of the apparatus included in the Society's exhibition formed, as in former years, the subject for the attention of the members at this meeting.

Mr. WINTER, representing the firm of Mawson & Swan, showed the detective camera which was described in THE BRITISH JOURNAL OF PHOTOGRAPHY last week. The method of stowing the exposed and unexposed plates, and of bringing the latter into position for use, was duly appreciated, and the arrangement for keeping the lens closed and invisible, except during the moment of exposure, elicited much approval.

A camera by Messrs. Sands & Hunter, which, although of whole-plate size, closed to two inches when packed, and another by the same makers which was slightly thicker, but in which the baseboard protected the focussing screen when not in use, were next shown.

Mr. S. SAMUELS next explained the use of his detective camera, which was for a dozen 5×4 plates, and which he stated contained nothing of an automatic kind. Everything was done by hand, the plates being kept in a reserve box at the back and lifted into place by the fingers acting through a bag of black material. He considered it a point to be able to use lenses of various lengths of focus with the one camera, and had arranged this apparatus accordingly. Another camera shown by Mr. Samuels was intended for use in the studio, and was furnished with a holder for eight plates.

Mr. W. E. DEBENHAM inquired whether there was not a likelihood of dust spots showing themselves upon plates manipulated through a bag.

Mr. SAMUELS had not found it so.

Mr. Wormald's copying camera for enlarging, in which a printing frame is substituted for the dark slide, was then exhibited and described, and was followed by Messrs. Swinden & Earps' detective camera, which has been awarded a medal, and which has been described on page 666.

Mr. Shew next showed a detective camera, one of the points of which was that there was a "pusher," by means of which it could be felt whether or not the plate was in its proper position. Another point was that if a plate was broken, stuck fast, or suspected to be damaged, the changing back (containing a dozen plates) could be removed, and the one spoil plate taken out without stopping the working of the remainder.

The Ferrero film carrier was then shown, and was followed by Marion's exhibits, including Greuley's shutter, which opens and closes from the centre and is very light; and an arrangement for printing lantern slides from half-plate negatives by means of a lens set at the fixed focal distance in a square tube or box of millboard, one end of which was furnished with a holder for lantern-size plates, and the other end with a carrier for the negative.

At the conclusion of the meeting Mr. W. England exposed plates directed at the medallers, who were illuminated by flashes from two of Schirm's magnesium lamps.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 17,—Mr. W. E. Debenham in the chair.

Mr. F. A. Bridge showed an instantaneous shutter of French manufacture, called *L'Automatique*. The opening was from the centre, what is known as of the diaphragmatic kind, and the apparatus was very light. The most striking thing in connexion with the shutter was that it was always ready for use without resetting; the pressure of the pneumatic ball actuated the movement, and after closing left it ready for another exposure.

A question being asked as to the best position in which to use such a shutter, the CHAIRMAN replied, either between the lenses or as close to one of the components as possible.

Mr. F. P. CEMBRANO showed a detective camera of exceedingly light construction, weighing, with six double plate holders for quarter-plates, only about three pounds. The sheaths or plate holders were of a peculiar construction, ingeniously contrived to be but little thicker than the plates contained in them, and the cut-off of light appeared to be very complete; but Mr. Cembrano noted what he considered a weak point in the durability of the sheaths, in that the line of union of the sheet-metal sides with the tubular top was too fine for strength. He had worked very satisfactorily with the camera, but had found that the only position in which he could secure steadiness was that of being held under the arm, pressed against the side of the body. There was no finder to the camera.

Mr. A. HADDON thought that the camera should have a finder. A camera held in the position indicated by Mr. Cembrano was most unfavourably placed

for dispensing with a finder. He also considered that a button was better for releasing the shutter than a lever such as this camera possessed.

Mr. CEMBRANO agreed that a finder was desirable; he could not compose the picture so well without it.

Mr. T. E. FRESHWATER had some eikonogen that had been kept open for some time before being used. It had consequently changed to a light chocolate colour, and he had not been very successful with it in developing negatives. For bromide paper, however, it worked very well, and the prints did not require clearing with acetic acid as when developed with ferrous oxalate.

Mr. A. COWAN said that for bromide prints and for lantern slides, especially the latter, there should be a little bromide used with eikonogen developer; a very small quantity sufficed—one or two drops of a ten per cent. solution of bromide of potassium to the ounce of developer. Mr. Cowan then inquired whether it had been noticed that if a plate was being developed with pyro, bromide, and ammonia, and carbonate of ammonia was added, the development, instead of being accelerated, as might have been expected, was retarded. He had found about double the time of development to be then required.

Mr. H. H. SUMMERS mentioned a recent experience of his. He had a parcel of extra rapid plates upon which he could get nothing but fog when using sulphite in the developer; the same plates worked well with a developer containing no sulphite.

It being remarked that crystals of sulphite of soda were very apt to become decomposed in the presence of air, Mr. ATKINS said that he filled his bottle of dry sulphite with common coal gas, and used a smear of vaseline round the stopper to prevent access of air.

Mr. HADDON inquired whether it was possible to develop several papers in succession with hydroquinone without stains, and whether on such stains occurring there was any means of removing them.

Mr. SUMMERS always found after developing several prints that the later ones became stained. He had tried acid baths to remove them, but without effect. He also inquired whether there was any radical difference in the Aristotype or gelatino-chloride papers in the market. With one make he found that a mere trace of hyposulphite of soda—half a grain to ten ounces—added to the sulphocyanide bath entirely stopped toning action, whilst with the other paper the addition of hypo was recommended and worked well.

Mr. J. S. Teape was elected a member.

CAMERA CLUB.

OCTOBER 17,—Mr. J. Traill Taylor in the chair.

A paper was read by Mr. LYONEL CLARK on his platinum toning process, a demonstration being also given.

Previous to the lecture some very fine platinotype pictures (copies and original work) by Mr. Burchett were shown, and the HON. SECRETARY drew attention to the special evening at the Pall Mall Exhibition in aid of the Photographers' Benevolent Association.

Mr. CLARK, in his paper, traced the history of platinum processes, and proceeded to describe in detail his treatment of various papers and textile fabrics—salting, sensitising, printing, and toning, &c. A large number of exposed prints on Whatman papers, silk, and on satin jean were toned and fixed before the meeting. Others brought by the lecturer were passed round to show what was possible to the process.

Messrs. F. W. Edwards, Davison, Humphery, Gifford, Friese Greene, Braham, J. King, E. P. Robertson, Major F. Nott, and the Chairman made remarks upon the subject. The chief discussion turned upon permanency, and upon the advantage of having power to obtain different colours in printing deposits, also the effect of using rough paper for certain subjects.

On Thursday, October 31, a discussion upon *Eikonogen* will be opened by Messrs. H. M. Elder, M.A., and Lionel Clark. Meeting at eight p.m.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 15,—Mr. W. T. Coventon in the chair.

An interesting series of views in India, taken and presented to the Society by Mr. F. Duusterville, of Madras, was handed round and much admired.

A letter was also read from Mr. W. P. Dando, in which he offered the use of a dark room to any members visiting Paris.

The officers for the ensuing year were then nominated, and some alterations in the rules proposed.

Mr. B. B. FULLER asked the easiest means of removing silver stains from a gelatine negative.

Mr. J. OAKLEY recommended immersing it again in the hypo bath.

Mr. T. LAWDAY recommended rubbing the parts with a tuft of cotton wool saturated with a solution of cyanide of potassium—a piece about the size of a pea being dissolved in half an ounce of water.

Mr. G. J. CLARKE had found a strong solution of cyanide of potassium with a few grains of iodine added very useful for removing stains or bleaching yellowness.

Mr. CLARKE then read his paper on *Enlarging for Amateurs*, and, in introducing his subject, considered it the duty of all amateurs to bring forward their experiences at Societies' meetings and overcome that reticence or modesty which frequently kept them silent. However trifling the experiences might appear, they would probably be of use to some one, and in some cases might even be serviceable to the professional members. He proposed to put the subject as simply as possible before the members, and dealing only with enlargements on bromide paper and describing the apparatus required for daylight and artificial light. Having read of solar cameras and artificial light, he came to the conclusion that a large looking glass and other elaborate arrangements were necessary to the former, and a magic lantern and large condensers for the latter; in addition to this, large trays were necessary for big enlargements, the whole making an expensive outfit. His own enlarging apparatus, which was a home-made one, was shown on the table, and was quite adapted to his requirements; enlargements made by it were also shown. It consisted of a lantern body made of mahogany, with four and a half inch condensers, and to the front two sets of bellows were fitted, the hinder one permitting of the negative being brought nearer to or carried away from the condenser, and the front one allowing

the lens to be placed at its proper distance in front of the negative. The light used in the apparatus was a triplexicon lantern, although any other light could be used with proper arrangements. There was also an arrangement by which the lens and sliding front of an ordinary camera could be readily placed in position. For economy's sake, the cheap Japanese trays one sees in shop windows were used for developing, and when they became a little worn a coat of Aspinall's white enamel was given. He had heard it suggested to make a tray of a large sheet of millboard supported on a wooden bottom, turned up all round the corners, which should overlap, and fastened with paper clips; the dish is then covered all over inside with melted wax candles. Some of his earlier trays were made of wood, the sides and bottom nailed together, but before fastening, brown paper soaked in paste was placed between the joints, and when nailed together all the crevices were filled in with putty and the inside and outside enamelled; these were also used for washing prints. For daylight enlarging, a shutter was made of match boards to fit the window, and a hole twelve by ten inches cut in the centre, which was then surrounded with a frame a few inches deep placed near the edge. Having the framework of an old 12x10 camera, it was fitted with bellows made of card-board and covered with American cloth, the negative being placed where the dark slide should be, and the back portion with the negative brought close up to the aperture in the shutter, stray light being cut off by the frame fastened round it. To support the camera, a shelf was fixed to the bottom side of this frame by means of a thumbscrew, and supported in front by a moveable strut. For a reflector, a small shutter the size of the twelve by ten-inch opening was hinged at the bottom to the outside of the aperture, and coated with white enamel, and in cloudy weather this was covered with cartridge paper to avoid uneven reflections. This reflector could be placed at any angle by means of a cord passed over a small Venetian-blind wheel in the right-hand top corner of the shutter to the inside of the room. To use as a dark room, the reflector closed the aperture entirely, and a small red window, which could be covered, admitted light to work by. The screen for the bromide paper consisted of a drawing board mounted on a frame easel with two legs, and pegs allowed the position to be altered. The ferrous oxalate developer was used, and a full exposure and slow development advised, beginning with the full quantity of oxalate and about half the usual quantity of iron. A red glass cap was used to cover the lens, and this allowed the paper to be placed properly in position. For vignetting, a card was recommended with an aperture nearly the shape of the figure and moved to and from the lens. Shading the very deep shadows was also advised for about a third of the time allowed for exposure.

Rev. E. HEALY had used hydroquinone for developing bromide paper—strength, about three or four grains to the ounce.

Mr. OAKLEY advised exposing the paper wet and placed on the front of a piece of glass; focussing could be done on plain paper and the exposed piece put into the developer while wet.

A hearty vote of thanks was proposed to Mr. Clarke for his paper.

Tuesday, November 5, will be the annual general meeting of the Society; November 19, a lantern evening; and on December 3 Mr. W. Bishop will read a paper on *Making Lantern Slides*.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

OCTOBER 14.—Owing to illness, Mr. Fry was unable to give the demonstration of *Enlarging*; the evening, however, was profitably occupied by Mr. E. T. HUSKOCK, who, at extremely short notice illustrated lantern slide making and opal printing, and explained the various operations.

Mr. Fry has expressed his willingness to give his demonstration on Monday next, October 23. Visitors interested are invited to attend.

DERRY PHOTOGRAPHIC SOCIETY.

OCTOBER 15.—Mr. F. G. PIERPOINT, of the Leicester Photographic Society, gave a most interesting and enjoyable description of the many beautiful places of interest on the Thames from Oxford to London, illustrated with lantern slides made by himself, from negatives taken *en route*. The excellence alike of the lecture and slides was proof of what a great interest Mr. Pierpoint takes in his work.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

OCTOBER 1.—The President (Councillor Firth) in the chair.

The SECRETARY presented the report of the Council for the past year, which showed that excellent work had been done, progress made, and that it was able to hold the position the Society had gained among kindred societies for theoretical as well as practical work. The membership roll had been increased, and the average attendances at the ordinary meetings showed a marked improvement on any previous year. The financial position of the Society was also in an encouraging condition, a good balance remaining in the Treasurer's hands.

The printed Treasurer's account, after further oral confirmation by the Auditors, was taken as read and adopted.

The following gentlemen were elected officers for the ensuing year:—*President*: Mr. R. J. Taylor. *Vice-Presidents*: Messrs. G. Bromley and T. Firth. *Council*: Messrs. J. W. Charlesworth, A. Davy, A. Reynolds, W. T. Furniss, and Jonathan Taylor. *Treasurer*: Mr. Bradley Nowill. *Hon. Secretary*: Mr. E. Beck.

The SECRETARY announced that he had succeeded in obtaining promises of papers or demonstrations from gentlemen for every ordinary meeting during the year, and a printed programme would shortly be issued to each member.

HASTINGS AND ST. LEONARDS PHOTOGRAPHIC SOCIETY.

A MEETING took place at the Brassey Institute at eight p.m. on October 14.

The proceedings were commenced by the chairman (Mr. W. Shuter) receiving the report of the Judges appointed to judge the results of the Society's summer excursions. There being only a few exhibitors, the original idea of making each excursion a competition was given up, and only two awards made, viz., to A. Brooker (Hon. Secretary), for the best photograph sent in, and to J. Downborough, for the best collection of photographs.

Mr. JONES, the demonstrator from the Platinotype Company, was then called upon, and read a paper on *Platinotype Printing*.

Correspondence.

Correspondents should never write on both sides of the paper.

PHOTOGRAPHS IN PRINTING INK.

To the Editor.

SIR,—Your correspondent, Mr. W. H. Davis, in this week's JOURNAL has probed a serious subject, one which will bear considerable balancing of *pros* and *cons* to properly clear the matter up as to where the cause of our backwardness lies in the production of photographs in printing ink.

Having had a lengthened experience, extending over the last forty years, I can endorse every word your correspondent says. There is one vital point, however, which must be considered as the main factor of our backwardness when compared with American or Continental press photography. I refer emphatically to the insatiable thirst for cheapness which develops itself with increased energy as the various processes become more practical. It is quite a common experience to find publishers and managers of extensive printing houses accepting work, not because it is first class and the best of its kind, but because "it is cheap and will do well enough." Take for instance the so-called "ink photographs." No other country in the world would tolerate such work; yet, because it is cheap and displays a ghost of the original photograph it is accepted with thankfulness. But there is a still more potent cause to be looked at closely and to which your correspondent truthfully refers, namely, the niggardly remuneration offered for talented experts. An experience of many years of American usage enables me to contrast the condition of things there and in this country, very much to our discredit. The American employer or publisher is continually on the alert for *excellence*: if the artist, workman, or process be not of the very best and newest thing out, he won't accept him or it; but, alas! with us, if either artist, workman, or process cannot undertake to turn out acres of work, and at a cheap rate, he is ignored, and they fall back upon what the "smart boy" and the "handy man" can give them.

No doubt we have a few rather large establishments in this country engaged turning out collotypes and zinc etched blocks of photographs, and if I were able to name the remuneration which the brains and hands have been paid for setting their works agoing and the carrying of it out, it would give us a solution of the cause at once.

It is a positive fact that parties contemplating starting the business of press photography in this country actually prefer to stumble into the various processes, blindly relying on the help afforded by a hand-book or photographic journal, rather than pay an expert for his services to start them in a profitable and perfect manner, or to share with him a portion of the business profits. The fact reveals itself, the gulf that separates employer and *employé* in this country is much wider than it is found either in America or on the Continent.

JOSEPH LEWIS.

Dublin, October 21, 1889.

AMATEURISM.

To the Editor.

SIR,—I am sure the better middle class of professional photographers are grievously injured by amateurism and by what pretends to be so. I am surprised a smothered feeling of this kind is so long pent up. It would, I think, do good, and clear the air, to have half a dozen good men speak out. Hundreds—ah! thousands—of men there are whose all is invested in their business—its plant, its connexion. They have to pay high rents for situation, they have to keep an effective staff, they are photographers, and, having been so all the best part of life, are that alone. They must stick to the holding; no other phase of commercial life would likely open up, or, if it did, would they be suited for it? A set of men have arisen who call themselves amateurs, and who yet sell their goods and pocket the money. Another set, under the name of charity, think it right to injure their neighbours by doing work the trader depends upon, and giving the proceeds to the various schemes they incline to support. To such an extent are these things done, the trader is being pushed to the wall by both. There is no law against it; men claim a legal and moral right to act thus. They even claim to be charitable by ruining their neighbours.

Sir, if there be no other law to prevent this evil, which is sowing seeds of bad blood between two classes of men, can no law of etiquette be established to abate it? Surely gentlemen will consider the peril and so declare themselves and act as to avert it. You, Sir, know I am what I sign myself,

AN AMATEUR.

COVENTRY AND MIDLAND PHOTOGRAPHIC EXHIBITION.

To the Editor.

SIR,—I should be obliged if you will make it known through the medium of your valuable paper that, in deference to many expressed wishes, and on account of many applications for particulars arriving rather late, the Council have decided to make the last day for receiving entries and exhibits Saturday, October 26.—I am, yours, &c.,

October 21, 1889.

FRED. W. DEW, Hon. Sec.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange ten-inch burnisher in good condition for chair, wall, or background. Difference adjusted.—Address, GERMAN, Tortay Terrace, Paignton.

Wanted, Luxograph or other good lantern for night photography; exchange, tricycle, sewing machine, photographic materials, silver watch, &c.—Address, HOPKINS, Photographer, 9, Market-street, Exeter.

Will exchange James's triple magnesium lamp, one ounce of magnesium powder, Cowan's changing box for 10x12 plates, and large glass dipping bath; wanted, studio table, camera stand, backgrounds, or studio accessories.—Address, A.B., 17, King's-road, Upton-park, E.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

HENRY BRADSHAW.—If you send the lens we shall then see what is wrong.

PYRO (Birmingham).—The specimens enclosed are produced by the ordinary collotype process.

ARCHITECT.—If the photograph can be taken from the highway, no permission is necessary, the local photographer notwithstanding.

A. BONSER.—No doubt the pictures are copyright, and it would be an infringement of it to make lantern slides from them. See reply to "Copy."

A. DEARDEN.—The stains arise from imperfect fixation, and not from the washing. More care in the fixing is all that is necessary to avoid the evil in future.

H. F. W.—The Miesenbach Company or Messrs. Waterlow will supply type blocks from a landscape negative. These blocks may be printed with ordinary letterpress.

EYES.—You appear to be suffering from mild intermittent astigmatism. Rest the eyes as much as possible, and when at work assist the eyes with an ordinary magnifier. If you have a good oculist in your neighbourhood you had better consult him.

PERCIVAL SOAMES.—The bottles may be had from any druggists' sundryman, but how they can be used for enlarging we are unable to say. In what direction do you wish to use them? Unless we have further particulars we cannot say what they should contain.

T. G. S.—I. When next we see Mr. Starnes we shall inquire respecting the first query.—2. The collodion must be very contractile indeed if its tendency to slip off cannot be met by a rather strong substratum of albumen or of alumed gelatine. Try also treatment with powdered French chalk.

SEA GULL.—Edwards's and Cadett's plate-coating machines are those used by the best plate makers who coat by machinery. Those who coat bromide paper generally use apparatus of their own design. So far as drying arrangements are concerned, they must be designed according to the requirements of the building.

E. J. B.—Evidently the shutter is too quick for the plates. All the pictures enclosed are very much under-exposed. Either quicker plates or a more rapid lens must be employed. We do not see that it would do to set the shutter to work slower, as in all the examples sent there is a visible movement of the wheels shown.

A. R. SXELLING.—The page is misquoted; on reference to that which you give we find no such formula. However, we imagine the proportion of water is not of much importance; the stronger the solution is made the quicker it will act, and *vice versa*. We believe the print washer referred to answers well, though we have had no practical experience with it.

PRINCIPAL.—The premium for apprenticeship in the photographic profession is no fixed sum; it depends upon the status of the establishment to a great extent. Of course the highest class houses would require a higher premium than third-rate ones. The salary, again, is a matter of mutual arrangement, and in most cases is dependent upon the premium paid; there is no fixed rate.

B. R.—So far as the photography is concerned, the work is very good, but in nearly every instance the point of sight is badly chosen. In some of the examples the work is completely spoilt through this. To an artistic eye, 3, 4, and 7 are positively painful, notwithstanding the good photography. Study the artistic side of the question, and your work will be exceedingly good.

COLLOTYPE (Cape Town).—1. You had better get a work on the subject, such as Husnik's or Vidal's.—2. So far as we are aware, no firms here supply complete outfits for the different processes you mention. If you obtain the works referred to—which may be had through German and French booksellers—you will see what is required, and can then order.—3. A hot climate increases the difficulties in working very materially; indeed, in some instances to such an extent as to make it impracticable except at night or in the early hours of morning.

W. A. MEIGH writes: "I shall be very much obliged if you will be kind enough to criticise the enclosed prints, both as regards the printing and toning. Do you consider the colour of the tone to be due to under-printing, or does the fault (if there is one) lie in the toner?"—The fault in the prints appears to be due to the negatives. They are both under-exposed and over-developed. Better results from them may, however, be obtained, we imagine, by using a paper which yields softer prints. The prints sent are on a paper which seems to have a tendency to hardness.

A. M.—1. Willesden paper trays will answer very well.—2. You cannot do better than follow the formula supplied with the plates for a normal exposure, and using more bromide or more ammonia, according as the negative has received more or less than the proper exposure. If the developer be made as concentrated as proposed we should imagine there would be some risk of the ammonia bursting the bottle in a hot climate if it were securely stoppered. Ten per cent. solutions are very convenient to use. Bear in mind that a drop is supposed to be equal to a minim, and measured minims are a more reliable quantity than drops.

COPY writes: "Kindly let me know, through the JOURNAL, how the law stands with regard to copying engravings and other pictures, and how I am to know which are copyright and which are not, as I should like to copy some for sale and private use. A man called on me with a fine collection of copies from most of the best and latest engravings, offering them for sale at 3s. 6d. each; they were about 15x12."—The law is simply this:—Any one pirating a copyright work renders himself liable to a penalty of 10*l.* for every copy issued. A register is kept at Stationers' Hall in which all copyrights are entered, and from this it may be ascertained whether any work has been registered. It may be taken for granted that all modern engravings are copyright. There are plenty of piracies now being offered for sale.

✂ The Editor once more reminds his friends that the ALMANAC is now being prepared, and he will esteem it a favour if they will forward their contributions by November 1. He cordially thanks those who have already spontaneously sent articles. Contributors will please write names and addresses distinctly, so as to ensure their early receipt of a special library edition of the work.

PHOTOGRAPHIC CLUB.—The next meeting of this Club, Wednesday, October 30.—First lantern meeting of the season.

INTERNATIONAL CONGRESS ON CELESTIAL PHOTOGRAPHY.—There was a preliminary meeting of this Congress at Meudon on September 20, to consider the programme that had been drawn up by the Provisional Committee. A few slight alterations were made in the original scheme, but the details of the work were not entered into. It was, however, decided that the greatest latitude should be allowed in the choice of instruments, and that each observer should employ that instrument to which he was accustomed, having no regard to uniformity. In order to indicate the spectroscopic work included in the programme, a change in the style of the Congress was agreed to. It is henceforth to be the "International Congress on Celestial Photography and Spectroscopy."—*Nature*.

THE ASTRO-PHOTOGRAPHIC CONFERENCE.—The *comptes rendus*, containing the full proceedings of the above Congress, which met at Paris during the past month, have not yet been received. The following, however, are some of the points decided by the Permanent Committee:—The centre of the plate is to be pointed not more than 5" distant from the selected point in the heavens, the size of the plate to be 160 millimetres square. The size of the field adopted was 2" square, whilst the *réseau* is to be 130 millimetres square, with lines 5 millimetres apart. The amount of overlapping decided upon was 5'. Vogel has undertaken the construction and verification of the *réseau*. The distribution of the work among the co-operating observatories has been completed, and to Greenwich is allotted that from declination +48 to +40. Plate glass only must be used for the plates; the chemical formula, however, is left open. The sensitiveness for the chart and for the catalogue is to be the same. *Réseau* to be used in both series. A series of standard plates will be prepared by the Paris Observatory, and the time of exposure must be adjusted so as to compare properly with these standards. There will be one or more *bureaux* established for such observatories as cannot measure their own plates.—*Nature*.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1539. VOL. XXXVI.—NOVEMBER 1, 1889.

AMATEUR DARK-ROOM APPLIANCES.

No. I.

PHOTOGRAPHY would be a much more pleasurable pursuit, no doubt, to a great many amateurs if it were not for the troubles that attend the provision of a dark room. It is not every amateur who is able to set aside a room specially devoted to photography, for even where perhaps the mere accommodation is available, the household "authorities" have to be reckoned with before so radical an alteration can be permitted in the domestic arrangements. Even those who possess the necessary room or "sanctum" too frequently either attempt to render it available for a great variety of purposes, or, dedicating it to dark-room purposes alone, fail for some reason or other to make the most of it by fitting it up properly. In either case the simplest operations in development, or even changing plates, become a trouble and a bore, and grow to be dreaded rather than looked forward to with pleasure.

But perhaps we are correct in supposing that a very large majority of the amateurs of to-day are not in a position to command a special dark room, for modern town houses are not built upon the same lines of the "Moated Grange" of bygone days, with its mysterious passages and corridors haunted by the family ghost and leading to unused wings containing waste space enough for the working of a considerable business. Ground rents are too high nowadays to permit of the luxury of many useless rooms, and compact "flats" are more in the order of things. Then, again, what proportion of the vast army of amateurs is to be numbered on the bachelor side? Bachelors, too, of the solitary description, with no more space than is necessary for actual living purposes, if, indeed, its extension would not add materially to mere comfort without at all bordering on luxury. Here, again, photographic manipulations must be carried on under the greatest difficulties, and it is no wonder that the establishment of a more or less complete dark room is becoming a feature in connexion with modern clubs and societies.

With a little method, however, and at no great expense, a perfectly comfortable temporary dark room may be provided under the most unfavourable circumstances, even though the accommodation be limited to the "bed sitting room" so frequently advertised in the daily papers, though it is true the arrangements must then be such a combination of simplicity and efficiency as to remind one of the wonderful piece of furniture that formed a bed by night and a chest of drawers by day.

Yet, after all, even the "one-roomed" amateur so fitted up is working at a great advantage as compared with many hundreds in the past, who, whether at home or when travelling,

were compelled to work under makeshift conditions. How much of the best dry-plate landscape work of twenty and more years ago was developed in hotel bedrooms or perhaps less convenient places, we wonder? Some of our leading professional landscapists could perhaps tell stories of their experience that would put to shame some of the luxurious grumblers of to-day; while, at the best, working wet collodion in a tent was an undertaking compared with which the development of gelatine plates at home, under *any* circumstances, must be child's play indeed. We have seen many an amateur of the olden time, after a day's outing with the camera, settle down "after tea," perhaps at the same table at which he has just satisfied nature's requirements, or perhaps in the smoking room, if one existed, and having spread a newspaper over the table, turned the gas down low and surrounded it with a paper screen, produced developing materials, and set to work.

It would, perhaps, be a little inconvenient to work in that manner now, on account of the comparatively greater amount of washing required by gelatine plates, and also the greater care necessary in the matter of light. We shall assume then, first of all, that the amateur can temporarily devote to his purpose a bed, dressing, or, perhaps best of all, bath room. The last simplifies matters very considerably so far as the water supply is concerned, and, indeed, leaves little to be provided except the lighting arrangement.

This, whether for temporary or permanent purposes, is easily arranged. Two or three thicknesses of black twill or silesia strained tightly over the window by means of loops, or rings, and nails provided for the purpose will effectually darken the room if artificial light is to be employed; or, if daylight is to be the means of illumination, a square can be cut out of the opaque material and filled in with suitable non-actinic fabric according to taste. The screen of twill will however, after being a little time in use, stretch slightly, and so cause trouble by admitting streaks of light at the side, entailing a considerable amount of pinning and dodging every time it is used. It is better, therefore, to construct a light frame to fit into the window and to strain the flexible material upon this. The screen thus formed is easily removeable and occupies but little space; when required it is quickly fixed tightly and securely in position by means of three or four buttons, or the same number of sash screws.

Instead of textile fabric, paper may be employed to form the screen, and forms a most economical and perfectly efficient substitute. If the window be small, or if arrangements be made, as will be described, for curtailing when necessary the amount of light admitted, the whole of the wooden framework may be covered with a couple of thicknesses of the ruby paper sold by most dealers for the purpose. This should be damped

thoroughly, not *soaked* in water, as the colour is frequently very soluble, and when quite limp stretched as tightly as possible on to the frame, using thick paste or glue for the purpose. The two thicknesses should be attached separately to the opposite sides of the wood frame, thus leaving a space equal to the thickness of the wood between them, by which arrangement there is less chance of white light penetrating through minute punctures. When dry, the paper should be literally "as tight as a drum." It may then be oiled or rubbed with vaseline, but the operation must be carefully performed, or the tightly strained paper may be broken. Such a screen, in fact, requires constant care to avoid injury, though in case of accident it is easily repaired by pasting on a patch of the same paper if the appearance be not objected to.

A much stronger job is made by using stout brown paper as the basis, cutting out a square after it is dry and pasting the ruby medium over the aperture. If two thicknesses of the brown paper be thoroughly wetted to stretch them to the utmost, then laid on the frame separately with good paste, and well rubbed into contact, they will form, when dry, a foundation as "hard as a board" and nearly as strong, and the finished screen will bear a great amount of rough usage.

In the case of a large window, such as that of an ordinary bedroom, it will be convenient to form the screen in two sections, the separate frames corresponding in size with the window sashes. The edges of junction should be rebated to fit one another, so as to lessen the chance of light getting in; and, as an additional advantage, they may be hinged together, which will assist in keeping the joint close and enable the two to be folded together when not in use. It will be a matter for choice how to cover the frames, whether with opaque material with a small ruby window, or wholly with ruby medium, so as to admit more light. The latter is undoubtedly the preferable plan when the room has to be used for purposes other than development, but it will then be judicious to provide an opaque blind, which may be drawn down to reduce the amount of light when very sensitive films are under treatment.

The best material for the blind is stout silesia, obtainable at any dealer's in tailors' materials at eightpence or ninepence a yard, about forty inches wide. But as this material will scarcely harmonise with the appearance of the other blinds of the house, it will be well to let the arrangement form part of the temporary screen. This is easily done by affixing the blind roller and furniture to the upper portion of the wooden frame. To avoid any inconvenience that might arise with a hinged frame from the cord being strained over the two sections, it is better to employ the "patent" roller ends, which work with a single cord and without rack, the blind descending by its own weight and winding up the cord in its fall.

The additional trouble involved in this blind arrangement is amply repaid in the extra convenience arising from the increased amount of light available when required. Nothing is more trying than to have to grope about in unnecessary darkness, and to manipulate slow plates or slower bromide paper in the same dim light as extra sensitive films is not only needless punishment, but is actually detrimental to the character of the work done in the case of enlargements, since it renders it impossible to accurately judge the progress of development. The power, therefore, of modifying the light to suit the work on hand will be thoroughly appreciated, and should be provided in every dark room.

In concluding the subject of windows, we may say a word on

the employment of ruby and other coloured papers and fabrics. These, as all know, rapidly bleach under the action of light, more especially the papers, and a single season will suffice to entirely discharge all the colour from such a screen as viewed from the outside. But it will be found that the inside, or side that has not been directly exposed to light, has changed but little, and, even viewed by transmitted light, the tint, though lighter than it was originally, has suffered less than might be expected. We advise, then, that the same side of the screen be invariably turned to the light, and then that will be the only side that will require renewing at intervals. The uniformity of illumination, as well as the "safety" of the light, will also be better preserved in this manner than if both sides of the screen are gradually bleaching simultaneously.

In our next article we shall deal with other appliances of the dark room.

ECONOMY IN THE DARK ROOM.

THE solution of "pyro," as made according to our instructions last week but one, will, as we stated, remain in good working order for a year or two, even if not specially cared for. But, as even acid solutions of pyrogallol are capable of absorbing oxygen, it is, of course, well to keep this mixture in properly stoppered or corked bottles, when it will keep for almost an indefinite time, with little discolouration. Many photographers prefer to keep it in corked bottles, to avoid the inconvenience of the stopper becoming fast, owing to the enclosed air parting with its oxygen, and so fastening the stopper by the double action of external pressure and the "locking" which is apt to follow that pressure. When a stopper becomes impacted in this manner, the best mode of loosening it—and it is surprising how difficult this sometimes becomes—is to give it a series of smart taps with some non-metallic object—a knife-haft for example.

We have, however, before pointed out that this may all be avoided by slightly greasing the stopper and neck with vaseline.

It is notorious that some brands of dry plates require a far stronger developing solution than others; and when any brands under consideration are considered of equal merit, it is obvious that, as this necessity makes an appreciable difference in the actual working cost, it affords data for deciding at once. Thus, let us take a half-plate size, that being more common than any. If we reckon, using fresh solution for each plate, that one brand requires a three-grain to the ounce, and another only one grain (and these are not extreme cases, though the average difference is as two to one), we have sixty grains needed for the latter, and one hundred and eighty for the former, if five ounces of solution per plate be used. Then, with pyro at 1s. an ounce, the working cost for this chemical alone is, per dozen, respectively, about 1½d. and 4½d.; in other words, 3d. per dozen. This is a point well worthy of looking into, for it means putting ten per cent. extra on the cost of an average cheap plate.

There is here another point to be noted as bearing on the economy of the use of pyro, especially to be considered at the present time of the year. It has been said that the temperature of the developer in dry-plate work has little effect on the rapidity of its action; but such a statement—at any rate, as regards dry plates as now made—is quite erroneous, as any one may discover for himself by a simple trial. Taking water as drawn from the main at the present season, its temperature will

probably be about 45° Fahr.; if, now, two solutions be made, one with water at this temperature, and another raised to about 75° by the addition of a little hot water, and a plate of equal exposure be placed in each, it will be found that the warmer solution will develop in almost half the time required by the cooler. When a number of plates are to be developed it will be seen that this difference represents a considerable amount where paid labour is involved, and, if the required speed is brought about by using stronger solutions, we get again that waste of money which it is the purpose of these articles to show how to prevent.

Passing from pyro to the other main constituent of the developer, there is little to say beyond repeating our frequent recommendation, that the solution be diluted with an equal quantity of water as soon as taken into stock, comparatively weak ammonia solution parting with the ammonia gas much less rapidly than the strongest. We have also recently pointed out that it is liable to absorb carbonic acid from the atmosphere, and so lose strength from another cause. To avoid this, the bottles should be kept well stoppered and, indeed, if any quantity be stored, the bottles not in actual use should always be luted at the stopper, which is easily done by applying a paste made by working linseed meal into a mass with water; this is most readily done in the palm of the hand.

Our remarks must now conclude by reference to what a well-known photographer terms the "painful" subject of waste plates. It goes without saying that, bearing in mind the strong feeling we have about the saving of "hypo" residues, we advise that all rejected plates, either accidentally damaged or found to be useless through moving of the subject, incorrect exposure, and so forth, should, before being cast aside, be passed through the fixing solution to dissolve every particle of silver possible to be saved along with the rest of the valuable contents of that liquid. Whether it is worth while collecting developed and fixed negatives for the sake of the silver they contain is a question whose solving depends upon the value of the labour employed. If the plates are cleaned solely to this end, we are afraid *le jeu ne vaut pas la chandelle*.

But what of the immense quantities of rejected negatives stored all over the country in the hands of amateur and professional alike? How are they to be utilised? How cleaned? As to their utilisation, where since wet plate for enlarging and such-like work is carried on they are very useful if of good quality glass—not by any means universally the case. But this would not utilise one per cent. of the waste negatives daily produced, and again the question thrusts itself into notice. Here we would appeal to our readers; our own practice is not extensive enough to supply a thoroughly practical answer. We can only describe one very admirable use that we know of their having been put to; that is, the glazing of greenhouses. We know of many houses so glazed; one successful amateur gardener having the whole of his houses roofed with rejected negatives, while another collected his 12 x 10 plates till he could make a window house of a few feet square; and this, as we need not say, would require several dozens. As to how to clean them for storage and future possible use, if these articles did not treat of "economy," we should be inclined to repeat the reply given to a similar query put at one of the photographic societies' meetings, "Clean them with a hammer!" Indeed, we are not very sure if, bearing in mind the worry and trouble of storing such heavy and lumbrous articles, this is not in the end really the most economical way of dealing with them after all. This, however, is debateable. For the rest,

we feel assured that if our advice is acted on it will really be followed by economy, both in the printing room and the dark room.

WE have now entered the month of November, and the photographic season of 1889 is now practically at an end. It is true that many amateurs will still be at work, obtaining autumnal and winter effects, and professional portraitists will be utilising the negatives taken during the summer for enlargements. But the busy time may now be said to be over. Upon inquiry amongst the profession generally, we are pleased to learn that they are to be congratulated on a prosperous year. Most of the leading houses, both in London and the provinces, say that the past has been the best season for business they have had for several years. Where this opinion has not been endorsed it has been by the middle-class photographers, and it is these who complain the most bitterly of the effect of amateur photography. The majority of those who supply apparatus also affirm that this has been the busiest year they have ever experienced. This is hardly to be wondered at when we note the large influx of new recruits there has been in the ranks of photography.

It will be remembered, on more than one occasion, we have advocated that in the new National Portrait Gallery a portion should be set apart for photographic portraits. We have also pointed out that the counterfeit presentments of many who have distinguished themselves in various ways would be lost to the nation for the simple reason that there may be no oil or water-colour paintings of them in existence, or if there is, their friends will not part with them. Or it may be, if there is a painting, that it may be of such a mediocre character that it could scarcely figure in a National collection; yet at the same time there might be photographs which are really works of art. We are pleased to see that our suggestions are being echoed by the general press. In a recent issue of the *Sunday Times* we find the ideas we expressed have been entirely reiterated. With a little persuasive agitation we are convinced that a photographic section in the new building will be secured. We commend the subject, once more, to the many amateur photographers now having seats in Parliament.

PHOTOGRAPHY is frequently utilised by the police in the shape of portraits of those "wanted," but it is somewhat of a novelty to see it used in connexion with those whom the authorities are desirous of getting quit of. Outside the police station in a suburban town we recently saw a cabinet portrait of a much better kind, by the way, than those usually issued by the police—a Woodburytype. It was the portrait of a pretty, chubby-faced, well-dressed child, about two years old. Together with the portrait was a full description of its wearing apparel, &c. The little one, it appears, was left surreptitiously in a garden, and the police authorities were anxious to learn to whom it belonged. No doubt photography will be, if it has not already been, the means of leading to the youngster's identification.

A SHORT time back we noticed in an auction room a number of expensive photographic mounts for portraits, those of the dark colour with bevelled and gilt edges. There was nothing unusual in such mounts being seen where miscellaneous scientific property is offered for sale; but in this instance they bore the names and addresses of some of the leading photographers in London and the provinces; and, in addition, some had on them the name of a very popular actress. One could but speculate as to why the mounts were there, seeing that the artists whose names they bore are all carrying on flourishing businesses, and the actress is still in the zenith of popularity. Presumably, any one purchasing these mounts would consider he had the right to use them, and the probabilities are certainly that no better pictures were likely to be put upon them than the general run of the work issued from the establishments they represented. The chances are, however, that they would be used for much inferior ones. In this event, as a matter of course, the work would be credited to the houses named on the mounts, hence their reputation would suffer. Again, any portrait of

a lady on the cards bearing the name of the actress might be mistaken for the latter by those who were not familiar with the parties. Fancy the feelings of a young and beautiful actress if she saw the portrait of an ancient dame bearing her name; or those of a first-class photographer on seeing third or fourth-rate work with his name and address on the mounts.

If the mounts were condemned from any cause—say because they would act injuriously on the pictures—one can scarcely imagine that the photographers would elect to dispose of them for the small sum they might be expected to realise at an auction sale; for it follows that, if the pictures eventually mounted upon them faded or became stained, the discredit would fall upon those whose names were on the cards, unless the circumstances were known, a thing hardly likely to be the case. Whether the mounts caused the pictures to fade, or inferior work was put upon them, in either case the reputation of the house whose address they bore would be placed in jeopardy. If the mounts were sent for sale without the cognisance of those whose names they bore, the proceeding was highly reprehensible.

A CORRESPONDENT, a retired portraitist, writing anent the leaderettes a fortnight ago—in which we mentioned that notwithstanding the great advancement in the art during the last twenty-five years, silver printing, as regards permanency, had retrograded—puts the somewhat pertinent question, “Has photography, from a technical point of view, really made any advance whatever? Has it not, like silver printing, also retrograded?” He says, in effect, that before the retouching of the negative was introduced, and when the operator had to make and keep in order the materials for preparing his plates instead of being supplied with them ready prepared, he had to rely solely upon the technical excellence of his work. If that were defective, either from the lighting of the model or from any other cause, there was no after remedy. Yet, at that period, work was produced which, in quality and size, was in no way inferior to that now made, notwithstanding that much of its merit is due to the retoucher's art. When, in the old days, a photograph was exhibited as “untouched,” it simply meant that the print had not been worked upon—sophistication of the negative being a thing unthought of. There is much in what our correspondent says, for there is no question that negatives are now passed in first-class establishments, because they can be improved by the retoucher, which in former times would not be tolerated for a moment.

THE writer of the communication just referred to makes a suggestion which is worthy of consideration. He says, “Why does not the Photographic Society of Great Britain, whose province it is to advance the art technically as well as artistically, offer a medal, or medals, for purely untouched work? Also others expressly for retouching, which may now be considered a distinct industry in photography; yet it has never been recognised as such by any Society.” In conclusion he adds, “The Photographic Society might well take a lesson from some of the City Guilds, who now offer annual prizes for the best technical work in the different crafts they represent.”

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

No. V.

J. P. Gibson (Nos. 205 to 208).—Four exceedingly well chosen pictorial scenes, which should all have made very good photographic results. No. 205 is the best of the series, arising from a lesser amount of those dark portions of foliage, which, if not properly attended to, completely neutralise the good that is elsewhere; and in three of these pictures this shortcoming has received its due reward, which is unsatisfactory, inasmuch as such charming subjects deserve better treatment.

H. B. Berkeley (No. 227 and eight other small pictures of scenes in Venice).—Nos. 228 and 230 are exceedingly well chosen for effect, where moveable objects (boats, &c.), have been selected at their best positions to assist the intended pictorial result; many of the others are very good, but those more particularly alluded to are most picturesque in character, and show taste and discrimination in selection; the whole have been also well treated photographically.

George Davison (Nos. 234 and three other frames).—Some exceedingly good examples of work, the negatives of which were made by a pinhole in place of a lens. These photographs are very interesting, as they afford evidence that foregrounds are sometimes overpowered with light when taken by a lens, which does not appear to be the result when taken with a pinhole; at the same time, it would seem that certain colours from dark-green foliage are just as difficult to be secured as they are by a lens. These examples of “natural” photography in its absolute rendering of facsimiles of nature, without suffering from any optical shortcomings, have a serious question to reply to: How came it to pass that the same clouds should be in two such different pictures as Nos. 10 and 237? The only difference being that their position is reversed, the points of view must, therefore, have been so far apart that some great natural problem has thus been brought forward for explanation.

Alexander Keighley (Nos. 263, 291, 292, 294).—These small photographs reveal the fact that the exhibitor possesses art capabilities which time will develop into some far more advanced productions. These pictures show much thought in the selection and treatment of the subjects, where figures have been arranged very nicely, so as to tell a tale, although simple in idea. No. 292 is the most ambitious; two boys, supposed to be “weary” and “with toil oppressed” (although they look very well fed), show much artistic feeling in their arrangement of position; whilst one of the boys makes a capital model for facial expression. The rest of the details have also been very carefully attended to. All these small studies give evidence that some most excellent work will be forthcoming from this very promising exhibitor.

Henry Stevens (No. 264 and six other similar pictures).—They are all exceedingly good specimens of photographic work. It is somewhat unfortunate that the models (apparently his own family), although very choice in dress and attention to orders, yet hardly justify some of the titles. This must arise from the studies being apparently only a reproduction of the ordinary every-day life of the models, without having been submitted to artistic control. They appear like very good portraits, but not pictures of events. The scientific aspect of this exhibitor's work is always so excellent, especially in his flower subjects, that we should be glad to give equal praise to the higher possibilities of the artistic faculty. The carefulness and skill shown in the use of the scientific portion of photographic picture making by this exhibitor should be carefully followed by many.

Miss Florence A. Harvey (Nos. 272, 277, 278).—Three very good studies of animals in motion—being stags and horses. These pictures show thought in the selection of a good arrangement of position at the moment of exposure, and hold out prospects of better work still in the future.

H. Bedford Lemere (No. 302), *Sandringham, Views of the Interior*.—These are very excellent specimens of this class of photographic work where great attention has to be given to the scientific side, and this has been done with most successful results. Great taste and skill have been shown in the choice of the point of view, as also in the arrangement of furniture—all these matters helping to make some good pictures.

Harry Symonds (No. 307), *Yacht Racing Scenes*.—In one frame are eight very effective photographs of yachts, where great attention has been given to effect by clouds being printed in, so as to aid the contrast of light and dark. There is only one matter which might be alluded to, and that is the effect produced by placing several pictures so close together; the difference in the sea lines has a retarding effect upon the vision to the detriment of the exhibits.

Thomas Fall (No. 309), *Dog*.—There are some other heads of dogs by this exhibitor in the Exhibition which are very good specimens of this class of work. They consist of vignettted heads only (thus eliminating a vast amount of study and awaiting good positions, which is a main point in animal pictures), and thereby affording possibilities of likeness, which apparently was the main point in view. They are very well done, as also has been the brush work, which has been used very effectively in completing the vignette form which these studies take.

Ralph W. Robinson (No. 314 and five other pictures, all about 15×12).—This series of photographs contains some very excellent work, in five of which country figures have been most skilfully

introduced, each telling a tale of human hope and joy. The sixth picture, perhaps, is the best. A group of oxen have arranged themselves in a line, which accords exceedingly well with the outline of the distant clump of trees, which are really far away, and thus a picture is the result. This style of photographing combinations of scenery with small figures will eventually be the peculiar outcome of this most prolific exhibitor.

F. W. Edwards (No. 322), *Woolpits*.—A country house, with grounds taken from an elevation, displaying a very effective bit of rising ground. The success of this work arises from the perfect way in which the lens has been utilised. Detail pervades the whole of the photograph, which is 23 x 16, which is also equally a very fine production taken direct, and is a remarkably fine specimen of scientific usage of materials, as also a well-chosen picture. No. 355, *Lambeth Palace*.—Another photograph the same size.

Miss E. Boyce Brown (No. 324), *Left Behind*.—This is a carbon enlargement from the original negative by the exhibitor, and in design is very good. A little boy being wheeled in a barrow has been suddenly left alone, and expresses fear at his position. This point has been seized upon by the exhibitor, and a picture produced of realism which is most effective. The colour of the print is rather warm, a cooler tone would have been more effective.

Hezekiel and Jacoby (Nos. 335, 336, and 337).—Three foreign portraits of ladies, noticeable from the fact that they are good specimens of the Pizzighelli printing process. In these photographs a very nice deep tone of colour has been produced.

Rev. H. B. Hare (No. 352).—A river scene, with bridge and distant dwellings, very carefully treated. There being no leaves upon the trees, that difficulty has not had to be battled with, the result being a very nice example of detail exceedingly well manipulated. This is really a very effective study, where two boys fishing (in the foreground) form some of the darkest portion of the design, which is thus made most effective.

Enrico Resta (No. 363), *Children's Portraits*.—Very pleasing and effective photographs are here before us, where all the positions seem very natural, yet at the same time this result has only been attained by very careful study in many of these fifty-three specimens. A very pleasing effect has been produced by using light backgrounds, which considerably help the pictorial result. Altogether these portraits are exceedingly good.

F. Whaley (No. 393), *A Mother's Pride*.—Now this is a picture which deserves some praise, for the model, who, from her expression, we assume to be the actual mother, has been very carefully and nicely posed; the play of light and shade, and the detail of the composition, have been very carefully studied, the result being a very interesting picture, and also an exceedingly good photograph. Only one matter we should like to notice: a piece of drapery rising just behind the mother up to the top of the picture, with dark broad lines on it, disturbs the repose, which otherwise is very nicely expressed. Altogether this picture reflects much credit on the exhibitor.

B. Scott & Son (No. 391), *Helena*.—This photograph is an attempt to produce a classical picture, the subject being a young female attired in a dress which is intended to be something approaching the old Greek costume. The result so far has been very good, for this dress is the most successful part of the picture, as it has been treated, scientifically, exceedingly well, the only part which does not quite realise the classical idea is the face of the model, which, however charming it may be, is not in general outline severe enough to pose for the subject, hence the picture assumes the character of a lady's portrait in classical costume.

R. Faulkner (No. 392), *Portraits of Children*.—The Exhibition without some specimens of this exhibitor's photographs of children would hardly be complete, so persistently year after year do they show themselves to please us by their refinement of treatment, both in arrangement of positions and in chemical manipulation, the result being a quiet appreciation of the art shown in their production.

T. Protheroe (No. 412).—A frame containing two studies which should never have been placed together, one subject being an old bellman, a *Bristol Fossil*, merely a facsimile of the individual; the other a well-arranged female, as *Marie Antoinette*, standing with hands clasped tightly together, with a nervous shrug of the arms, the head turned looking up at a crucifix on the wall. The face is well

suit for the character, and the expression has been carefully thought about, and yet there is something antagonistic to that appreciation which the study deserves. We arrive at the conviction that this must arise from the two sides of the figure and position of hands being almost exactly alike, and the picture thereby becomes automatic; very carefully thought over, very nicely photographed, but it hardly excites any sentiment of sympathy, this presentment being somewhat too mild in the expression of the figure.

Werner & Son (Nos. 434 and 445).—Two very large portraits taken direct, one a lady who, for the sake of her extreme length of costume, has been placed too much to the left side of the picture, which leaves her in a position to withdraw some day quite out of the frame. The detail of this light dress has been very carefully attended to, and is a very nice specimen of careful manipulation, but the face and hands of the sitter have suffered, so that in a large room this picture would partly lose its principal interest because the features retire and the costume asserts its reigning power. No. 445, *Prince Edward of Saxe-Weimar*, is quite another picture; here, despite the very light portions of some part of the costume (military), the face, having been carefully lighted, assumes its right function, viz., a likeness which demands the whole interest of the spectator, the result being a good and very perfect specimen of photographic portrait work.

THE APPARATUS.

We have already spoken of two cameras of foreign make which are contributed by Mr. Oscar Schölzig. We are now in a position to say more concerning them, and by the courtesy of the exhibitor to give illustrations. As stated last week, the principle involved is that of transferring the plates from a reservoir or plate box to the camera in which they are exposed. The inventor of this special appliance for effecting this transference is Herr Fichtner, its maker is R. Hüttig, of Dresden, and it is said to have been patented in "all countries." It is suitable for either dry plates, sensitised papers, or celluloid films. The mode of attaching the plate box to the camera is shown in Fig. 1. A firm clamping of one to the other is effected by a hook at

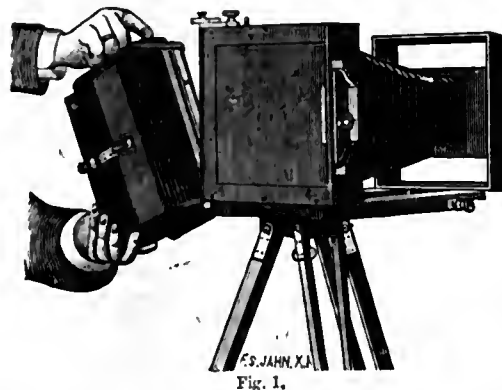


Fig. 1.

b (Fig. 2), connecting with a below, and by a turn-button, c, at top. To transfer the plate from the box to the camera, the lever, f, on

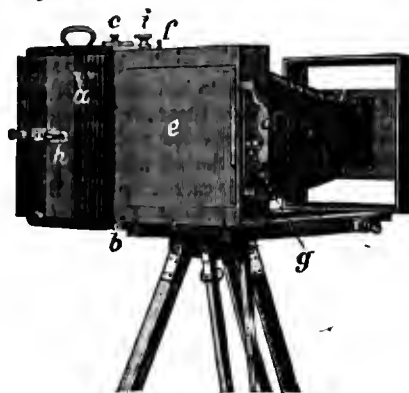


Fig. 2.

the top of the camera is pushed forward, which opens the passway from the box; next a bolt, g, on the handle of the slide, d, is pressed,

which causes a hook to pass into the box and grasp that plate which happens to be opposite the aperture. Fig. 3 shows the camera and plate box when turned from the vertical to the horizontal position, in

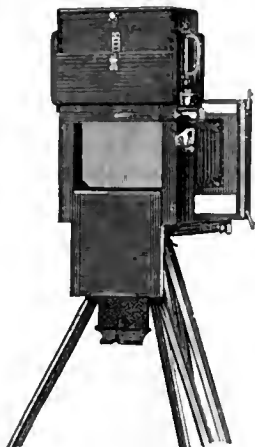


Fig. 3.

order to vary the form of the picture. In this case the dark shutter of the slide is pulled downwards.

We observe that the editors of several foreign journals, who are supposed to be more conversant with the working of this camera than we are, have pronounced it as excellent, and there seems no reason why we should not share in this opinion.

Ferrero's Film Carrier, which has already been alluded to, has never yet been described by us. By the aid of the adjoining cut

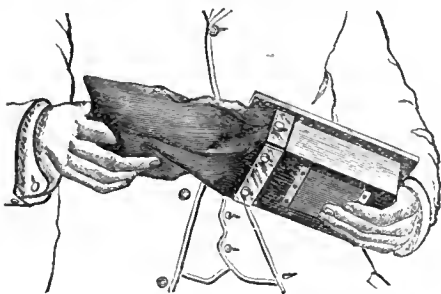


Fig. 4.

we shall now endeavour to do so. It is a dark slide and changing box combined for celluloid films. It enables the photographer to carry and to expose two or even three dozen films without having recourse to a dark room. It consists of a box, the front of which is fitted as a dark slide. Inside the box a loose board, actuated by a spring, presses the films towards the rebate, whilst a light *papier maché* board divides the film which is being exposed from the others, and a similar board placed behind the unexposed films divides them from those which have been exposed. When the film has to be changed, the opening of the lid causes the pressure board to be drawn back to the bottom of the box, thus leaving ample space in which the films can be changed. Attached to the carrier is a bag having two holes, in which the thumb and forefinger are inserted for changing the films. The two finger holes are provided with elastic bands, which exclude all light from the interior of the bag when the fingers are inserted.

The advantages claimed for this carrier are: 1. Extreme simplicity and absence of anything liable to get out of order. 2. The films are put into the carrier just as they are taken from the packet, no shields or metal frames being required. 3. The films are moved by the fingers; no reliance is placed on springs or the action of gravity, which so often fail to act in changing boxes for glass plates. 4. Two qualities of films can be carried in one carrier, and either can be picked out for exposure as required. 5. The operation of changing the films is done in a few seconds, whilst the filling or emptying of the carrier is infinitely more simple than with roller slides.

Mr. W. F. Stanley, Railway Approach, London Bridge, is the maker and exhibitor of this piece of apparatus.

LANTERN SLIDES ON GELATINE PLATES.

In giving a precise formula for the preparation of the emulsion, I do not pretend to offer the very best that can be devised, but merely one that, after trying many variations, seems to me to be the best for general purposes, combining as it does very excellent quality of results with the greatest ease, both in preparation and manipulation.

Opinions may differ on the subject of which haloids to employ, whether bromide of silver alone, or combined with iodide or chloride, or both. After trying almost every possible variation, I am convinced not only that the best combination is the bromo-iodide, but that the presence of iodide confers distinct advantages, both in colour-giving and other good qualities, and in rendering the general working of the emulsion easier and cleaner. I have used chloride, which in a negative emulsion plays an important and valuable part; but for positive purposes, unless worked in an entirely different manner to the ordinary plates, tends rather to lower the quality of image, especially in the matter of tone. I shall, therefore, confine myself to a bromo-iodide formula.

This may be stated as follows:—

A.	
Gelatine (soft)	100 grains.
" (hard)	60 "
Bromide of potassium	120 "
Iodide	6 "
Nitrate of ammonia	20 "
Water (distilled) as required.	

B.	
Alcohol (methylated)	1 ounce.
Nitrate of silver	150 grains.
Nitric acid, s.g. 1.420	1 minim.
Water (distilled)	2 ounces.

The choice of gelatines is, of course, one of some importance. For the softer kind I decidedly give the palm to the old favourite, Nelson's "No. 1 Photographic," which I consider unsurpassed by any I have used; indeed, except for its tendency to frill under slight provocation, I should confine myself entirely to that kind, using, say, 200 grains instead of having recourse to the hard. Another "soft" gelatine that answers nearly as well, if very carefully filtered, is a sample of sheet gelatine by the same makers, known, I believe, as "No. 1 Flake," and this has the advantage of being cheaper. The mixture, however, will give the better result, and the question arises which of the numerous "hard" samples in the market to select. If it were for negative purposes I should have no hesitation in recommending Nelson's "X Opaque," but after what I have said on the subject of absolute clearness of the film, I can scarcely do so. Of the foreign kinds which are clearer and possess less colour I should prefer Coignet's if I could always depend upon getting it free from grease spots, which, I am sorry to say, is far from being the case; otherwise, it is a pattern gelatine, both for hardness, setting qualities, and absolute transparency. Next, I rank Heinrich's, and though this varies much in different samples, it is perhaps, generally, more reliable; and after that, again, Simeons's may be used.

Let the gelatine be weighed out and placed to soak for a few minutes in boiled and cooled rain water, and when soft, let it be vigorously rubbed together, as described in my last article (page 632), to loosen and detach any particles of dirt or foreign matter from the surface. After this treatment, rinse it well; squeeze out as much as possible of the water, and place it to soak in distilled water for a couple of hours at least, or until thoroughly swelled. Now take it out of the water, drain it for a minute or two, and then liquefy by heat and make the quantity up to four or five ounces with distilled water. Heat the solution to 150° or 160° Fahr., and filter, as already described, in front of a clear fire. Or the gelatine may be liquefied without the addition of further water, when it will filter with perfect ease, though, perhaps, more slowly; and the filter may then be washed out by passing through it three or four times sufficient hot distilled water to make up the volume of the gelatine solution to four or five ounces.

The bromide of potassium and nitrate of ammonia are next added in crystals and stirred until dissolved, the iodide being reserved for addition at a later stage. I am unable to explain the precise

function of the nitrate of ammonia, but I have used it for some years and find that it makes an emulsion, whether for negative or positive purposes, much cleaner than it would otherwise be, possibly from its solvent action on some of the organic compounds of silver that tend to produce fog. It only now remains to keep the mixture hot, or even to raise it to 180° , while the silver solution is being got ready for sensitising.

Dissolve the silver in the stated quantity of distilled water, and add the nitric acid, and finally the alcohol. The acid is best added in the dilute form (say 1 : 20) as securing greater accuracy, which is important, as if too much be used, not only will great insensitiveness be the result, but the gelatine will be softened or decomposed. The alcohol is added, on the recommendation of a very early writer on gelatine emulsion, to promote fineness of division—a function which it undoubtedly performs.

Everything up to the present may be performed in full daylight if desired, but the subsequent operations must be carried on in the dark room. The two solutions of bromised gelatine and nitrate of silver, both at a temperature of 180° or thereabouts, are therefore taken into the dark room and carefully mixed by pouring the silver into the gelatine a few drops at a time, or in a very slow continuous stream, the mixture being all the while vigorously whisked with a silver fork or wooden salad server, or any similar instrument that will not be acted upon by the emulsion. Under ordinary circumstances, the quality of the emulsion, so far, at any rate, as fineness of division of the bromide is concerned, depends greatly upon the care with which the mixing is performed; but here, in the presence of so large a quantity of gelatine, it is scarcely a matter of serious moment whether the whole of the silver is thrown in at once or half an hour is consumed in the process. It is better, however, to err on the right side and be careful.

After mixing comes the process of digestion, or "cooking," by which the sensitiveness of the preparation is brought to the right pitch, and this constitutes in ordinary or rapid emulsion making the crucial part of the task. In the circumstances under which we are working, however, the difficulty is practically nil, as our aim is not to attain to anything but a moderate degree of rapidity, as compared with quick commercial plates. It suffices, therefore, to keep the emulsion at the mixing temperature—about 180° —for an hour or so, which is easily managed by means of changes of hot water, into which the jar or bottle containing the emulsion is plunged. A longer immersion or a higher temperature will do no harm; but those I have given will serve all our present purpose.

Those who are not in the habit of making emulsion—and it is for those I am chiefly writing—will probably imagine countless difficulties and inconveniences in this part of the proceedings, but with a little method all trouble will disappear. The first important point is the mixing vessel, which must, obviously, be one that will stand a considerable degree of heat. Ordinary glass bottles are not, as a rule, calculated to bear the strain put upon them, unless specially "tempered" for the purpose. A wide-mouthed earthenware or china jar answers better, and if thick enough to be thoroughly impervious to light, it is an additional advantage. A very useful article for the purpose that I have used for small quantities of emulsion for some years past consists of a well-glazed earthenware shouldered jar with solid cork-fitted stopper of the same material, pierced with two holes, through which glass tubes can be passed. This constitutes the principal item in an inhaling apparatus, and as the makers are in no way connected with photography, there can be no harm in advertising them in these pages, namely, Messrs. Bourne, Johnson, & Latimer, of 35, Castle-street, Holborn.

With this or a similar apparatus, if the projecting glass tubes be covered with short pieces of rubber tubing pushed well down to the stopper, the emulsion is perfectly protected from light, although there is free vent for steam to escape. Consequently, after mixing, if the stopper be inserted, the jar and its contents may be taken with impunity into open daylight or gaslight and set to digest in a saucepan of hot water beside an ordinary fire. Or, failing the "inhaler," an ordinary preserve jar may be placed within a tin canister of suitable dimensions, and containing a little water, and with the lid on, the light will be similarly shut out, though there is free escape for steam, even if the whole affair be boiled. Perhaps many similar contrivances will suggest themselves to individual readers.

I have spoken of continuing the digestion for an hour; but up to the present it will be noted that the emulsion is one of plain bromide, the iodide not yet having been used. Consequently, when the digestion has gone on for half an hour the jar is opened, in the dark room of course, and the six grains of iodide of potassium, in crystals, thrown in. After two or three minutes stirring, to effect the solution and thorough incorporation of the iodide, the jar is recorked and set to finish its term of "cooking." This method of introducing the iodide is recommended as tending to bring about a finer state of division than if it were added at first with the bromide, as the iodide in combining directly with the silver does so in comparatively coarse particles, whereas by the method given it acts upon the fine particles of bromide of silver already formed, converting them into iodide.

The next operations—those of "setting" and washing the emulsion to free it from the soluble matters it contains—are usually ranked as the most tedious and troublesome; but I shall endeavour to show how they can be conducted with the least possible inconvenience or danger of failure. After cooking, the emulsion is poured into a flat dish or shallow basin to set, or become solid. In ordinary practice it is customary to resort to the use of ice, especially in warm weather, in order to get the "jelly" into a sufficiently firm condition to bear the subsequent washing without loss of material, and without absorbing too much water. My method, however, renders ice entirely unnecessary, and, in fact, renders us almost independent of the setting of the emulsion, whether it be firm or the reverse.

When the emulsion has become solid and feels tolerably firm to the finger—a condition it will attain in an hour or two if the dish or basin containing it be set in or floated on the coldest water obtainable—it is ready to commence washing. For this purpose I pour on to the emulsion, without disturbing it in its dish, sufficient good, clean methylated spirit to well cover it. When this has stood upon it for five minutes or so, I "score" the mass of gelatine in all directions with a strip of glass or bone spoon to permit the alcohol to penetrate freely into the mass. In a few minutes more I scrape it well away from the dish, stirring it well up with the alcohol, and adding more of the latter, if needful, to cover it.

By this use of the alcohol, instead of water, the jelly is rendered firmer and more manageable, however "soft" it may be originally, in consequence of the extraction of a portion of its water by the alcohol, which also exerts an independent toughening action of its own. At the same time, the water in leaving the gelatine to combine with the alcohol takes with it a great portion of the soluble salts, and more of the latter follow by natural diffusion during the subsequent soaking.

When quite firm to the touch, a small quantity of distilled water is added, say about as much as the alcohol already used, and the mass left to soak for about half an hour with an occasional stir. The dilute alcohol is then poured off and distilled water substituted, and the latter is poured away and renewed at intervals until the emulsion has ceased to show any signs of the presence of alcohol, beyond a faint smell, which it always retains. The absence of "greasiness" on adding fresh water is the sign of the removal of the spirit. If two or three changes of distilled water be given after this point is reached, it may safely be considered that all the soluble salts have been eliminated.

I claim for this process the advantages of simplicity as well as economy, bearing in view the conditions I have laid down as to avoiding the introduction or precipitation of insoluble lime salts in the emulsion. To thoroughly wash in the ordinary manner with distilled water would necessitate the use of a very large quantity of the latter, which, at sixpence a gallon, even if obtainable, would add very materially to the cost of the emulsion. But for the above quantity of emulsion an equal volume of spirit is more than ample, and with methylated spirit at from three shillings to three and sixpence a gallon, the extra expense for alcohol is not great; while the quantity of distilled water required to finish off need not exceed half a gallon if judiciously used. I have thoroughly freed ten ounces of emulsion from soluble matter in this manner with only one quart of water. I venture to think also that the elimination of the salts is more perfectly attained by this plan than is ever the case with plain water, unless the washing be continued for an injuriously protracted period. Certainly it is far better attained than is otherwise possible with the same amount of trouble or in the same time.

The emulsion is now ready to be melted up for use, or arrangements may be made for its preservation. These usually consist in drying it—a tedious, troublesome, and never entirely satisfactory job. I dispense with that operation by well draining the lumps of jelly, transferring them to a clean bottle, and pouring over the mass sufficient to cover it of methylated alcohol, containing a quarter of a grain of salicylic acid to each ounce. In this state the emulsion will keep perfectly for a very long time; but if it is required to keep “indefinitely” it will be well to pour off the first lot of alcohol after a few days and replace it with a fresh supply, also containing salicylic acid. By this means much of the water will be removed and the chances of decomposition correspondingly lessened.

It will be, of course, necessary to bottle off in this manner known quantities of the emulsion, as in the moist condition it is obviously impossible to weigh it, and its subsequent use would therefore be based mainly on guess work. But if it be bottled in batches as made no trouble will arise, and a stock may be prepared during slack periods for use at busier times. When this preserved emulsion is required for use it is necessary some hours previously to pour off the alcohol and replace it with distilled water, changing this two or three times and using just enough to cover the mass of emulsion. This removes the greater part of the alcohol and restores the emulsion to its former “swelled” condition and facilitates its solution.

In another article I hope to describe the remaining part of the process, and also the method of coating plates, with a few simple aids that will be useful to the amateur.

C. BECKETT LLOYD.

THE NEGATIVE IMAGE.

NO. II.

THE following occurs in the address of the President of Section A at the recent British Association meeting: “The question as to what is the exact product of the decomposition of a silver salt by the action of light is one which has not as yet been fully answered.” This is an emanation from the originator of the celebrated theory of the sub-haloids, which has received considerable support for years.

In the same address, what is virtually a doubt is cast upon the conclusions drawn by Mr. Carey Lea from the series of beautiful experiments on the silver salts, an account of which that distinguished writer published in the summer of 1887, and which was reproduced in these pages at the time. Reference to the first of the memoirs—that treating of the coloured haloids in relation to heliochromy—will show that Mr. Lea takes occasion not merely to reiterate his doubt of the correctness of the sub-haloid theory, but to instance certain formidable facts inimical thereto, namely, the comparative action of nitric acid upon sub-salt and photo-salt. We therefore find the two gentlemen, whose researches into the chemistry of photography entitles their remarks to general attention, acutely sceptical of each other's deductions, while one of them practically confesses that he regards his own with some misgiving. Nevertheless, these important disagreements over “what is the exact product of the decomposition of a silver salt by the action of light” are not unprofitable in this sense—they form an ark of refuge for many who, when studying the properties of those interesting compounds, are led to form opinions at variance with the older beliefs which, in the absence of a general acceptance, they have less compunction in treating with discourtesy.

Probably in very recent times no memoir on the silver salts is so replete with succinctly argued photo-chemical philosophy as the third of the series by Mr. Lea, identifying the photo-salts with the material of the latent image. The facts there arrayed on behalf of the author's theory have a weight and a completeness about them that are not characteristic of the evidence advanced for its sub-salt and vibration rivals.

The memoir in question is largely concerned with the action of sodium hypophosphite upon sensitive haloid, by which means the experimentalist identified the chemically prepared photo-salt with the material of the undeveloped impression. Upon normal silver bromide the effects of light and of hypophosphite, determined by subsequent treatment with developing agents, were demonstrated to be interchangeable. In Mr. Lea's own words: “In the entire absence of light sodium hypophosphite is able to effect a sensitive film of silver haloid exactly in the same way as does light, producing a result equivalent to a latent image formed by light and capable of development in the same way as an actual impression of light;” and “that these two effects . . . comport themselves to re-agents exactly the same way and seem every way identical.” What follows is, it must be allowed,

strongly corroborative of the primary resemblance, and is by far the ablest attempt to solve a long-standing problem in a thoroughly skilled and scientific manner.

The darkening of normal silver bromide in the camera and in unrestrained light, to which allusion has been made, long ago led the writer to consider whether a modification of the sensitive haloid would exhibit an acceleration of the direct action of light in such a degree as to place the property upon a serviceable basis. The remarkable influence of the alkaline hypophosphite upon the sensitive body, as recorded by Mr. Lea, also gave rise to the further speculation that the substance so formed was directly altered by the brief impact of light. Prepared films treated with sodium hypophosphite solutions of various strengths did not, however, yield results of a conclusive description.

But the previous suggestion that the darkening of normal silver bromide is the effect of the action of light upon the invisible body first formed by short exposure nearly concerns the belief in the possible existence of several true compounds of silver and bromine. For if the base took up the halogen in differing proportions, and the combining weight of the latter had a closer assimilation to that of chlorine than to that of iodine, we might further conjecture that the lower compound or compounds would be less stable under light than the higher, and consequently the more easily reduced and separated, at no loss of sensitiveness, but, possibly, on the other hand, with the added property of visible alteration. Silver is the only important metal classed as monad, and the sub-salt and photo-salt theories are incompatible with such an atomicity. If we conceived of that element being hexad or pentad, uniting with four or five parts of bromine, the equivalency of which was represented by 20 or 16, one-fourth or fifth of that now universally assigned to it, we should probably find that $\text{light} + \text{Ag}^{100} \text{Br}_4$ (188) = $\text{Ag}^{\text{Br}} \text{Br}_2$ (148); that $\text{Ag}^{\text{Br}} \text{Br} + \text{Light} = \text{Ag} + \text{Br}$; or that from $\text{Ag}^{100} \text{Br}_5$ we were enabled by the same agency to get respectively $\text{Ag}^{\text{Br}} \text{Br}_3 + \text{Ag}^{\text{Br}} \text{Br} + \text{Ag}$ and Br ; in other words, assuming such an atomicity and equivalency of the elements capable of being proved, and their various compounds to possess an amenability to the direct influence of light inversely proportionate to the weight of halogen in the combination, the final product of the two equations would represent deposited silver to form the image. It is almost certain that some such reaction as this is necessary to get visible camera negatives with short exposures; and although the assumption and that which immediately precedes it are still “of the clouds,” their aerial features are lessened if they be placed in juxtaposition with the teaching of the chemical text books, to which the behaviour of silver bromide, as we know it now, is in contradiction. Moreover, the extreme reducing power of light above conceived of is already clearly exemplified in the instances of the platonic haloids, which, if exposed to light on paper, are converted to platinous salts, while these again undergo further reduction, the metal and the halogen entirely separating.

In short, to obtain visible negative effects on normal silver bromide, the chief obstacle to success is that that body is not to be reduced to metal by light. Sensitive films allowed to remain in the light for days will only yield up an infinitesimal proportion of the metal in combination. Therefore, the ideal darkening in the camera is really convertible language signifying a total reduction by light of the sensitive haloid. While there is no ground at all for supposing that the addition of any substance with which we are acquainted to silver bromide in emulsion would operate as an instant reducer of the altered salt, there is considerable likelihood of the prepared film, under suitable treatment, giving such results as to justify the hope of further achievements.

Light has never been set to commence its work where now it leaves off, namely, upon what we will term a proto-salt, represented by the convenient formula, $\text{Ag}_2 \text{Br}$. Since, however, it was stated by Mr. Carey Lea that the photo-salts identical with the material of the latent image are themselves possessed of great sensitiveness to light (“if rose-coloured photo-bromide, and some normal bromides are exposed side by side, the normal bromide darkens but very slowly, while the photo-bromide is quickly acted upon”), it may be reasoned that the elimination of a portion of the halogen of a normal silver bromide plate would partly, and in an analogous sense, submit Mr. Lea's theory to practical proof, and perhaps afford a key to the elucidation of other and cognate matters now obscured.

It was formerly established by Vogel that silver iodide, when in contact with, among other substances, mercurous nitrate, stannous chloride, sodium sulphite, sodium nitrate, rapidly blackens in the light. These bodies, to which he aptly applied the term “sensitiser,” have great affinity for iodine, and, in some degree, for the co-relative halogens. Another term applied to them is that of “absorbent;” but if many of the re-actions in which some of the compounds play a part are studied there is some inducement to regard the word “absorbent” as a misnomer.

THOMAS BEDDING.

THE WHOLE DUTY OF THE PHOTOGRAPHER. No. IV.

Trees and ferns when they can be found motionless are always excellent subjects for the camera, but, best of all, when they can be found reflected in still water. Their beauty depends much on their fineness and complexity of detail, and in rendering this the brush and pencil need not seek to rival the camera. Rocks are also a very suitable subject, and they are patient and stay still where nature placed them. I think that a really good photograph of rocks is, in some respects, equal to the best picture that can be made of them. Let every one attend to his business; the artists may well leave the rocks to the photographer; they still retain much within their monopoly.

Photographs of mountains have been well abused for giving no idea of their height; and not altogether without justice, for I have seen a view in which the Matterhorn appeared like a mere pimple on the horizon. Now, from no point of view is the Matterhorn less than grand and terrible; and a picture reflects something of the artist's imaginative conception of its terrors, and so conveys a truer idea than the photograph, although the latter is correct, and the former represents the mountain as being about eight times its true height. I said not altogether without justice, because the opinion in its crude form usually refers to a taste degraded by the ridiculous exaggerations of the ordinary painter of mountains. I believe that in time the photographer may teach this person to mend his manners and educate the public taste to value correct representations of mountains.

Many of the worst æsthetic faults of photographs depend on their being made on the same principle as that celebrated picture belonging to the Vicar of Wakefield, where the artist was to paint as many sheep as he could put in without extra charge. That is to say, the purchaser must have good value for his money, and have plenty of things in one photograph; so we get atrocious products, including an angle of view up to a right-angle, whereas, *ceteris paribus*, the smaller the angle of view, the more nearly will the result approach to what may be seen by the eye at one time, and the higher will be the æsthetic value of the picture. This is a point which cannot be too strongly insisted on; the wide-angle lens may have its uses when we want small panoramas, but it can never produce a beautiful picture. When this is wanted the right thing to use is one of the lenses of a long-focus doublet. I know that many of the cameras of this day will not take such a lens; more's the pity! They will have to be made longer.

I see no reason why the photographic portrait should not rival the work of the brush in all the qualities most valued in a portrait. As a matter of fact it does not, but the reason I take to lie chiefly in the abuse of retouching. This craft, which ought to be an art, like making composites, or printing in sky, or any of the many tricks of the trade, is of great value in its proper place. Unfortunately, there is no agreement as to the proper place for the retoucher, and I would rather see the creature abolished entirely than let him continue his present work of destruction. There are many real defects inherent in photographs of human beings, such as the exaggeration of scarcely perceptible spots on the face till they appear like the marks of small-pox. In clearing away such offensive marks, and otherwise making the portrait more like nature than it could be without such aid, the retoucher is doing a useful work. In order to know just where to stop in this improvement, the person intrusted with the business ought to be an artist, and not a mere user of the pencil, and, farther, ought always to see the subject of the portrait, so as to be more sure to destroy none of the characteristic lines of the face. Really good large portraits are one of the rarest things in the world, but they might become common enough if the retoucher could be kept in order. Probably the reason why the best work, both in portraiture and landscape, is produced by amateurs is that they (the amateurs) are often unable to retouch, a fact for which I believe that they are not duly thankful. Far be it from me to assert that the products of the average amateur approach at all near to those of the average professional, but I do distinctly maintain that the very highest work in all departments is done by amateurs (that of the unapproachable Rejlander alone excepted; he, in truth, seemed to possess the merits of both classes).

I suppose that Rejlander must remain still for long entirely without rival, the king of photographers; but I say it is to the shame of the present generation that with all the advantages placed in their hands by science and mechanics they have not among them one such artist. It may be that even the name of Rejlander may be strange to some of this day, but if they could see some of his portraits they would go and hide their diminished heads in shame and wonder.

I believe that when Rejlander was about to take a portrait it was his practice to invite his sitter to breakfast and study his gesture and

expression while at ease and unconscious, and afterwards proceed to arrangement and lighting with great deliberation. How different from the practice of the modern fashionable photographer, who knocks off sitter after sitter during all the hours of daylight! In truth, considering the system by which they are produced, I marvel that his results are not worse. By the way, I wonder what has become of Rejlander's negatives; all his photographs that I have seen were beginning to fade.

A department of portraiture which receives far less attention than it deserves is one to which I have already referred briefly—the photography of men and women at work. In this subject there lies an inexhaustible supply of material for real pictures. The difficulties, it must be admitted, are not few; workmen are often enclosed in ill-lighted workshops, or in places where there is no room for a camera, and the photographer must go to them; he cannot bring them into his studio and expect to get them posed there in really natural attitudes. The position assumed by men and women in the performance of any manual labour which they can do well is nearly always beautiful and full of the grace of strength and simplicity. Walt Whitman knew this well when he wrote "The Song of the Broad Axe."

Now, I have said over and over again that a photographer must, before everything else, be an artist; secondly, he must be something of a scientist, but that he may certainly acquire by taking thought. But suppose one to say, "I am not an artist, but I want to make photographs." Like *Punch*, I would say, "Don't!" but if he needs must, these is still hope for him of attaining to a fairly high level, although not the highest.

It is said that the artist must be born, which is a common fate, and not made, which is false; for, like other men, he must submit to both of these processes of nature. The photographer who wishes sincerely to improve his work must seek to do so by first improving himself, which is by no means impossible. To begin with, he must not imagine that he will gain anything but woeful confusion by studying the productions of those who have written on "art in photography;" and he need not expect to get much from any writings whatsoever, except in so far as they may induce him to look to the right models for the training of eye and sense.

To become an artist a man must discover what is beautiful, and study it patiently and lovingly for his whole life long. Let him read Ruskin, and go to the Turner pictures in the National Gallery, not once, but many times, until he feels that he could spend the rest of his life contentedly in contemplating one of those miracles of man's handiwork. Let him read Ruskin or not, as he thinks fit, and go out into the fields and woods and use his eyes and leave his camera at home, for it may sound paradoxical, but it is nevertheless true, that by so doing he will in the end produce better pictures. There are fewer rarer qualities than a sense of colour; women have it a little more often than men, but even in them it is usually weak. The photographer working in monochrome is more likely than other men to lose or never to acquire an appreciation of colour, so I would say that whatever else he does or neglects he should study colour, for there is no doubt that the more he can appreciate one phase of beauty the better will be his knowledge of all others.

I look forward to the time when the photographers' rooms will be decorated with paintings glowing with rich colour, and the artists' studios with photographs.

COSMO I. BURTON.

EIKONOGEN.

THIS new developing agent has certainly come to stay, at least until something better is discovered. The rapidity with which it works, the clear black and white negatives that are so readily obtained with it, reminds the worker of collodion days and the iron developer. There is perhaps a little more care needed in judging of time in the longer exposures where small diaphragms are used in the lens; but for instantaneous work with large openings in the lens, eikonogen works with all the vigour of pyrogallol, and will give more detail in negatives of the same exposure than when using pyrogallol, without the risk of staining or fogging the negative.

Dr. J. Sehnass, in *Photographisches Archiv*, speaks thus of his recent experiments with the new developing agent:—

"For the past six months I have worked only with hydroquinone. The action and formulæ for this developer are closely analogous to eikonogen, it is therefore not very difficult to become acquainted with the latter.

"Experience shows in both cases that fresh solutions are only useful for the development of instantaneous views, whereas time exposures should have an addition of bromide of potassium, or, better still, should be developed with partly old developer. It may also be stated for

both developers, that carbonate of potassium develops quicker than carbonate of soda, but at the same time it has also a greater tendency to frilling. Under these circumstances an alum bath would be advisable in both cases.

"Preliminary baths have been used very seldom for hydroquinone, which is certainly a good thing in its favour; these are recommended, more for oxalate and lately for eikonogen, to help under-exposures, particularly in instantaneous pictures.

"In the rapidity of development of the latent picture, with equal strength and the same age of the solutions—whether fresh or already used—and equal quantities of the same carbonated alkali, I have observed no difference with equal duration of exposure on the same kind of plate. But in the strength of the negative there is an essential difference in favour of the hydroquinone. The latter develops undoubtedly much more powerfully, while the eikonogen produces less depth, but better half-shadows. The latter is therefore better for portraiture, while the hydroquinone is more suitable for landscapes and reproductions. The formula for mixing the eikonogen solutions, as published in the prospectus by the manufacturer, has given the best results, while the prescription of E. Vogel, published in the last number of the *Archiv*, recommending only half the quantity of eikonogen and more alkali (carbonate of potassium) gave flat, much too weak, negatives, requiring always strengthening.

"Plates developed with eikonogen, even if applied in extra strong solution, require, with the exception of the instantaneous negatives, almost always intensifying, at least for albumen prints."

What Dr. Schnauss says about the details in the half tones we have confirmed by our own experiments; but we cannot agree with him about hydroquinone being better for landscape work. With reasonably good judgment of the light, negatives of the highest character can be obtained with eikonogen, and in every respect equal to hydroquinone. There is also the added advantage that eikonogen works much more rapidly than hydroquinone. We have developed a number of negatives with eikonogen and have never found it necessary to intensify them, unless the eikonogen solution was too weak. Here also we may remark that weak solutions with much alkali have a tendency to fog. The negatives from weak eikonogen developer were flat and without density, thus confirming what Dr. Schnauss says about the use of more alkali and less eikonogen.

It is probable that eikonogen will be cheaper, like all other new developing agents, as economy in its manufacture is attained; but when we take into consideration its rapidity of action compared with hydroquinone, and its freedom from the foggy and staining qualities of pyrogallol, it seems destined to be a very decided improvement in developing agents.

—*Anthony's Photographic Bulletin.*

Foreign Notes and News.

THE expanse of land and sea which separates the two countries does not prevent a sociable exchange of amenities from taking place between Switzerland and the United States. An arrangement, namely, has been entered into by the three Swiss photographic societies and the New York Society of Amateur Photographers, by which the former will combine and send to the latter once a year a hundred slides of Alpine scenery in exchange for a similar number of selected American landscapes.

A LARGE panoramic orthochromatic photograph of the neighbourhood of Geneva, including the view of the Salève and the Alps, 50×60, has recently been taken by the Messrs. Charnaux Brothers. Our contemporary, the *Revue Suisse*, pronounces it a perfect tableau. Should the united societies place this among their first consignment the result will probably be to stimulate still further—if any stimulation is needed—the almost feverish activity of the American amateurs. We may be quite sure they will not rest till the compliment is returned in quality as well as kind, for the Americans do not like any one "to hold over them."

AMONG the more interesting exhibits of the Berlin Jubilee Exhibition appear to have been those comprised under the heading of Astro-Photography; and among these the admirable results obtained by Herr Eugen von Gothard (Herény in Hungary) seem to have been especially deserving of the highest commendation. This astronomer worked with orthochromatic plates and a ten and a quarter inch reflector, thus proceeding in the direction indicated some time ago by Professor Piazzi Smyth in the columns of this JOURNAL as the one most likely to be attended by success. Some of the results were obtained with an exposure of three hours and twenty-five minutes; a fact which, of itself, is sufficient to indicate the progress recently made in sidereal photography, for it is not long since it was thought a triumph of practical skill to succeed in keeping a telescope pointed to the same part of the heavens for over two hours

with sufficient accuracy. But the principal point is the success in photography by means of a reflector, and the fact that the results obtained with so small an instrument are nowise inferior to those of the Brothers Henry, obtained with their big reflector, but even show stars which do not appear on their charts. An additional point of interest is to be found in the fact that where the plates were exposed longer than necessary the image of the star on enlargement appeared with six rays.

HERR C. FABRICIUS, of Vienna, has constructed a ligroine gas lamp, which produces a hot colourless flame, especially applicable for the Aner light. The apparatus consists of a reservoir for the ligroine—a kind of essence of petroleum—which is sucked up by an asbestos wick, and conducted into a metal tube heated by a spirit lamp. A gas is thus formed causing a certain amount of pressure, and, mixing with air entering by lateral openings in the side of the tube, burns with a very hot, pale blue flame. The light is said to be of great whiteness, and, thanks to its richness in blue and violet rays, possesses a photographic power far superior to that of ordinary lamps.

It is amusing to read, in this year of grace and supposed general distribution of scientific knowledge, of the alleged discovery in Sweden of a new optical glass, whose wonderful qualities enable it to increase the power of microscopes and telescopes to a miraculous degree. Miraculous truly! for the glass in question is stated to have a refractive index 500 times that of ordinary glass. In addition to this it is said to be achromatic! These entertaining statements have been made, by the way, not in the *Timbuctoo Courier* or the *Central African Advertiser*, but in some of the daily papers of enlightened Germany!

ANOTHER of those picturesque differences of opinion of which the Fatherland appears so prolific, and which, at one time, seemed about to render the Berlin Jubilee Exhibition a fiasco, has recently been convulsing the interior economy of the Photographic Union of Berlin. Dr. Stolze, the President of that Society, has hitherto figured as the editor of the *Photographisches Wochenblatt*. It appears that he was recently served with notice to quit, but some formalities having been neglected in the appointment of his successor, Dr. Miethe, a controversy of a rather bitter and personal nature took place between the supporters of both gentlemen. The result was that the last meeting of the above-mentioned Society was much more interesting from the point of view of the psychologist than from that of the photographer. What the bone of contention exactly was it is very hard to make out; that there was a bone of contention, alas! is only too apparent.

AT the last meeting of the Zurich Photographic Club, Herr Bretsches exhibited a number of Alpine views by Herr Rzewnski of Davos, as well as several negatives on eosine-silver plates. Herr Schultheiss showed an ordinary plate, one half of which was exposed in the usual way, the other half behind a yellow disc. This latter showed a much greater amount of detail, but those present were not agreed as to whether this fact was due to the yellow disc or to the more lengthened exposure. Some interesting exhibits were also shown by Herr Böhni.

Our Editorial Table.

DIE PHOTOGRAPHIE MIT BROMSILBER-GELATINE UND CHLORSILBER-GELATINE.

VON PROFESSOR DR. JOSEF MARIA EDER. Halle a. S.; WILHELM KNAPP.

LEHRBUCH DER PHOTOGRAPHISCHEN CHEMIE UND PHOTOCHEMIE.

VON ALEXANDER LAINER. Halle a. S.; WILHELM KNAPP.

WE shall here merely acknowledge the receipt of these two excellent works, the former of which, containing 476 pages and 206 illustrations, is the fourth edition of Dr. Eder's valuable work; and the latter, a seemingly exhaustive treatise on photo-chemistry, of 260 pages, deferring till a near future a full notice of them.

PHOTOGRAPHS OF THE RED END OF THE SOLAR SPECTRUM.

By F. McLEAN, M.A., F.R.A.S.

THIS pamphlet, reprinted from the *Monthly Notices* of the Royal Astronomical Society, contains a page illustration showing the A group of the solar spectrum, from the photographs by the author, enlarged about eight and a half times.

SUN ARTISTS. No. 1.

LONDON: KEGAN PAUL, TRENCH, & CO.

THIS is the first number of an illustrated monthly work which has for its *raison d'être* the emphasising the artistic claims of photography by reproducing the best work of the best photographers in the best possible manner.

The projectors have acted most wisely in the selection of the artist by whose works this number is illustrated. Mr. Joseph Gale ranks, and for many years has ranked, among the very foremost of those whose artistic taste and manipulative skill have conducted to elevate photographs from scientific facsimiles of nature into the realm of art.

There are four of Mr. Gale's works in the number before us, respectively his *Sleepy Hollow*, *A Foggy Day on the Thames*, *Brixham Trawlers*, and *Homewards from Plough*. These are all executed by the photogravure process employed by the Typographic Etching Company, and all hand work upon the plates has been scrupulously avoided. This is well, at any rate in the present instance, for we cannot conceive of any work of even the most skilled engraver which if put upon the etching of *Sleepy Hollow* could improve it in the slightest degree. The text matter is of the most racy character, and is from the pen of Mr. George Davison.

Sun Artists is sure to take well, for never before has such an admirable five shillings-worth been offered to the public. It is of large size, and well printed on fine hand-made paper.

THE TERPUSCOPE.

UNDER this name Mr. Alfred Wrench, of the firm of John Wrench & Son, the well-known lantern manufacturers, has just completed the invention of an optical lantern so different in construction from all others as to merit special notice. As will be seen from the engraving,



it is rather taller than a single lantern of the ordinary form. It has a square recess, with grooved side guides in front and immediately below the condenser. When a slide is inserted, the screen now being quite dark, this is what takes place:—Upon giving one turn to the winch handle, which is seen projecting at the left side, an opaque curtain which obscured the disc rises and reveals the slide now projected on the screen; and after time has been allowed for its examination, during which the second slide of the series is inserted in the same manner as was the first, the handle is again turned, causing the curtain to descend for an instant and immediately to rise again, showing the second picture standing motionless upon the screen. The slide which was first seen is now standing in a groove above the optical system ready to be lifted out, and the action described goes on automatically all through the series. This system entails all the slides being of uniform size and unmounted; but so well has every provision been anticipated, that at any stage a mechanical or other slide mounted in wood can be inserted, *in situ*, without this being discovered by the spectators and withdrawn again; or the rolling curtain effect may be temporarily or altogether suspended, the lantern then becoming, for the time, one of the ordinary class.

The inventor claims that one great advantage of this rolling curtain effect is, that between each slide, the screen having been made black for a few seconds by the curtain rolling down, the eyes are relieved from the great glare; and each picture all through the entertainment comes as fresh and bright to the eyes of the spectators as the first slide exhibited.

The space below the floor of the lantern proper, on which the lamp or lime burner stands, is utilised for holding a Russian iron box, which contains sixty photographic slides, and an oil-can large enough

for holding sufficient petroleum for a two hours' entertainment' besides space for chimney and tools.

Acquainted as we are with the various ingenious contrivances invented by Edwards, Davenport, Cowan, and others for producing dissolving or curtain effects by a single lantern, we think that in this "Terpuoscope," which is complete in itself, is to be found such a balance of advantages as will secure for it an enviable position amongst the high-class lanterns of the future. We need scarcely add that the Terpuoscopic system can be applied to every lantern the optical system of which is the requisite height from its floor.

ILLUSTRATIONS (1, St. Swithin's-lane) this month is exceptionally valuable from its containing an admirable portrait of the late Wilkie Collins, printed in phototype, the text matter accompanying which is written by Charles T. J. Hiatt. In addition to numerous other "illustrations," in all cases nicely printed, there is a full-page one (in phototype, by Meisenbach process) of the marble group *Hylas and the Water Nymphs*, by John Gibson, R.A.

THE COVENTRY EXHIBITION.

This Exhibition, which opened on Tuesday evening, remains open till Saturday evening. It is a very successful one—many high-class artists contributing. Silver medals have been awarded to Messrs. Lyddell Sawyer, A. Seymour, T. W. Owen, and W. D. Welford; and bronze medals to Messrs. F. M. Sutcliffe, J. E. Austin, J. W. Green, T. H. Faulks, B. J. Wilkinson, and W. W. Winter. There may be others besides those named, but the foregoing are given in the local paper from which our list is compiled when going to press.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,528.—"New or Improved Lifters for Photographic Plates, Papers, and Films." T. STANWAY.—Dated October 19, 1889.

No. 16,778.—"Improvements in Photographic Cameras and in Apparatus connected therewith." S. D. McKELLEN.—Dated October 24, 1889.

No. 16,788.—"Improvements in Dark-room Photographic Lamps." W. TYLAR.—Dated October 24, 1889.

No. 16,903.—"Improvements in Cameras and Dark Slides for the same." W. I. CHADWICK.—Dated October 26, 1889.

No. 16,909.—"Fastening the Shutters of Dark Slides of Camera Backs, Film Carriers, Roll Holders, Changing Boxes, &c., to be known as 'Sands's and Hunter's Improved Locking Spring.'" C. SANDS and J. J. HUNTER.—Dated October 26, 1889.

No. 16,955.—"Improvements in Camera, Music, and other Stands." M. JUSTIN.—Dated October 26, 1889.

SPECIFICATION PUBLISHED.

No. 14,652.—"Photographic Cameras." KERRY.—Dated October 26, 1889. Price 8d.

PATENTS COMPLETED.

IMPROVEMENTS IN MAGIC LANTERN SLIDES AND APPARATUS IN CONNEXION THEREWITH.

No. 16,785. WALTER POYNTER ADAMS, Springwell, The Terrace, Barnes, S.W.—September 28, 1889.

My Improvements relate to the substitution for glass of a flexible and transparent support for the picture, in slides used with the magic or optical lantern. Gelatine, algin compounds, and celluloid are suitable for this purpose.

Slides made with such substitute may be of the usual square form or in strips.

The following is a description of one way in which a series of photographic views may be produced, in a strip, with gelatine as the support:—

Each view is printed on a special paper known to the trade as "transferro-type paper," and then squeezed in a row on to a smooth, even surface—glass will do—carefully levelled and previously polished with French chalk; when dry the paper is removed with hot water, leaving the picture film adhering to the glass; over all is flowed a solution of gelatine so as to form an even layer. A solution of gelatine prepared as follows gives good results:—For a series of twelve views three and a quarter inches square—the glass being about four inches wide—dissolve three-quarters of an ounce of gelatine in eight ounces of water; this is filtered and applied hot. When "set" it is soaked for five minutes in a saturated solution of chrome alum, to render the gelatine insoluble; it is then well washed, and again soaked in a solution of one ounce of glycerine in fifteen ounces of water. When thoroughly dry the strip is cut to the required width, and a length of four inches left at each end for attachment to rollers; then the whole layer of gelatine, with the picture films adhering, may be stripped from the glass.

In connexion with the strips of pictures I use roller holders to bring each view into place in front of the lantern condenser.

The rollers are placed on opposite sides of a frame, whose position when in use is in front of the condenser, and the strip is wound on to one roller from the other, so that each view passes the condenser in turn.

The movement of the rollers may be accomplished by hand or mechanically. Claims:—1. The employment of a flexible and transparent substitute for glass as the support for the picture in optical lantern slides. 2. The employ-

ment of roller holders in connexion with the flexible and transparent strip lantern slides.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 14,652. WILLIAM HUGH RUBENS KERRY, Manor House, Poolton, Wallasey, Chester.—October 3, 1889.

This invention has for its object a photographic camera that will be, as much as practicable, self-contained. In its most improved form it will carry its own plates, and automatically, or almost automatically, change an exposed plate for an unexposed one, so that views can be taken in quick succession. It can be carried under the arm, and the image found and focussed from the top, and then the exposure is instantly effected, without having to alter the position of the sensitive plate, focussing glass, or screen in any way.

In carrying out my invention, I prefer to form the frame of the camera as a simple rectangular box, formed of three main chambers—the ordinary body of the camera, a chamber above this body, and a chamber in front, holding the shutter, the lens, and the focussing glass, or screen. This box has preferably three orifices, one immediately in front of the lens, one immediately above the focussing plate, and the third (which is not necessary, but useful) immediately behind the sensitive plate carrier, at the back of the carrier. These are all supplied with opaque slides or lids.

On the shutter, considerably above the exposure orifice, I place a diagonal reflector, so arranged that, on this reflector being brought immediately behind the lens, the image shall be reflected on to a ground glass (or focussing screen); immediately above the ground glass I place an orifice, normally closed by a sliding shutter in the top of the camera.

The exposure shutter is supported by springs from above, or is otherwise counter-balanced, so that when pulled down by means of a string at the bottom, or the winding up of a roller, or otherwise, it shall spring back, thus taking the reflector away from the back of the lens, and immediately and momentarily exposing the plate by causing the exposure orifice to pass between the lens and the said plate, the shutter stopping when its perforated portion has passed beyond the lens. The lower part of the shutter can be formed of opaque cloth, or can be of wood, or other material; and if required to pass through the bottom of the camera, is protected by a waterproof or other opaque bag or sleeve. In practice, however, this can be obviated by causing it to be wound round a roller, instead of being drawn out through the bottom by means of a string. A spring catch, which can be released by a button or spring from the outside, holds the shutter when it is in its lowest position with the reflector immediately behind the lens.

A little in front of the shutter, between the lens and the top of the camera, I place a shield of cloth or other material, so as to prevent the light which passes through the orifice in front from striking the focussing lens; or, in place of this, a box can be placed in this position, carrying a dark lantern or other useful apparatus.

The opaque slides of the orifice of the focussing plate and the lens are connected, being preferably supported on a web or band, passing over rollers, and kept in the normal closed position by a strong spring. By this means both openings are exposed and closed at the same moment, the strong spring instantly closing the openings whenever the spring catch holding them is released. This spring catch can be of any convenient arrangement, but is so placed as to be released by the exposure shutter whenever the latter lies to the top of the box; and indiarubber buffers are also preferably placed above this catch, or any other convenient position, to buffer the slide when it arrives at its highest point.

Immediately above the camera body I place a second chamber, containing the carriers with their plates, and also a light block or blocks to fill up the remaining space not occupied by the carriers and plates. The carriers can be of any suitable material, preferably of thin cardboard, ebonite, Willesden paper, or other light material, so as to occupy as little space as possible, and yet entirely cover the back of the plate and protect the edges in front, so as to prevent the back of one carrier touching the plate of the next carrier. As many plates as are required for the day are placed in this chamber, and then the block of wood or other material is placed in front loosely filling the remaining space. Two or three sizes of blocks can be kept in stock, so that any one of them can be used as required. A slit in the bottom of this chamber at each end—just large enough to allow a plate and its carrier to pass, but not large enough to allow the block to do so—enables the plates to be passed from the chamber into the carrier frame at the back end, and from the carrier frame afterwards to the front end of the chamber in the manner hereafter to be described.

In the body of the camera I place at the right distance from the lens, and immediately below the back slit in the chamber above, a carrier frame with a slit in the top to enable plates and their carriers to fall into it. This carrier frame has mechanism for drawing it forward, preferably a string at each end passing to a windlass in front beyond the exposure orifice, and in order to enable the windlass to pull absolutely evenly, these strings instead of being each separate are united together at the back of the carrier frame. By, therefore, turning the windlass the carrier frame is drawn forward from one end of the body of the camera to the other, so that it shall come immediately below the front aperture leading from the chamber above. In order that it may be drawn back automatically after having got rid of its plate in the manner hereafter described, the carrier frame is fastened by two or more strings, preferably two above and one below, to a spring roller similar to a blind roller. The two strings at the top, or at the bottom, as the case may be, or in both cases, are united together, being simply attached to the carrier frame by eyelets, so that they can allow for any variation in winding up. Any other arrangement by which the carrier frame can be brought forward in a direction perfectly parallel with the front and back and allowed to fly back by means of a spring can be used instead of the above apparatus. In order to close the two orifices when the carrier frame is travelling, and thus prevent plates falling down into the body of the camera, two bars or shutters are employed, regulated by springs, but preferably connected together at each end by a single spring uniting the two, so that whenever the carrier frame is in an intermediate position these two bars close the orifices, but the moment the carrier frame begins to come into position under either orifice it pushes the bar before it and takes its place. The shutter in the sight hole at the back of the body of the camera is provided with an ordinary

shutter and catch. The space between the upper chamber and the back of the camera, namely, that part just above the roller can be used to keep spare carriers or for any other object.

The mode of actuating is as follows:—A sufficient number of plates and their carriers having been placed in the upper chamber at the back of the block to form a day's supply, the camera is carried out under the arm, or if desired it can be placed on a tripod in the usual manner, slides being fixed on the bottom of the camera to fit the tripod. When a view is required to be taken the shutter is pulled down to its utmost tether, by this means the reflector attached thereto is exactly behind the lens, and a catch holds it in place. The two shutters closing the orifices to the lens and the focussing plate respectively are now drawn back against the pressure of their spring, and an image is arranged and focussed by means of the focussing plate or screen and the ordinary focussing screw. The moment the image is exactly right, as seen from the focussing plate, the spring catch holding the shutter is touched and the shutter released. The powerful springs attached to the latter draw it up, momentarily exposing the plate as the orifice in the shutter passes the orifice into the body of the camera. The moment the shutter reaches nearly the highest point it comes in contact with the spring catch which holds the shutters of the two orifices open, and these are instantly closed by means of the spring attached to them. The carrier frame is now drawn forward by means of the windlass until it arrives immediately below the front carrier orifice. The camera is now inverted, the carrier and plate fall through the orifice into the upper chamber in front of the block, when a slight tilting causes them to fall back against the block or the last plate that has been exposed. The windlass is now let go, the carrier frame flies back, allowing the bar or shutter in front to close the front carrier orifice, the frame then comes in contact with the shutter of the back carrier orifice, pushing it away and taking its place. Another carrier and plate now immediately falls down into the carrier frame, and the apparatus is ready for another focussing and exposure.

In order to regulate the duration of exposure, a simple straight shutter pulled down may be used. I attach weights to the strings; if it be wound on a roller I use retarding or accelerating devices.

As in focussing it is rather difficult to see the image clearly when the light falls on the top, I box the focussing plate in with a fixed or moveable box having a hinged or moveable lid, composed of a lens and its frame. The image first seen in its exact size on the focussing plate, the lens is now placed in position, and the image is magnified, and so more perfectly focussed. This camera can be adopted for taking long exposures by the addition of an ordinary flap or other shutter, or a small stop device can be added to the shutter already described to stop it half way, and thus let it remain open as long as desired. When the stop is withdrawn it closes instantly. When an iris diaphragm is used, its outer milled rim or equivalent is connected with a notched handle or the like outside the camera by means of levers, links, or other mechanism.

The claims are:—1. In a photographic camera, the combination of a box or chamber to contain sensitive plates, and having a slit at each end thereof, a reciprocating plate carriage within a second chamber adapted to receive a plate dropped through one slit and to transfer it again to the first chamber through the other slit when the position of the camera is reversed, substantially as described. 2. In a photographic camera having a moveable carriage for transferring the plates from one end of a chamber to the other, an externally operated winding device connected to the said carriage to effect a steady, forward movement of the same, and a spring device adapted to effect its return, substantially as described and for the purposes set forth. 3. In a photographic camera, the combination of an exposure shutter capable of movement behind the lens, and a reflector capable of rectilinear movement, and adapted to reflect an image on to the focussing screen, and of being drawn aside either attached to the shutter or independently in the manner described, whereby a smaller reflector will reflect a given sized image than is possible with the ordinary hinged reflectors. 4. The arrangement of a small moveable mirror immediately behind the lens, as described in place of the large hinged mirrors now in use, whereby a larger image can be reflected with a smaller mirror than is possible on the old plan. 5. The improved photographic camera, taken as a whole, substantially as described and shown.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 1	Sheffield Camera Club	
" 4	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 5	North London	Myddelton Hall, Upper-st., Islington
" 5	Holmfirth	
" 5	Sutton	Society's Rooms, Sutton, Surrey.
" 5	Sheffield Photo. Society	Masonic Hall.
" 6	Paisley	Paisley Museum.
" 5	Bolton Club	The Studio, Chancery-lane, Bolton.
" 6	Coventry and Midland	The Dispensary, Coventry.
" 6	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 6	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 7	Bolton Photographic Society	The Baths, Bridgman-street.
" 7	Leeds	Philosophical Hall, Leeds.
" 7	Dundee and East of Scotland	Lam's Hotel, Dundee.
" 7	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 7	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 24.—Mr. A. Haddon in the chair.

A question from the box was read:—"What is the best method of producing negatives in the studio in misty weather?"

Mr. F. A. BRIDGE suggested using isochromatic plates, and giving ten times the usual exposure.

Mr. W. E. DEBENHAM said that insufficiency of light was not the great difficulty in the way of producing good negatives in the studio in misty weather, but the presence of particles in the atmosphere, which, being illuminated, caused a veiling or fogging of the shadows. To minimise the evil, as short-focussed a lens as would serve the purpose should be used, as of course the nearer the camera is to the sitter the less thickness there is of misty atmosphere to contend against. For full lengths and for any purpose where it is not practicable to be near the sitter, he used a framing covered on the top and one side, which shaded the air for the greater part of the distance through which the light had to travel from the sitter to the lens. Of course, too, a good fire in the studio would dissipate a great deal of the haze.

Mr. BRIDGES remembered a few years ago he had seen some such arrangement as the shade described by Mr. Debenham in a West End studio, and he understood that it was effective.

Mr. W. H. HARRISON said that the air should be filtered through wet screens of coarse canvas, as was done in the House of Lords.

Mr. A. COWAN had known cases when he could not get a full-length portrait on account of the mist present, but had succeeded with a large head when the camera could be brought near the sitter.

Mr. Morgan exhibited a camera by Mr. Jowett, of Romiley, Stockport, in which the back was made to revolve so as to serve for either the landscape or the upright plate, and that without increase of size of the instrument. Another point in the camera was the manner in which the front was given a considerable amount of play, both laterally and vertically. The dark slide also might be inserted at either end of the camera back, and when used vertically might be inserted downwards from the bottom instead of the top, and the shutter is then drawn—a consideration that would be appreciated by those who used large cameras.

Mr. J. HUBERT then read a paper on *Bronze Enlarging*, and afterwards proceeded to demonstrate the process in the presence of the members. In the course of his paper he recommended those who used daylight for enlarging to employ a sheet of tin coated with Aspinall's or other pure white enamel outside the negative as the source of illumination to form the image. Personally, he had abandoned daylight work, as the exposures were so variable, and used a lantern. With an oil or gas lamp, he said, it is well to interpose a diaphragm between the flame and the condenser to cut off all but the most luminous rays, else sharpness of the image is decidedly impaired. In case the operator can avail himself of the limelight, he may modify the character of his negatives somewhat by using more or less hydrogen. A very weak negative might be improved by coating the back of the negative with a varnish coloured yellow with iodine. An old cap cut out in the centre, with a piece of yellow glass inserted, was recommended as permitting of the easy adjustment of the sensitive surface by cutting off all but the yellow rays, which are, of course, non-actinic. He recommended making trial exposures by passing a long strip of the sensitive paper through two pieces of brown paper fastened at the sides. The length of the exposure having been marked on it with pencil, it is drawn downwards a few inches, which will, of course, place another portion of bromide paper in position. Dishes for large-sized papers can easily be made out of cardboard; with care they last a long time. One of the large straw-boards is turned up to the depth of one and a half or two inches at the edges all round, fastening them with paper fasteners. Then melting in a common or silver pot a pound or so of wax candles, the fat must be applied to it hot, previously heating the dish all over. When cooled down the tray is ready for use. He concluded his paper by saying that it would now devolve upon him to practice what he had preached. The fear of boring the members with the length of the paper had already proved a strain upon his nervous system, so he begged them not to be too severe upon him whilst he waded practically through a process—perhaps interesting to them only by providing an amusing sketch of the blunders which, alas! even an experienced photographer may commit. The demonstration which followed did not, unfortunately, prove successful. After the trial-pieces had been exposed and developed, the demonstrator considered that a smaller supply of gas would suit the subject better, and lowered it accordingly. The succeeding trials, however, scarcely yielded an image, a circumstance which he attributed to the zinc can from which the water supply had to be obtained. Discussion on the paper was adjourned to the following meeting.

Mr. COWAN handed round two lantern slides to show the slowing action produced by the addition of carbonate of ammonia to the developer, an effect which he had referred to at the previous meeting. The slides had been equally exposed, and developed to the same intensity, but with the carbonate of ammonia six minutes had been required, whilst the same amount of action had been obtained with the other solution in two minutes. Mr. Cowan also showed two slides developed with pyro ammonia and sulphite of soda. One slide had pronounced green fog, whilst the other was remarkably clear. The difference was only in the particular samples of sulphite used. Very contrary experiences as to the production of green fog by sulphite of soda might thus be explained. Another pair of slides exhibited the clearing effect on the shadows on the addition of disulphite of potash to the hypo-fixing bath, in the proportion of one to six of the hyposulphite of soda.

It was decided to have a discussion at the meeting to be held on November 7 on the variations of samples of sulphite of soda that would or would not produce green fog.

The CHAIRMAN asked if Mr. Cowan would bring with him some of the particular kind that had given green fog in his case.

Mr. COWAN regretted that he could not, as it had been thrown away.

CAMERA CLUB.

THURSDAY, October 24, was the first lantern evening of the season at the above Club. Slides by members and friends are shown at these meetings, one of the regular Thursday evenings each month being devoted to the exhibition. On this occasion there was a large and varied collection of transparencies, about ten members bringing or sending up contributions. Altogether about one hundred and sixty slides were passed through the lantern. The chief exhibitor was Mr. T. M. Brownrigg, who exhibited and described a fine series, including views of the Lake District, of Italy and the South of France, at the Paris Exhi-

bition, &c. These gave much pleasure, and Mr. Brownrigg's humorous recital of his experience in photographing the pictures added much to the merriment of the evening. Mr. T. Charters White showed microscopical work and some capital landscapes; Mr. W. A. Greene, mountain scenery from negatives taken on stripping films in a hand camera; Mr. Humphery, Italian views; Mr. J. H. Williams, country views, including one or two charming cottage bits; Mr. Gowan, a varied set; Mr. Hausard, very fine photographs of the Alhambra. (These were beautiful in colour); also pictures by Mr. F. Howlett and others.

Mr. J. F. Roberts had the management of the lantern.

During the evening a small electric dark-room lamp was exhibited by Mr. Freshwater.

On Thursday, November 7, Mr. A. Pringle will give an address on *Exposures*, illustrated by photographs and lantern pictures. Meeting at eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 25.

The PRESIDENT (Mr. Charles Belton) gave an address, and acknowledged the honour which the Society had conferred upon him in electing him to the post of President. He felt conscious of many shortcomings, but, with the co-operation of the Council, he hoped to hand over the Society to his successor in an even more prosperous condition than it was at the present time. He wished now to acknowledge, on behalf of the Society, the services rendered by his predecessor, Mr. William England, whose name was well known; and he considered the Society had been fortunate in having so eminent a photographer for its first President. They learnt, with regret, that he had considered it desirable to resign, but he was sure whenever he felt a desire to attend their meetings a hearty welcome would await him. The President, continuing, said every individual ought to have a hobby of some kind, and all would agree that a more attractive and interesting one than photography could not be found. Photography tended to cultivate the qualities of patience and perseverance, and its pursuit promoted a love of the beautiful and grand in nature. Again, the practice of photography was *suggestive*, and led its followers to experiment, paving the way to future discoveries. Some might be led to study the laws of optics or the science of chemistry, subjects as delightful in their own way as photography itself. The man who could follow the chemical changes which occurred would derive an enhanced pleasure from his work. He would also refer to the opportunities afforded of giving pleasure to others, lantern evenings being always popular and much appreciated.

Slides by Messrs. Power, Rickford, Scanlan, Horton, Kellow, and Wilson were exhibited by the optical lantern.

The next meeting takes place on November 8, when Mr. Lyonel Clark will give a demonstration of his platino-toning process.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

OCTOBER 17.—The members of this Society held their first annual dinner in the Masonic Hall on Tuesday evening last. There was a good attendance. The Vice-President (Mr. T. Firth) presided.

An interesting collection of photographic views—all members' work—was exhibited, many of the pictures having medalled at the various exhibitions. The work sent in for competition for the Society's silver and bronze medals and other prizes was also hung, and came in for a fair share of commendation by all present.

Mr. W. B. HATFIELD proposed success to the Sheffield Photographic Society, and in so doing remarked that the Society had held its own very well, and now stood better than it had ever done. The work exhibited was good evidence of the perseverance and ability of the members.

The PRESIDENT, in replying, expressed his pleasure at the manner with which the toast had been received. The Society had commenced in a small way, and he was pleased to see around him gentlemen who were in at the beginning. True, some had, after continuing for a time, tired and fallen away, yet their presence there was good evidence that still they were at one with us. He was exceedingly proud of the work exhibited; it would stand the severest criticism both for *technique* and artistic quality. In art work the photographer laboured at a disadvantage as compared with his companion knights of the brush, who were able to leave out such of the surroundings and add other items by way of improvement to their productions as was deemed necessary, whereas the lens took in all the small details, whether in balance or not; therefore it behoved them to study with all the accessories used, and add only such as agreed with the composition of the picture desired to be produced.

The next item was the presentation of the Society's silver and bronze medals, and other prizes offered during the year. The SECRETARY having stated the particulars of the several competitions, the awards were presented as under:—"Best series of six pictures"—Silver medal, Ernest Beck; bronze medal, J. W. Charlesworth. "Best single picture"—Mr. Beck. "Best series of three under whole-plate"—Mr. Beck. "Best three stereoscopic prints"—Mr. Bromley. "Best set of six lantern slides"—Mr. Furniss, first; Mr. Beck, second. "Study taken against the light"—Messrs. Beck and Hibbert equal winners.

Mr. ALLEYNE REYNOLDS then submitted "The Advancement of Science," and in so doing he pointed out that photography played an important part in scientific research; for instance, the recent discoveries in astronomy were in a great measure due to it, and here a necessity for faster plates was apparent in order to go further and deeper and more correctly into the subject. The microscopist used it for a better study and teaching of the minute things of creation, and in such had made great progress. The medical faculty also admitted the uses of photography into their researches, and in fact every scientific branch found in it means of advancement.

Mr. HOWARTH, in responding, expressed his pleasure at the happy reception of the toast, and spoke at some length on the recent researches and discoveries made in animalia. He believed that further investigation would reveal greater and more startling facts. He contended that every photographer should be a competent chemist, an enthusiastic and persevering student of science in all its branches, and have a good knowledge of the canons and laws of art in order that his productions should give satisfaction.

Mr. PRESTON submitted "The Advancement of Art," and urged the members to study art in their work. He spoke at some length on the mutual aid that the artist and photographer might render to each other and in many ways give assistance. He contended that each exposure should be well studied, and if on looking at the ground glass of the focussing screen anything was found wanting it should be either procured or the exposure not made.

Mr. F. SALTFLERT, in replying, pleaded not guilty to the impeachment of the artist adding accessories to his painting and removing other items visible in the original, and he claimed truthfulness in the sketch, and a close following of nature in her many moods as the surest way to success. Apart from being a theorist only, he claimed to be a practitioner, and had already found an advantage in the use of the camera as an aid to his work.

Other toasts followed, and songs, recitations, and music were rendered at intervals. A series of lantern slides illustrating the Paris Exhibition were also exhibited, and at a late hour the party separated, having passed an enjoyable evening.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

OCTOBER 17.—The President (Mr. P. Lange) in the chair.

The PRESIDENT read a circular referring to a course of lectures on photography to be given in the University College, Liverpool.

Mr. THOMAS COMBER, J.P., then read a descriptive paper on *Photo-micrography*, during the course of which he passed round several prints of microscopical objects, and also showed some fine slides, through the lantern, of diatoms, &c.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

OCTOBER 28.—Mr. G. A. Bull (President) in the chair.

A mass of correspondence was read by the HON. SECRETARY (Mr. P. E. Knight) relating to the forthcoming *conversazione* and exhibition of photographs, cameras, &c., to be held on Monday, November 11, in the Castle Gate Lecture Hall. Further additions of photographs from Mr. I. Furley Lewis and Mr. R. S. Armitage for decorating the walls were acknowledged.

The HON. SECRETARY also announced the formation of an instruction class for beginners, Mr. T. Carnell undertaking the duties of instructor. A set of twelve phototypes, kindly lent by the Ilford Plate Company, showing the terrible results of the explosion at Antwerp on September 6, were exhibited.

Mr. R. S. ARMITAGE gave a practical demonstration on lantern slide making, and explained the different ways and means of obtaining the best results. Mr. Armitage then proceeded to expose, by means of gaslight, plates of different makers, including Dr. Backelandt's water developing plates, and was highly successful in the results. The mounting and finishing of the plates were also practically shown.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

OCTOBER 2.—Mr. Frederic Graff (President) in the chair.

A paper on the new developing agent known as *Eikonogen* was read by Dr. MITCHELL [this will appear subsequently].

Referring to the statement that the solution was green in colour, Mr. BULLOCK remarked that the pure aqueous solution was pink, and that the green colour was induced by the sulphite of soda contained in the developing solution.

Mr. WALMSLEY spoke most favourably of the new developer, stating that he had used it without the addition of any alkali with excellent results.

Mr. BULLOCK thought this was owing to the presence of some carbonate of soda in the sulphite.

Mr. WOOD had found difficulty in correctly timing the exposures of transparencies on slow gelatine plates, but with plates as rapid as Cramer's 50's, at a distance of ten to fifteen feet from the source of light, he had obtained excellent and certain results with about one second's exposure.

Messrs. RAU and DILLON questioned whether a desirable colour could be obtained with such rapid plates.

Mr. SUPPLEZ called attention to some plates he had recently seen coated with an opaque varnish for use in that species of etching in which a glass plate forming a negative was used instead of a copper plate and the usual process of biting by use of acid. The process was similar to that in use for twenty or thirty years, in which a plate was coated with collodion, sensitised, exposed, and developed, and then used as a surface on which to operate with an etching needle.

Correspondence.

✉ Correspondents should never write on both sides of the paper.

BLACK MATT PRINTING.

To the Editor.

SIR,—There is evidently a great amount of interest shown in the above subject. It has occupied my attention for about two years, during which time I have been constantly working it, having during a course of experiments discovered a very successful, simple, and certain mode of working. The difference between mine and the usual treatment of albumenised paper may briefly be summarised as follows:—

1. Any suitable paper may be used and salted in the usual way.
2. The floating (sensitising) bath is prepared with modifications and additions of an important character.
3. After printing in the usual way the prints are washed thoroughly, but to the last water but one a few drops of a concentrated solution are added to every pint of water; this I term the preparatory bath.
4. Two toning baths are used. The prints are first immersed in bath

No. 1 till they assume a rich chocolate; they are then slightly rinsed, and placed, one or two at a time, in bath No. 2, which acts *very rapidly*, a few seconds only being necessary to produce a beautiful velvety black tone, which *does not alter* in the fixing bath.

5. Both toning baths keep indefinitely, and there is, therefore, no waste of toning solutions; occasional strengthening keeps them always in working order.

I notice the summary of a paper read by Mr. Clark before the Camera Club: the results he obtains would, I imagine, be somewhat similar to mine. I have not yet seen any results by Mr. Blanchard's process, but expect they also will be similar.

I, however, claim priority of introduction. Two seasons ago I exhibited a number of prints, being reduced representations of charcoal drawings; from that time till now they have been exposed for sale in one of the art shops in Nottingham.

I have sent three small frames to the Pall Mall Exhibition (P.S.G.B.) now open, Nos. 119, 201, and 356, but, unfortunately, no mention is made in the catalogue of the special means of production. I was quite unprepared for the Exhibition, or would have sent additional work in the form of views, and with much regret I was unable to do so.

Apologising for the space I occupy, which is only warrantable on account of the importance of the subject,—I am, yours, &c.,
Nottingham, October 29, 1889. S. ROBERTS STEVENSON.

LANDSCAPE ART.

To the Editor.

SIR,—Mr. Davies's reply to my questions about his remarks on landscape art is going so far from the point that it is impossible to consider it a satisfactory answer. That the development of the landscape art is comparatively newer than historical art is an undisputed fact; but whether photography has anything to do with this development, that is quite another question. A long time before photography was thought of the landscape art was as highly developed as it is now, and for this reason can the "one remark" about *Liber Veritatis*, &c., not settle the matter. Likewise is the quotation from the editorial column of this JOURNAL not coming to the point, as there was never said or hinted anything of "revolutionising" the landscape art.

Relative to the second point, about "several of the most famous names in art circles" using photography in the way indicated by Mr. Davies, I can only say that any one acquainted with painting will easily understand that a design of a landscape, produced on canvas by photography, will never give the painter any advantage whatever, as, for instance, any line over-reaching the sky would disappear by painting the sky, &c. Besides, the landscape art depends entirely on colour. Vegetable life is prominent, but it is expressible only as it becomes in harmonious unity effectual to the whole, and for this fact any design in the way of a photograph can be of very little consequence to the artist.—I am, yours, &c.,
38, Crown-street, Liverpool. F. B.

TUNBRIDGE WELLS EXHIBITION.

To the Editor.

SIR,—May I ask you to be kind enough to announce that the third Annual Exhibition of the above will be held on November 23 and 24, and that there are classes for amateurs and professionals? Silver and bronze medals are being offered for competition. Entry forms and all particulars can be obtained of the Hon. Secretaries, Joseph Chamberlain, 14, Calverley-park-gardens; B. Whetton, 15, St. John's-road. By so doing you will greatly oblige, yours, &c.,

JOSEPH CHAMBERLAIN, Hon. Secretary.

14, Calverley-park-gardens, Tunbridge Wells, October 28, 1889.

AMATEURISM.

To the Editor.

SIR,—From the tone of a recent letter which appeared in this paper over the signature "An Amateur," I opine that in the event of professional photographers declaring open war against the so-called amateurs of the present day, they will have on their side the moral aid of the true amateur. Before going further, it will perhaps be advisable to distinguish between these two—the so-called, or rather the self-called, amateur and the true. To take them in their proper order, "the true amateur" is he who from a natural love of the beautiful in art and nature pursues the art—science of photography at his own expense—that is to say, he does not interfere with it in its commercial aspect; he takes photographs because it is his own sweet will to do so, and would consider it beneath him to sell his productions for money. The true amateur may be a rich man, he may be poor; but, whichever be the case, he does not begrudge the cost entailed in the pursuit of his study. He does not want to fill his pockets at the expense of his neighbours; all his ambition is to produce good work, that he may gaze upon and show to his friends as produced by himself. All honour to such men, say I, for in their unselfish love for the art they do far more good than harm. The amateur, as a rule, has more time at his disposal for experiment than has the professional, and photography has at various times received much and substantial aid as the outcome of the experiments of such men, and, what is more, has received it

freely. The amateur who makes a discovery that has any bearing on photographic progress is usually only too ready to present the same to the profession. The roll-call of the amateur photographer contains the name of many a good man and true, and if at any time my pen may seem to cast discredit on the amateur, I trust it will not be imagined that it is to such men as these that I refer.

Now for the other section—the self-styled amateur, who is really a sort of hybrid, or, so to speak, an “amateur-professional,” by which title we should do well to distinguish him from the more honourable and true amateur. The amateur-professional, then, is one who would consider himself degraded by openly working at a trade, for as such he usually designates professional photography, and yet, forsooth, he actually carries on a trade under the rose while designating himself an amateur. He has no recognised place of business, he does not advertise for work in the papers, or issue circulars or price lists to his customers, but he still puts a price upon his work, and by so doing places himself in antagonism to the “tradesman” he looks down upon; in point of fact he is a professional, if we take the rule that “an amateur is one who does not work for money, or has never competed with a professional or for a money prize.” If, then, he is a professional, to what branch of the profession does he belong? From the fact of his having no recognised place of business, and obtaining what work he does by touting, together with the similarity in his scale of charges and in the general quality of his work, I can only class him with that branch of the profession we meet with on the sands or at a country fair, or, say, on the roadside near any favourite suburban resort. Whether the cash obtained in this way goes into the pockets of the amateur-professional himself, or into the coffers of a charity (*sic*), matters little to us; the fact remains that it is taken out of our pockets,—indirectly, perhaps, but nevertheless, surely. As these men increase, so does our work decrease in a corresponding ratio, and wherein lies the remedy? “An Amateur” thinks an appeal to the gentlemanly instincts of these hybrids might be effectual. I venture to differ with him, as I opine that in nine cases out of ten these instincts are absent. The man who calls himself an amateur and acts as a professional is not likely to heed such an appeal; besides, he will tell you he cannot afford to give his work away; it costs him money, and he must have that money back. In justice to such men, I will admit that they act fairly to their customers; they put a fair price upon their work as a rule, and they do so advisedly, for they know that they dare not ask the price that the professional claims as his due. Unfortunately, however, the idea is spreading that professional photographers obtain an exorbitant and unreasonable profit upon their productions, such idea being caused and fostered by the prices charged by the amateur-professional, and the fact being ignored that the professional “has to pay high rents for situation and to keep an effective staff.”

“An Amateur” says that “men claim a legal and moral right to act thus.” So far as legality goes I say nothing, but the moral law is a different matter. I have yet to learn that it proves morality in a man to take the bread and butter out of the mouth of another when he has no need for it himself. Genuine business or professional competition is one thing, unfair competition such as this is of an entirely different complexion. That “they even claim to be charitable by ruining their neighbours” I admit, but then charity always did cover a multitude of sins, and I always look with a certain amount of distrust on obtrusively charitable people. It is very easy to be charitable when you have the means, especially if you obtain those means at the expense of others.

By all means let photographers, both amateur and professional, speak out upon the subject at once; let them show the amateur-professional the light in which they look upon him. It is utterly useless to disguise the feeling that there is with regard to this middleman, who has not only been harming the professional, but has been materially damaging the true amateur, between whom and the professional there had hitherto been a thorough *entente cordiale*; but whose relations have become strained owing to the difficulty, in many cases, of distinguishing between the true amateur and the false. Photographic dealers have been blamed by many as the main cause of the present amateur rage. It is alleged that they supply amateur and professional alike at the same prices, although the former naturally purchases in much smaller parcels. Manufacturers of plates and chemicals do the same thing, and it is here the blame is mostly deserved, although it should be noted that they supply dealers at a much less rate. For example, if a professional photographer applies to the manufacturer of dry plates direct for a quotation, he is told that they can only supply him at the same price as he can obtain the goods from a dealer. Now, a photographic chemist in a small way ranks as a dealer, and obtains a discount upon his orders, while a professional photographer who purchases ten or twelve times the number of plates at one time, receives no discount at all, and, in point of fact, pays the same price per dozen for eight or a dozen gross as he would pay if he procured his plates by the single dozen from a dealer or a small photographic chemist. This is manifestly unfair to the large consumer and is not the case in any other business or profession.

Although agreeing so far with those who accuse manufacturers and dealers of helping the amateur-professional, I cannot agree with them in the idea that if the professional obtained his materials at a less rate he might fight the amateur-professional by approximating his prices. This would never do; let the professional keep up his prices, and, above all, keep up the quality of his work, taking care that no one shall be able to compare his productions unfavourably with others produced by his rival.

In conjunction with “An Amateur,” I anxiously await to hear the voice of others on the subject; it is useless to pretend that it does not interest us, as it clearly touches each and every one of us; not only those with businesses of their own, who are employers of labour, but *employés* equally with employers, as, if the work fall off, less hands will be required to do what is left, and consequently the number of the unemployed will be increased. A serious danger is threatening the profession, and it is now high time that the profession awoke to the fact and devised means to combat that danger.

G. BRANWIN BARNES.

6, Victoria-street, Windsor.

To the Editor.

SIR,—Referring to that vexed question of Amatenism, may I be allowed, from a humble place in the ranks of the profession, to suggest to amateurs that they charge the full market value of the work they supply? It is manifest that amateurs supplying photographs cheaply, or at cost of the materials, must do the profession some harm, as there are many people who would take anything for cheapness; but, charging a fair price, all work would stand on its own merits, and the number of amateurs the profession has to fear would be very materially reduced.

I do not share the opinion of so many people as to the great harm being done by the former class to the latter. Most of the business of a professional photographer lies in portraiture, which few amateurs attempt beyond the circle of their intimate friends, and friends, as a rule, don't think much of one another's work—“A prophet hath no honour in his own country.”

I cannot see, however, why a man who devotes only part of his time to photography, and yet produces work *equal* to a professional, has not a perfect right to sell it. That is only in accordance with free-trade principles. The harm and *real injustice* lies in the work being sold *too cheaply*.

I hope the time is not far distant when the objectionable distinction will be forgotten, and both amateurs and professionals will work together as brother artists.—I am, yours, &c.,

M. W.

Chelsea.

To the Editor.

SIR,—The letter signed “An Amateur,” which appeared in your issue of October 25th, raises a question which has been much discussed, and which if let alone I fancy will settle itself.

“What is an amateur?” is a question which needs settling before a letter such as “An Amateur's” can be answered. I am an amateur, and have no intention of becoming anything else, and yet I am prepared to take pay for the work which I produce. I am an amateur because I do not make a business of photography, but I suppose “An A.” would dub me a “pro.” because I take pay for what I do and what people of my acquaintance desire to possess. I go out with a picnic, and in a suitable place and suitable circumstances take a group which never would have been done had it depended upon professional skill. I take a church for which a bazaar is being held, and supply a dozen copies for people who desire them, and so assist the funds. I take a landscape which cannot be had from any professional, and supply copies to people interested in the scene, for which I am paid. Am I, because I am an amateur, to refuse to do these things simply because “An Amateur” chooses to style me “No gentleman?”

It is too late in the day to attempt to set up monopoly in anything, which appears to me to be the purpose or desire of “An A.” The only way left for the profession is to make their work superior to that of the amateur, and so long as they do this there is no fear of ruin from cheap competition.

“An A.” suggests the possession by the professionals of suitable plant for the purpose of their business. With this and the practice they have, competition from amateurs ought to be impossible, but if they turn out work which can be equalled or surpassed by amateurs let them take the consequences.

I am proud in knowing that we have such complete liberty of action in our great and free land that, so long as we do not inflict injury to our neighbour by interference with his lawful rights, we are at liberty to do anything which pleases or profits us.

My own honest impression of the supposed injury to the profession by amateur work is that it is a myth, as I don't think the profession was ever better patronised or more liberally paid than it is at the present moment. I admit that there is now little room for “quacks,” and well it is there is not, for their work is worth little more than what is obtained by the average amateur—nothing.—I am, yours, &c.,

ANTI-MONOPOLY.

To the Editor.

SIR,—“Amateur,” in your last issue, writes very absurdly. Professional photographers are not fools; as men fitted to enter business with some prospect of success, they study well the *pros* and *cons* before they make the venture. No sensible man would place his capital in any business whose condition of success depended on the army of amateurs, or pretended amateurs, not doing what “Amateur” tells us some do.

Amateurs, or pretended amateurs, have *truly* a legal and a moral right to sell their labour at what price they think proper, or to give that labour free, if it be their pleasure. It is presumption and impudence in any man to find fault with them for so doing.

Professional portraiture is a small item in photographic work. Photography soars higher, and these higher flights are by amateurs.

But to return. Let me tell "Amateur" that the "pent-up smothered ill-feelings" of which he writes are not in the professional photographer. No, they exist, I am happy to say, in a few only of men of independent means, who have taken to photography as a pastime, and who imagine their social position lessened by being classed with others less fortunate than themselves under the name *amateur*. This is the real sore, and is the root of the amateur question.

Exhibitions and prizes given settle the question, "What constitutes the amateur competitor?" which is enough for all practical purposes.

I also am an amateur, and one who takes no money for photographic work, but freely gives it away, and which I consider I have a perfect right to do.—I am, yours, &c., J. SROBY.

October 28, 1889.

Exchange Column.

Would exchange Dallmeyer's 2s for twelve-inch studio or view camera.—Address FRANZ BAUM, Manchester.

Wanted, whole-plate lens by good maker; exchange, genuine Spanish guitar.—Address, CHARLES JOHNSON, High-street, Wincanton.

Will exchange whole-plate Universal studio camera with lens by Watson, also fifteen and a half inch burnisher; wanted, outdoor set with rapid rectilinear lens.—Address, R. CARTWRIGHT, Photographer, Brighton.

Books on photography (for amateurs), treating of exposing, developing, printing, toning, &c., also a few cabinet photographs, in exchange for fireworks or Godeve's *Mechanics*.—Address, J. R. RIGBY, Howick House, Burscough, near Ormskirk.

Answers to Correspondents.

PARTICK.—The suggestions are receiving consideration.

J. H. W.—1. Apply to Messrs. Marion & Co., Soho-square.—2. Liesegang, Dusseldorf.

REGULAR READER has omitted to send name or address. If he writes again he must repeat his query.

A. H. C. CORDER.—See in "Our Editorial Table" in this number an account of a lantern having the rolling curtain effect desired.

E. G. REYNOLDS.—The lithographs of watering-places got up in the style of photographs may be obtained wholesale from most of the fancy warehouses in the City.

R. CARTWRIGHT.—If your former exchange did not appear it was probably because it was unsuited for that column or not constructed in accordance with published instructions.

J. COOK.—Probably if the positive be varnished and dried by heat its transparency will be restored. The best method of obtaining copies from it will be to print as from a negative.

A. M. W.—Walery, Regent-street; Faulkner, Baker-street; and Tunny, Edinburgh, will make a reduction from your negative and produce a coloured enamel picture suitable for a finger ring.

W. H. J. (Leeds).—Send on one or two of the negatives. From the description, we cannot suggest the cause of failure. The plates are in high repute, and we can scarcely imagine that the fault is due to them.

INQUIRER.—Celluloid and ivory are two distinct materials. The former is a compound of xylidine and camphor, and the latter one of gelatine and a white pigment. One swells and expands in water and the other is unaffected by it.

A. GARDNER.—A wide-angle lens, by reason of its small aperture, is not suitable for instantaneous street views. A quicker lens than this is necessary, such as those of the "rapid" type. Remember the light is much slower now than it was three months back, also that London is not Hastings for light.

SIGMA.—1. For enamelling collodion, methylated alcohol will do quite as well as pure, provided its strength is sufficient. Usually the methylated spirit of commerce is too weak. The specific gravity ought not to be less than .820 to make a really good collodion.—2. All dealers in photographic material will supply pyroxyline.

CANARY BIRD.—It is certainly possible, and quite easy, to get a lens of six inches focus which will give sharpness of everything beyond thirty feet when worked with an aperture of $f/10$. It may be difficult to do so with a larger aperture. To reduce this distance to twenty feet, $f/15$ will be requisite. We could not say more unless we had your lens for examination.

A. has two vats, one for fixing and the other for print washings, but by some means the old fixing baths and print washings have become mixed. He would be glad to know how to proceed to precipitate the same.—Sulphide of potassium (liver of sulphur) must be employed. This will throw down the silver as sulphide of silver. See the recent articles on *Economy in the Printing Room*.

PERPLEXINUS.—The best artificial light for portraiture undoubtedly is the electric arc. We imagine this is available in your town. Next to this is magnesium. So much on this subject appeared in our last volume that we cannot do better than refer you to what is there written. However, if you can secure a supply of electricity, nothing is equal to it for commercial photography.

A. H. R.—It seems to us that the centre of your flame is not quite opposite the centre of the condenser. Measure, and ascertain if this is the case. To test whether the lantern is otherwise right, make use of a candle instead of the regular lamp, and move it up and down, to and fro, until a uniform disc is obtained, no matter how feebly lighted it may be. If you cannot get this, then is there something optically wrong.

W. asks the following questions: "1. Kindly inform me if operators in the best-class studios wear aprons when operating. 2. Also kindly tell me what is the best colour and spotting medium to work up a portrait on albumenised paper?"—So far as we are aware, operators in first-class studios do not wear aprons; certainly they do not when attending upon sitters, as then they are usually in the most *recherche* attire. They may don an apron when in the dark room to save their clothes, but they discard it when in the studio. One gentleman we know of who was in practice some years ago always received and posed his sitters in white kid gloves.

SPOTS writes: "I should feel greatly obliged if you could tell me the cause of spots on the two enclosed pieces of prints—the white spots on the gentleman and the dark spots on the lady. I have seen the dark spots when the prints have been in the toning, or else I should have thought it was something to do with the fixing. A trace of the dark specks can be seen over the gentleman's head."—The spots appear to be due to particles of foreign matter in contact with the surface of the paper. Probably floating particles of pernicious matter from the workrooms have settled on the paper at some stage of the operations—possibly while the paper was drying after sensitising.

ARTIST says: "1. I have got a large number of photographs (landscapes) to colour in water colours, and I find that after the colours dry they are, of course, exceedingly dull, and thus spoiling their beauty. What is used to get the gloss upon the ones I see exposed for sale in the stationers' windows? Are the paints mixed with something (if so, what) before application, or are the prints treated somehow after colouring?—2. My prints (toned to a rich purple) turn brown on immersion in the hypo. What is the cause?"—In reply: 1. Transparent water colours only should be employed, and they should be mixed with gum water.—2. Evidently the prints are over-toned.

B. WOODROW writes as follows: "Would you kindly advise me, through your valuable paper, the best lens for taking a good-size head, say, good cabinet-size vignette? I have a Ross rapid symmetrical and a Vogel cabinet portrait lens; neither of these will take a fair C.D.-V. vignette without distortion. Would a Ross Universal whole-plate take a good-size cabinet head? I have a lens by A. Ross in splendid condition, but it will scarcely cover a quarter-plate, and it is a larger lens than a Ross whole-plate rapid symmetrical."—The diameter of a lens is no criterion of the size picture it will take; that is governed by its focal length. To take a good-size head (cabinet) free from distortion a lens of about fifteen inches focus should be employed. A "Universal" is the best form that can be employed.

A. B. writes: "I should be obliged if you will give me your opinion on the following:—For twelve months I have been using ready-sensitized paper, and in washing prints in five waters before toning the water does not show any silver in it. I have had the first water like milk before this brand, now I do not see the least sign of it. The strangest part is, I have an assistant, and he lives seven miles away, and does work at home, and he gets his paper from the same place, and his always turns the water milky. The water is supplied from the same works. I got him to take six sheets of my paper to try, but with the same result—his water milky, mine not."—Perhaps some correspondent can account for the discrepancy. It does not necessarily follow that because the water may be supplied from the same company that it is delivered in the same condition in different districts.

BEGINNER writes: "I have just taken a studio with the lighting of which I am rather puzzled. Position, running north to south; sides facing east and west: both sides equally available for light; size of studio, twenty-four feet by twelve feet, the whole of which, excepting three feet at each end and the same proportion of sides, is composed of rolled ground glass. I am anxious to know how much and where to block out light (the amount of present light being intolerable), and which side is preferable for lighting the sitter, east or west."—Our correspondent is in possession of a studio which would be the envy of many. In such a studio work of every possible description could be carried out. We should recommend that curtains be fitted so as to cover up the whole of the sides, and blinds to cover the top; then every possible lighting can be obtained. The most convenient way of using the studio for portraiture will be to place the sitter at the south end, and use the west light in the morning and the east in the afternoon. As our correspondent is a novice in photography, it would, perhaps, be well for him to get a few lessons in lighting from a professional photographer.

* * Several articles and letters are unavoidably postponed through want of space.

PHOTOGRAPHIC CLUB.—November 6 will be the annual general meeting.

THE HACKNEY PHOTOGRAPHIC SOCIETY.—On November 14 a paper will be read by Mr. Birt Acres on *Isochromatic Work*, illustrated by the lantern. He will also exhibit his patent developing dish, by means of which the care now needed in developing isochromatic plates is greatly obviated as regards light used.

WORCESTERSHIRE CAMERA CLUB EXHIBITION.—The first Exhibition of photographs, photographic appliances and apparatus, will be held in the Museum and Art Gallery, School of Science and Art, Kidderminster, from March 1 to March 15, 1890. Particulars may be ascertained on application to the Hon. Secretary, Mr. William Ray, School of Science, Kidderminster.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1540. VOL. XXXVI.—NOVEMBER 8, 1889.

NEGLECTED PROCESSES.—GLASS POSITIVES— ALABASTRINE PICTURES.

AMONGST the neglected processes must now be enumerated the glass positive process, and the alabastrine process. In the minds of the majority of modern photographers positive pictures are doubtless associated, solely, with the productions of those itinerant photographers who take portraits on glass, or on japanned sheet iron—ferrotypes—on the beach, or other well-frequented spots. It is true that these are positives, but they are, without exception, nothing more or less than a libel on the process and what it is capable of producing.

A really good glass positive is an exceedingly nice picture, while, for delicacy and fineness of detail, it is unapproached by any other photograph, if we except, perhaps, the Daguerreotype. We well remember, in the early days of collodion photography, the charming glass portraits that were produced by some artists. We have also in our mind, just now, some most excellent stereoscopic pictures by Messrs. Negretti & Zambra of the interior of the Crystal Palace, and views from the grounds—not their transparencies of the same subjects—which were exceedingly beautiful when seen stereoscopically.

At one period the positive process was extensively practised, even by the best photographers, but somehow or other, in a comparatively short time, the pictures came to be looked upon as being of a kind of plebeian character. It almost appeared that the professional, when he became proficient in producing first-class work—for it must be remembered that, as a rule, in the old days of the collodion process, positives were the first things that the beginner essayed—went in for negatives, then he usually considered it *infra dig.* to take a positive picture; hence this branch of collodion photography, as a business, was left entirely in the hands of third or fourth-rate men, possessing little or no skill whatever. It is mainly from this cause that collodion pictures on glass fell into ill-repute—that is, in this country; for in the United States glass pictures, under different names, mainly that of Ambrotypes, attained a higher status and retained it for a much longer time than they did in England. In America greater skill was brought to bear on this class of picture than was ever the case here. It may be mentioned that quite as much, if not more, skill and experience is requisite to produce a positive of the highest order of merit than there is in the production of a first-class negative. And, as we have said before, those who possessed this qualification would not expend it in this direction.

Positives could be coloured, and thus be rendered still more effective. The present idea of a coloured glass picture is generally connected with a little powder colour roughly applied by those who have no artistic knowledge whatever. For ex-

ample, a little red is rubbed on the cheeks, blue on the background, with perhaps some red and yellow on the drapery, and is applied in such a manner that the picture, when finished, looks vulgar in the extreme. But collodion positives could be really well coloured by any one with artistic ability, as they were by many, notably by M. Mansion and others. When thus treated they were exceedingly good and effective pictures. The best class of positives were always varnished, to preserve them. The varnish generally employed was dammar resin, dissolved in benzole or chloroform, and it was applied cold. This varnish did not degrade the whites as a spirit varnish was liable to do. In the early days glass pictures were taken and coloured by some of the then leading houses, and were charged at a very remunerative rate, the prices being often reckoned by guineas.

The term "alabastrine pictures" will no doubt sound novel to many, but it will be perfectly familiar to all our older readers. These pictures were essentially collodion positives, whitened by bichloride of mercury. The peculiarity about them was their extreme delicacy, and the pearly-like whiteness of the lights. This quality rendered them especially suitable for tinting, and the surface of the film lent itself particularly to the reception of the colour.

The process was this:—A positive was made in the ordinary manner. It was then treated with the alabastrine solution, which converted the image into one of pearly whiteness. The solution was a commercial article, and its preparation was long kept as a trade secret, although we are aware it has since been published. It is well understood to be a solution of bichloride of mercury strongly acidified with both nitric and hydrochloric acids, and containing a certain proportion of alcohol. Positives, when treated with this solution, become beautifully white, and are quite free from the blueness conferred by the use of a plain solution of the bichloride. With the commercial preparation was sold a so-called "penetrating varnish," also a secret preparation. This, when applied to the tinted picture, caused the colour to show through on the glass side, which gave a very pleasing effect; furthermore, it permitted of non-reversed coloured pictures to be produced. A dammar varnish here answered very well.

Although collodion positives could be finished off, and be ready for delivery within a few minutes from the time of their exposure, they must, if varnished, be classed amongst the most permanent of all silver pictures.

Gelatine is not so well suited for glass positives as collodion, the difficulty being in obtaining purity in the whites. Ferrotypes plates, however, prepared with gelatino-bromide of silver, were introduced some time ago, but we believe they did not

meet with much success, principally for the reason just mentioned. There is very little doubt, if dry plates were placed in the market which would yield positive pictures such as those obtainable on collodion, that they would command a ready sale.

AMATEUR DARK-ROOM APPLIANCES.

No. II.

AFTER the lighting, the most important item in the dark room is, perhaps, the water arrangements, and here, as a rule, the amateur finds greater difficulties standing in the way of his comfort and convenience than in any other department. It is not a great hardship, perhaps, to have to convey a can of water into the dark room before commencing developing operations, and to use it from a jug is not much more trouble than from a tap; it is not difficult either to provide a suitable receptacle for the waste; but the necessity is always present, failing a properly fitted sink with supply tap and waste pipe, of providing for the disposal of the waste and generally clearing up every time the dark room is used. The amateur who rejoices in the possession of a fully equipped dark room, with laboratory conveniences, enjoys luxuries which too many are strangers to, and only those who have experienced it know what a constant nuisance makeshift contrivances are, and how persistently, just at an awkward moment—when all attention is required in some other direction—it is found absolutely necessary to empty the waste vessel or replenish the supply.

Where a bath room or lavatory is available, such will always be utilised, if at all possible, on account of the convenience of fixed water arrangements; and as such rooms are usually or frequently provided with windows smaller than those of ordinary apartments, they are specially adapted to the purposes of a temporary dark room. But if circumstances prevent, then there is nothing for it but to make the best arrangements possible. We shall presume, then, that no fitted water supply is available.

Many of our readers, no doubt, have experienced, before the days of public dark rooms at hotels, the "pleasure" of developing in the bedroom, with the aid only of the ordinary toilet conveniences, supplemented perhaps by an extra can of water supplied by an obliging chamber-maid. Such conveniences are, perhaps, to be tolerated as a matter of "Hobson's Choice" when travelling, but how often is it found that the water supply is in excess of the facilities for disposal of the waste? and how often is it discovered in the middle of the development of a plate that all the available waste receptacles are full, and there is no means of washing the plate? Unhappy, indeed, is he who is compelled to rely on such "conveniences" at home; but we fear there are many so situated, merely for lack of a little energy or ingenuity.

If it be a matter of compulsion to work in this manner, it should be at least arranged that the receptacle for waste is of ampler capacity than the supply vessel. Then the failure of the supply is the signal that in replenishing the latter it is time to empty the waste, and if it be made a matter of invariable duty to perform both operations at once much trouble and mess will be saved.

But at the best of times the ordinary toilet basin forms a most inconvenient "sink" for developing. Its capacity is not great, and it is difficult to pour from when it gets nearly full, so that constant "slopping" is the almost invariable result. Even if a circular basin, fitted with a plug and waste pipe, be

substituted, the shape is against it, especially when the plates are anything larger than half-plate; still, for the smaller sizes such an arrangement may be made to answer. The small japanned metal washstands, now so common, consisting of stand fitted with basin, and waste pipe, and platform below for slop jar, supply an inexpensive and not very bulky arrangement, that may be made a permanent arrangement for the special purpose of development; but, as we have already said, the circular basin is inconvenient, and not to be compared to a sink of proper shape and dimensions.

The Doulton-ware sinks, obtainable in all sizes and at moderate prices, are better in respect of shape, but they are heavy and clumsy, and necessitate a fixed position for the developing table. They are, moreover, as a rule, too shallow to prevent splashing unless great care is exercised; and, lastly, from their material are apt to lead to frequent breakages. A lead-lined tray or sink is an improvement, but these are both expensive and weighty, still they need not prove unduly so. The best arrangement, without exception, for the amateur is a plain wooden sink constructed as we shall describe.

We may, first of all, speak, however, of the general arrangement, which we will call the developing table, and which, without occupying a great deal of space, may be retained for its special purpose even in an ordinary bedroom. The table may, of course, be specially constructed, and made to close up like a folding washstand, in which case it will not only be self-containing, but, when not in use, may serve the purpose of a side table or even dressing table. But the arrangement we have to describe is of a simpler and less costly character.

It consists mainly of one of the cheap washstands, procurable in all sizes, from about two feet in width, in painted deal, at a cost of a very few shillings. In addition to the table, with or without a circular aperture for the basin, there is usually a platform a few inches from the floor, but this is not absolutely necessary, though it is convenient. In selecting such a piece of furniture, let one be chosen not less than thirty inches wide (three feet will be better), and commence by cutting a square or oblong aperture on the table a few inches smaller each way than the size it is intended to have the sink. The latter is then fixed beneath the table by means of screws, in addition to a couple of fillets of wood fixed to the legs for it to rest on. The sink must be perforated for a waste pipe, and an ordinary galvanised household pail of large size—say, to hold four gallons—placed on the lower platform will complete the arrangement so far as the water is concerned.

If canvas or some cheap ornamental material be nailed round three sides, and a curtain of the same provided for the front, the lower platform may be utilised for a variety of purposes—as, for instance, in storing away bottles and dishes when not in use, or it will form a convenient place for the fixing and alum baths, and for the washing rack when at work. The whole, when so arranged, will form a not unsightly adjunct to the room, and, if fitted with a removeable top to cover the sink, may be utilised for other purposes when not required for its legitimate one.

We now come to the construction of the sink, which is to be, as we have said, of wood. Many useful water-containing vessels are constructed of wood simply, without any lining whatever, but in order to be water-tight they must be not only well put together, but must be kept constantly in use, or nearly so; for their staunchness depends upon the wet and swollen state of the material. If this becomes dry it shrinks, and the joints at once commence to leak, if they do not actually develop fissures.

We do not, however, propose to rely upon either of these conditions for the efficiency of our sink. Good workmanship is never wasted, but in this case there is no necessity for dovetailing or "tonguing and grooving" the body of the sink together, though the latter, of course, makes a better job of it. Let the wood be one-inch deal, carefully planed, at least one side. Cut it up to dimensions, taking care that all the edges are carefully and truly squared up, and put it together with stout screws. It is screwed together first of all merely to fix the positions of the various parts.

Next procure some white lead ground in oil, and mix with it, carefully and thoroughly, about one-fourth its weight of dry red lead until it is of the consistency of putty. This being ready, unscrew the woodwork, and with a putty or palette knife spread a layer of the mixture over the joints of the sides to the depth of an eighth of an inch, and then screw them tightly together so as to squeeze out as much as possible of the lead. The bottom now remains to be put in, and this will present a little greater difficulty, as it is nearly certain to be in at least two pieces. If so, and the joints are tongued, thin down a little of the lead with turps to the consistency of cream, and apply this freely to both tongue and groove, bringing the two pieces together with as much pressure as possible. If a pair of carpenter's cramps are available so much the better. Finally, put in the bottom in the same manner as the sides were put together, screwing up as tightly as possible; or one section of the bottom may be put in first, followed by the other or others, trusting to the screwing up to make the joint good. It will be easy to find the screw holes with the points of the screws, and as these are worked home they will gradually force the two pieces into contact. If the joints be not tongued, but square, the thick lead must be used.

We have now a framework solidly screwed together, and with its joints filled in with a waterproof composition which will gradually harden and cement the woodwork tightly together. But to make assurance doubly sure, and fill up any chance interstices, that may occur, we take some of the lead thinned down with turps and paint over all the joints, inside and out, and then let the whole dry.

While the drying is taking place we may proceed to arrange for the waste pipe. If preferred, an ordinary brass plug and furniture may be let into the bottom, and a lead pipe soldered, or a short length of rubber hose attached by means of wire at the reverse side, but we prefer the following plan as making a better job:—Commence with a centrebit to bore a hole an inch and a quarter, or an inch and a half, in diameter, and when a depth of three-eighths or half an inch is reached, change the bit for one of an inch and finish. This will furnish a hole with a shoulder or rebate.

Next, get a plumber to supply an eight-inch length of one-inch lead pipe, with a flange or washer of stout sheet lead, three inches in diameter, soldered on to it at right angles to its length, and about two or two and a half inches from one end. Insert the shorter length of pipe into the hole in the sink from the outside, and fix it firmly in position by means of three or four screws. Turn the sink over and measure off as much of the projecting pipe as will a little more than reach to the edge of the recess or larger hole in the wood when bent over, and cut the pipe at that point. With a plumber's "turn-pin"—a conical piece of hard wood—or with the nose of a small hammer, gradually beat out the projecting pipe until it is turned over in all directions, and lies down in the recess left in the wood, which should first be packed with the red lead to make

it water-tight, and when completely in contact scrape or pare the pipe down to make a neat funnel-shaped aperture. This makes one of the most satisfactory joints at a merely nominal cost.

When the red lead is dry, which may be expected to occupy a day or two at least, the sink is finished by giving it one or two coats of ordinary Brunswick black, allowing the first to dry thoroughly before applying the second, and it will be improved if exposed to sunshine for a day or two to harden the asphaltum. That done, the sink is ready to fix in position.

Although described as a "makeshift," this is really not so, but a thoroughly durable and efficient contrivance that can be constructed at a very moderate cost. We have had one in use for some years that had no more elaboration in its construction than we have described, and it would have been as efficient now as when newly made, without any further care, had we not, in an evil moment, decided to renovate it. Preparatory to re-blackening it, it was placed in the open air to dry, and unfortunately the sun got to it, with the result that the wood shrunk and "let daylight through" the joints.

As the simplest way of remedying the defect, after vainly endeavouring to re-caulk the seams, we adopted the following plan, which we recommend to those who would in the first instance avoid such a mishap. Having procured some "lead foil," which is really thin sheet lead, we re-blackened the wood, and while it was still "tacky" laid the lead carefully down on the bottom, and turned up half an inch round the sides, using a hot iron to smooth it into contact, and by melting the asphaltum make it adhere. The sides were then covered in the same manner, and we now have practically a lead-lined sink. The foil is obtainable, we imagine, at any lead merchant's, but Harrison's in Drury-lane supply it in sheets about 28 x 14 inches, weighing about one pound or a little less, and costing a shilling a pound.

Portable dark rooms will form the theme for our next chapter.

WE are glad to learn that some friction—the result of misunderstanding—which has lately existed between the two past-Presidents of the Photographic Convention, Mr. Andrew Pringle and Mr. J. Traill Taylor, has been assuaged—the hatchet has been buried, and the *entente cordiale* once more established. It only needed that they should discuss their differences quietly and dispassionately to ensure the descent of the Angel of Peace. *Appropos* of the Convention, we have received a letter from Chester, from which we are pleased to perceive that the photographers and friends in that quaint old city are already making such arrangements as will ensure the next year's meeting being a most enjoyable one.

THERE is no reason why an ordinary camera and lens should not be employed for photographing the moon; the image obtained would be very minute, but, enlarged to a size within the bounds of practical photography, a representation of the orb sufficiently interesting to be worthy of preservation and reference, if not of great scientific value, might be obtained. Any one who knows—as all ought to do—the focus of his lens can ascertain the size of the image it will give by a simple calculation. Let us take an example to elucidate this fully. Most photographers who work up to 12 x 10 plates possess a portable symmetrical of at least twelve inches focus; if this be unscrewed and the back lens removed (a plan which, for the purpose in view, will be preferable even to using the back lens alone *in situ*), he then has a lens of, roughly speaking, twenty-four inches focus. If now we multiply this twenty-four by nine, and divide by 1000, we obtain the size in fractions of an inch of the moon's image obtainable by the lens. In this case it would be $24 \times 9 = 156$; $156 \div 1000 = .156$, or about one-seventh of an inch, as the size of the picture of the moon this lens

would give. It is a very common thing to enlarge a head one inch in diameter to life size with extremely sharp results. This is seven or eight diameters, and the small moon negative enlarged on a similar scale would give us pictures one inch in diameter.

THE moon being so bright, the exposure of the original negative might be sufficiently nearly instantaneous to prevent any possibility of blurring through the earth's motion, and again, by taking certain precautions, two negatives might be taken which would give stereoscopic effect.

ATTENTION has again been called to Japanese varnish materials. A near inspection of even the cheapest of the varnished or lacquered goods that come to us from that country serves to show that its craftsmen must be in possession of some serviceable substance procurable at an exceedingly cheap rate for this class of work. Mr. R. Hitchcock lately read before the Chemical Society of Washington an account of the source of the resinous basis of Japanese lacquer. It is the product of a tree that grows to a considerable size and lives for nearly half a century, but useful for lacquer production only in its younger stages. The lacquer is obtained year by year, and, finally, the tree is cut down and the substance extracted from its branches. Mr. Hitchcock urges that greater attention should be given to it than has yet been the case, and from his information it is evident that it would be an invaluable addition to the resources of the photographic manufacturer. "It gives a surface to wood much harder than our best copal varnish, without brittleness. It takes a polish not to be excelled, which lasts for centuries, as we may see in the old treasures of Japan. It is proof against boiling water, and, indeed, it seems to be insoluble in every agent known. It is the best possible application for laboratory tables. I have a set of photographers' developing trays that have been in use for more than a year, and I find them excellent and cheap." This is the report of Mr. Hitchcock, and it surely calls for a really close investigation into the properties of such an agent as he describes; as for baths, trays, and sinks, its use would be simply invaluable in photographic work.

THIS agent appears to have only one drawback: it is poisonous in the fresh state—a quality, however, which would have little concern with its employment by photographers; they are familiar enough with the handling of poisons.

ACCORDING to the *Novoe Vremya*, as quoted in *Nature*, the carrier pigeon has been turned to a curious use in Russia. It is to convey negatives of photographs taken in a balloon. The first experiment was made from the cupola of the Cathedral of Isaac, and the subject photographed was the Winter Palace. "The plates were packed in envelopes impenetrable to light, and then tied to the feet of the pigeon, who safely and quickly carried them to the station at Volkovo." So we are told; but there is an extensive hiatus in the account. The wonderful material on which the negatives were taken is not stated, nor the mode of preserving from light; nor how this is proposed to be arranged in a balloon, nor the distance of the bird's flight. This is all a very different affair from the Paris Pigeon Post, the messages in which were photographed by collodion on glass, which was afterwards peeled from its support and enclosed in a packet attached to, not the bird's feet, but a tail feather. Seeing that about fifteen grains is looked upon as a practical weight for a bird to carry, it would appear that very little negative and light-tight wrapping could be included in the weight, which does not include much in the shape, for example, of thin paper, seeing that even so slight an object as a five-pound (or any other) bank-note weighs more than that amount.

So far photographers have not gained much from the improvements in, and the cheapening in the manufacture of, aluminium; yet there are few cases where the metal could be introduced with greater advantage—lenses and cameras, not to speak of numerous machines and mechanical appliances, could all be practically improved by the adoption of this metal, or of a bronze obtained by its aid. We should, however, expect that its introduction is only a question of

time, as the papers read at the British Association meeting by Professor P. P. Bedson, D.Sc., on the one hand, and Mr. J. H. J. Dagger, F.I.C., on the other, show the great industrial importance the works erected for its manufacture already possess. The former *savant* describes the metallurgical process adopted at Wallsend, and the latter the electrical process in use at Milton, in Staffordshire, and from their accounts we learn that a large industry is already started.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

No. VI.

F. H. EVANS (Nos. 435 and 446).—Two frames of portraits containing some very good work. The photographs are only quarter-plate size, but display an aptitude for the realisation of character which is worthy of being especially alluded to. Two matters are deserving of attention: one, the introduction of moderately dark backgrounds, which throw the attention direct to the portrait, the lighting of which is also well managed; the other matter is, that apparently they have not been subjected to the ruinous retoucher, as many lines on the faces testify. Altogether, these are a very unaffected example of photographic portraiture.

F. Downer (No. 454), *Lady Edith Villiers*.—Portrait of a very young lady, where the position is effective, being simply the realisation of a perfectly natural position, which, although involving the necessity of each side of the figure and dress being identical, is nevertheless in harmony with the character of the sitter. There is a calm repose and dignity about this portrait which makes it very effective.

Mr. and Mrs. W. J. Anckorn (No. 435), *Saturday Night*.—Another of those realistic pictures where children are portrayed in a necessary domestic occurrence, in the house, possibly, of the working classes, being nothing more than the Saturday night's washing. Alas! that photography should be just as capable of accurately depicting the commonplace as it can be exalted with all the glamour of that accurate detail which to many appears to be the only reason for perpetuating such a subject.

G. Balfour (No. 490).—The head alone of a boy, noticed just to point out the singular effect produced by the chin being almost at the lower part of the photograph, suggesting the possibility that sooner or later this dark boy will descend right out of the frame.

Lient. R. C. T. Blunt, R.N. (No. 518), *Under the Olive Tree*.—The executive part of this photograph is very good, and well chosen for pretty detail: a little girl in white has been arranged to be effective, but the scene is so quiet that solitude would have enhanced the effect.

Valentine Blanchard (No. 525 and three other frames).—Containing small views in the Isle of Wight, being a departure from the usual figure-subjects which we look for from this exhibitor.

Rev. F. C. Lambert (No. 531).—A study of a seafaring man, *Waiting for the Signal*, who has been carefully arranged, but the repetition of some straight lines in the material of the background considerable interferes with the repose which is suggested by the title.

Mr. J. Harding (No. 542), *Evening Pastime*.—Some rustic cottagers at their door; the daughter sitting on the ground, reading a book, is rather awkward in position, which might have been more effectively arranged if her dress had been carried out to the left of the picture.

Anselm Schmitz (No. 546).—A frame of thirty-five views, very dark in treatment, and not in concord with the large work of the same exhibitor, which we shall notice in due course.

J. C. Andreae (No. 549).—A series of small views with figures, which are rather dark in some parts, and, as a whole, not up to the usual specimens of this exhibitor (who makes his own plates). The figures, of which there are many, in many instances have been more carefully attended to than in previous exhibits.

S. Glen Payne (No. 555).—This is one out of three pictures by this exhibitor, who has done better work in the past. It is a very pretty study of trees on the Chilterns, but there are too many dark portions, which should have had better treatment from the scientific aspect.

The Misses Mead (No. 562).—This is the best work out of six other

pictures which these ladies have done. This particular specimen is exceedingly good, both in choice of subject and treatment of the negative. It is a most effective "bit" of English trees and foliage, which promises well for some future work.

Mrs. Main (No. 565).—Two bits of Swiss mountains, most carefully manipulated. Success in such studies can only arise out of very careful attention to the treatment, which these views have evidently received. There are two other frames of bits in the same locality by this lady, whose present exhibits are in considerable advance of previous work, and show much daring in the study of such cold but grand mountainous scenes.

Mrs. E. Penton (Nos. 567 and 568).—Two enlargements from small negatives by the exhibitor, who shows a capacity for pictorial effects which will become increased in power by future study. One photograph is a fisherman, the other a fishwife; and although the positions are possibly those of the persons themselves, it is evident that care and appreciation of the result has guided the point of view.

J. J. Acworth (Nos. 582 and 583).—Two frames, each containing eleven small studies of views in Italy; and No. 586, three views in Nuremberg. Some very good, although small, photographs of picturesque spots, very nicely manipulated; but there is one matter which disturbs the enjoyment of these scenes, and that is the blue-grey colour of the mounts and the white edges of the openings; these coming into the vision produce a disturbing effect, which is not doing justice to the photograph. We dwell upon this matter because there is much wrong done in this direction.

H. G. Peabody (No. 591 and three following pictures).—Contains some exceedingly good manipulative work of sea and yacht studies; and here, again, the colour of the photographs and that of the mounts are not in harmony. Once more the disturbing power of these matters pains the vision, and one cannot look at such a combination of opposing forces without a shudder.

Alfred Stieglitz (No. 598).—A scene by a foreign photographer, where some country children are enjoying the ceremony of being photographed; also No. 599—a little maid at the sea, stooping down to fill a vessel. These pictures are very small, yet they both give evidence of an appreciation of character which will show good results in the future.

W. J. Byrne (No. 602). *The Emperor of Germany*.—There are six photographs of the Emperor in one frame, and we notice this simply to remark what a singular effect is produced by the mixing together of portraits of one person only. We also think that it is not possible under such circumstances to produce results which are worthy of being exhibited. These subjects require a larger amount of thought and design than can be given on such occasions, and hence the conclusion arrived at is that it would have been prudent to have kept these results in retirement.

Fred. Downer (No. 636).—Six rather large portraits in one frame. These prints are fastened on to folded fabric, which is very unsuitable for exhibition. However, some of the photographs show very good work, but the eccentricities of costume will often stop the way for pictorial advance.

Anselm Schmitz (No. 638), *Staircase, Royal Castle, Cologne*.—To this picture has been attached the word "medal," in conjunction with No. 129. This exhibit is a very large photograph, being 40×32 inches, and is full of very fine work, the original being constructed of marble figures, columns, and ornamental detail, the whole of which has been exceedingly well managed. A staircase covered with some dark fabric helps the general arrangement for light and shade, and the whole is a triumph of optical and chemical study, which has resulted in a production which nothing but photography alone could have produced. The same remark will apply to No. 129.

F. Muller (No. 635), *Portrait*.—This is one of many others exhibited where the frame has been made as large as possible, overwhelming the subject-matter; head about five inches in height, and dwarfing the importance of the photograph, which is very nicely treated, but somewhat too dark in general.

S. R. Brewerton (No. 96).—Out of several other photographs by this exhibitor this is decidedly the best. There has been thought exercised in the selection of the subject and the figures, the result being a very good example of careful work.

Fred. Beasley (Nos. 132 and 133).—Two pictures which show a

departure from the usual work of this exhibitor, who now leans towards the picturesque with rustic figures. These, not requiring training, are so handy for the living accessories which now pervade the detailed scenes so attractive to the photographer.

E. A. Perkins (No. 192 and two frames of similar subjects, each having three 15×12 photographs in them).—All these are very similar in construction, and hence these exhibits show the dawning of a better time, when a little more freedom in the arrangement of the subject-matter, aided by such good scientific treatment, will result in some very good work.

F. Muller (No. 196), *Portrait direct*.—This head is smaller than life-size, and has been well arranged for effect, possibly a little deeper in tone than many of our English photographs, but having a larger range of tones, and consequently greater rotundity in the modelling. This is a quality which much of our own portrait work is deficient in.

Thomas Protheroe (No. 362).—A frame containing six 16×11 portraits, showing an onward movement in natural posing, which is also increased in value by light draperies being most carefully manipulated, resulting in detail combined with softness.

W. J. Byrne (Nos. 374 and 375).—Two subject pictures. An endeavour to realise the difference between a town and village artist, who are both making pictures from girl models. The subjects are very good, but the posing is somewhat artificial—a little too much like portrait work. The best is that of the village artist, but it loses its effect by the three figures (two girls and a boy) having been placed too symmetrical, namely, one in the centre and one at an equal distance right and left.

R. S. Redfield (No. 384).—There are several other small studies, but the best is a frame of two pictures—a little girl in one eating, in the other drinking. Rather unpoetic subjects, yet at the same time very simple and perfectly natural in action, which is very pleasing in the result.

J. Chester Jarvis (No. 397), *Un Militaire en retraite*.—A foreign scene, where a supposed sportsman is marching on with a hare or rabbit dangling in his hand. There are three other photographs, containing domestic figures. All these pictures show a decided advance upon former exhibits, only it is unwise to make the same building do duty for three out of the four backgrounds.

Gunn & Stewart (No. 404).—A frame of ten children very carefully manipulated, showing great attention having been given to the lighting, the result being that the faces become the most prominent part of the photographs; and the same results have also attended No. 624, a frame of ten ladies 12×10, partaking of the same well-directed care and workmanship. Another single picture, No. 9, *Baby*, in platinum, 24×18, is an exceedingly good photograph, where the position and treatment of the very young lady is also marked with very good qualities.

Lyonel Clark (No. 409 and two other portraits).—Evidently treated with a view to produce an effect unlike other photographs, the result being somewhat like copies from paintings where the colours have come out too dark.

J. M. Nisbett (No. 456), *The Great Strike*.—A very good photograph, conveying an accurate memento of the Dock Strikers in their daily march, and which contains a large amount of their curious personality.

V. H. Chintamon (No. 513).—An enlargement, about four feet high, of the Maharaja of Bhownager, G.C.S.I. A full-length figure, very carefully treated for position, but which has received much brush work, although the original negative must have been good.

The Autotype Company (No. 436), *A Lion*.—A very fine enlargement from the original negative by Gambier Bolton, which has been already noticed; this picture possesses the good quality of being seen at its best from a distant point of view, and is an exceedingly fine specimen of all the best qualities of an autotype enlargement.

THE WHOLE DUTY OF THE PHOTOGRAPHER.

No. V.

WITH these words I thought to conclude this little series of "*Obiter Dicta*" * (especially *Obiter*, many will think), but certain matters

* An "*Obiter Dictum*" is defined by the author of that delightful little book to be an extraneous or impertinent opinion expressed by a witness in the course of evidence.

which have lately come under my notice seem to call very urgently for a few condemnatory remarks.

Firstly and chiefly, the ways of the retoucher. That destroyer of beauty is a product very natural to this time and country, where there seems to be no higher ideal of art or beauty among the people than a mechanical smoothness and perfection of detail, technical quality in short, as distinguished from artistic merit. This is well shown in casts from fine antique models. It is generally known that many people prefer casts with the lines of the mould left untouched; and very rightly, for though these sharp, ragged lines are a serious blemish, they are far preferable to the entire destruction which would be wrought by the workman in removing them. The ordinary method of finishing a cast after it leaves the mould is to pass a wet sponge over the whole surface; this, done by a skilful hand, accomplishes its end to perfection, and produces a most perfect smooth surface, but at the cost of completely sacrificing all the subtle delicacy of line which distinguishes the work of the great artist from the product of mere mediocrity. What wonder then that any one who has an eye for the value of the original design prefers to have a faithful copy with all the imperfections of mould lines and rough surface rather than the same "improved" by the British workman? This same base ideal of mechanical perfection is found in every product of industry in this country. We make very fine engines and tools, probably as good as they can be made in the present state of knowledge, for here the mechanical ideal is the true one, and there is no higher. But whether we be a nation of shopkeepers or no, we are certainly a nation of engineers, and we manufacture nearly everything on the same principle that we build machines; witness these casts from the antique models I have mentioned.

Proof upon proof of this assertion is to be found wherever we turn, but perhaps the results of this low ideal are more obtrusively abominable in the case of photography than in any other art or craft. The destroyer whom I wish especially to anathematise at present is the reckless retoucher. A few instances from a multitude will best show what sort of work this enemy of mankind has been doing.

I saw a panel portrait, by one of the best London photographers, taken from an original certainly not deficient in good looks. The face of this sitter, however, was not to the retoucher's mind, so he got his tools about him and went to work, and I have no doubt looked on the result with triumph. Said result represents a face apparently very skilfully moulded in dough which had run a little in the baking. It is smooth, characterless, idiotic, and the eyebrows and eyelashes have disappeared in the course of the improvements! I tell a plain, unvarnished tale; the thing is as I say. The portrait of the dress is good, and that was the principal object, or the photograph would have been rejected. Other portraits I see every day which have the same sort of resemblance to the originals that a corpse has to the living, breathing human being; the features are usually left almost unchanged, but all the life and character are gone. Would we not rather have portraits which would really show us what our friends look like, than these smoothly finished products of retouching, though the complexion was not so perfect, and might even appear freckled? Surely we would, those of us who have eyes to see, but I know only too well that we are a minority; the retoucher has educated the public taste down to his own level, and the majority now expect and demand the products of his handiwork. But it is assuredly true that photography can never take its right place in the world of art as long as the retoucher is allowed to lay his dirty fingers on all the finest work of the lens.

To bring about any change for the better would, I know, be a difficult matter. It has often been said that when a man starts on the downward course he finds the rails have been well greased for the occasion, to which is added that if he wishes to reform and climb up again, he discovers that the same kind friend has once more made his foothold slippery. The same is true of classes as of individuals. Portrait photography is in a bad way at present: how may it be improved? This would appear to me to need much of the wisdom of the serpent as well as the gentleness of the dove; for how is a professional to know whether a particular sitter wants a real portrait or the thing the retoucher makes? This can only be found out by acuteness and careful questioning, for most people would say they did not wish to be retouched, but many of them would be highly disgusted with the result. Some there are, however, and I believe more than we might think, who would pardon some roughness and technical defects in order to have portraits satisfactory to the eye of the artist.

To be just to the wretched creature, the retoucher has a function, a small and humble one, and he is far from being a humble person; he thinks no small beer of himself, and will by no means remain in his proper sphere; and this is the reason why my soul craves for a revolver and a bowie knife wherewith to enter upon a new crusade and wipe out the whole fraternity.

There is a lower depth than this. We stand in a wilderness of ugliness, crying out to all who may hear, "Give us beauty, surround our lives with things fair to see," and in answer to our wild appeal comes the new prophet of commercialism with his fixed shopkeeper's smile, and recommends "his new series of studio boulders in eight pieces, price sixteen shillings, defying competition." Did ever any one hear of such a grim travesty of nature as a stuffed boulder? Yet this is not a joke, for I received quite an elegant little circular from a very well-known firm of photographic providers, setting forth the excellent qualities of their stuffed boulders, with two engravings representing the said strange fabrications to be nearly as ugly as I have no doubt they are in reality. These things are, no doubt, lineally descended from the monumental pillar which held its place in all studios so much too long. The pillar had a function in its young days when exposures were long and head-rests not invented, but what can be the use of stuffed boulders?

Blind leaders of the blind! do you conceive that you can imitate the works of nature, and with your tools and low cunning make to yourselves representations of the products of frost and flood, fashioned and polished by streams and waves in ages of patient labour?

COSMO I. BURTON.

COLOURED PHOTOGRAPHS.

XII.

I FEEL sure there were many who, having read these papers regularly, murmured a gentle prayer of thankfulness that the analysis of the various colours had at last come to an end. Well, believe me, I can heartily join them, as there is nothing more tedious than writing or reading such matter. Still, however, I think it will, at least, be no disadvantage to know a little about the colours we are about to use in painting photographs. I am writing these papers with a double purpose; to show some of the best methods of colouring photographs, and also to prove that an artist who is thoroughly master of his art can paint a portrait upon a photographic base which may, undoubtedly, be looked upon as a work of art. I presume, naturally, that the qualities which mostly tend to constitute that most debatable of objects, a work of art, is *faithfulness* in representing nature in its true colours, and *style* in carrying it out. Without these two qualities, I take it, we are abroad in terming any picture a work of art. There are few, it is to be hoped, who will hold that a fair drawing decently coloured, although presumably a work of art, is entitled to be so described.

To any one who has never made a study of colouring, and who knows little or nothing about the relative values of colours, the difficulty of painting a head from life must appear almost insurmountable. Of course, if to this be added the incapacity to *draw*, we should only expect a dismal failure; and I think, in this regard, we would be more fortunate than most people in this world—we *would get what we expected*.

From this it may be gleaned that *drawing* is the first branch of art to be acquired, as without the power to depict faithfully the *shape* and various markings of a head, it will be useless proceeding further with our picture. We will assume that this knowledge, together with a keen appreciation of the value of light and shade, has been acquired, and to such may be left the option of accepting the help of photography or not. I can assure my readers that the number of artists of the first standing at the present day, who call in the aid of photography from time to time, would astonish the uninitiated. There are many who have a strong sense of the relative values of colours, and who possess a very striking style of placing same on a canvas, and who are yet unable to make a faithful drawing of the object, or subject (perhaps this is better), before them. To such, what a boon is photography!

We will, for our present purpose, assume that we are fairly gifted, and know a little of what we are doing. Let it even be conceded that we can paint from nature, but find ourselves obliged to paint upon a photographic base. It may also be as well to restrict ourselves to *water colours* in the first instance; we can afterwards take *oils*. Now suppose we have a vignette head and bust to colour; we must first *prepare* the paper, before starting colouring, in such manner as may be best for the various surfaces upon which photographic images are sent to artists. In this we can use either the preparations made by Newman or make substitutes ourselves, which will suit the purpose fairly well. This done, we will go ahead.

In painting a portrait, be it either a head and shoulders vignettised or an ordinary *printed-out* background, *three sittings* used to be considered sufficient in most cases; but, needless to say, some artists,

although men of the highest and most undoubted talent, required more. Indeed, there are cases on record where the artist has had more than forty sittings. Now, in the case of photography, *one sitting* should be quite sufficient to enable an artist, who thoroughly knows his work, to turn out a good and highly artistic portrait. Without the aid of photography the *first sitting* would be almost entirely given up to the making of a complete *drawing* or sketch. This done, we proceed to give the first wash of flesh tint, and so the sitting ends. A good deal of the *work*, such as patching, &c., can then be proceeded with during the interval between the sitter's first and second visits. If any length of time were to elapse between the first and second sittings, the *background*, too, should be worked in. This is also advisable from the point that it is essential that the background should be painted in such a *tone* as not only to secure general harmony, but to be complementary to the leading tints in the face and hair. Where we have a photographic base to work upon we have only to give our first wash of flesh tint, guided by a detailed list of the colours, and, if I may so express it, the coloured peculiarities of the original sitter, and so prepare for further work. To produce really good work our *directions* or *detailed list of colours* should be exhaustive, otherwise there will surely be defects in our finished picture.

Now the *second sitting* for the picture we have drawn in should be utilised chiefly for putting in the shadows and half tones of the face, which endow it with roundness; then follow on with the colour in the cheeks, the hair. The figure will also receive its due amount of consideration. We will have to draw in and paint the leading folds and broad peculiarities of the drapery. This must be carried, as far as possible, to a finish, as we may never again have them under the same exact conditions. The masses of light and shade, too, should be indicated at this stage. If the dress be a very particular portion of the picture, which it very generally is in the case of ladies, I would suggest the assistance of a *lay figure*. As I say, if the dress be a matter of importance it should be placed upon a lay figure, and then the artist could have as many sittings from nature as he wanted, and the *drawing* would never be altered. In nature, every time the artist gets a sitting it would be almost a matter of impossibility to get all the folds of the dress and other leading points quite the same.

In a photograph all this is altered. There is a faithful drawing of the dress, with every fold and peculiarity shown and fixed. It is, indeed, such a faithful copy of the original that, if at all capable, we cannot go wrong. In this sitting, one of the most important points is the delicate indication and skilful adjustment of the masses of light and shade. Here, too, the photograph is a good friend, for it has, without trouble, secured those effects. It is true that sometimes they are exaggerated, but with taste and judgment we can very easily rectify what may be defective.

In the interval between the second and third sittings, we may, if so disposed, soften the tints of the flesh. Until one has had considerable practice and experience, and can be accounted proficient, little, if anything, should be added to the flesh in the absence of the sitter. I need not say that the thoroughness of this rule must be considerably dependent upon your knowledge of the sitter, be it from the life or through the help of your detailed list of colours.

As may be supposed, the *third sitting*, being the last, must be chiefly occupied in finishing and softening down the picture, and also in correcting any deficiency that may exist in the likeness generally. This done, we may presume we will have a very satisfactory portrait as a result.

Of course these *three sittings* are necessary only when the artist has to make his sketch from life; but when he has a photographic base *one sitting* only should, in the majority of cases, prove to be ample. You see, in the first place, the sitting utilised by the artist in making a sketch more or less elaborate is obviated by the aid of photography; and we are furnished with such a detailed sketch for colouring as no artist, however painstaking, ever puts in for his own use. Indeed, not only have we an exhaustive outline or sketch, but we have actually all the various degrees of light and shade. This, too, not only in the head and face, but the entire figures, or as much of it as appears in the portrait. All this is no small advantage, and I think it worse than nonsense trying to make little of the assistance that we can derive from photography.

One of the most important points in a portrait is the position. This refers almost equally to a head and bust or three-quarter figure. There are many instances where the artist *goes out* to paint a portrait goes with the sitter to the photographer's studio, and *poses* the subject. But even where this is not, or cannot, be done, there is little doubt that in a first-rate studio there will be an operative quite equal to the task of doing justice to a sitter in this regard. Of course, much of the value of the portrait is dependent on the *pose*. Much of the likeness and individuality of a sitter may be lost or secured by a very

slight turn of the head. It is, therefore, the first object of importance that the operator should examine carefully the sitter's face, and decide upon that position which would make the sitter's face appear the most agreeable as well as most characteristic.

We may, I think, accept the rule that wherever the features of a sitter are more than ordinarily *prominent*, a full face will be found to give the most agreeable results. This is the case simply, because in such heads the features are, in nine cases out of ten, less strongly defined. The position most frequently selected, however, is the three-quarter. This may at first sight appear remarkable, but on consideration it will be seen that the reason why this selection is so often made is that it combines to some degree the qualities and advantages of the full face and profile as well. There is a very considerable scope for the exercise of an operator's skill and judgment in fixing the exact proportion of a three-quarter head, considerable beauty and individuality being at stake. Another point, which is of vital importance, although to the unskilled it may appear unimportant, is the selection to be made between the different sides of the face to be turned to the operator; that is to say, whether the sitter will face, in three-quarter proportion, to the right or to the left. There is an enormous difference between the aspects of the two sides, and one will give a much more favourable portrait than the other. It will be remarked that there is a vast difference in the shadow and general appearance of the nose when photographed on the *right* side as compared with that of the *left* side. I have never met any one in my experience with both sides of the face alike, and I am inclined to say there is not a living soul whose two sides of the face are identical. As a natural result one must, therefore, present a better aspect than the other. A strange thing, too, is the fact that one side carries considerably more individuality than the other. I judge all these little matters by my own personal observation. As is only natural to one mixing so long with photographers and artists, I have been photographed a few times. Now a photograph of the right side of my face will give a very fine result. The nose is well defined and regular to a degree, and (*with considerable help from the retoucher*) might be considered, to a limited extent, attractive. This is all very nice and as it should be, I have no doubt, but it is not *my* likeness. The *left* side of my face carries all my individuality, and a portrait taken of it may not excite admiration as a picture, but there is the undoubted likeness of your humble servant. The idea that strikes you is not so much "What a nice picture!" as "What a good likeness!" As it is with me so is it with all others, only we will not recognise it if we do not enter heart and soul into our work. Profiles are not usually selected, for the reason that from a point of likeness its quality is naturally more limited than that of a three-quarter.

Having settled the position of the head satisfactorily as regards itself, the next point to consider is its position with regard to the body. There is a great lack of gracefulness when the head and body are turned in the same direction. To place a head to the best advantage, suppose the body turned to the *right*, the head should turn, in reason, of course, towards the *left*. Although there is more grace in this treatment, having the body and head turned the same way is not without its charm. A portrait treated thus is more remarkable for its simplicity than for its grace. I would suggest that the character of the man as expressed by his features should be the guide as to which should be selected. To the man who has artistic feeling in these points there are many considerations to claim his attention. An artist shows his skill in selecting that position which is best calculated, taking sex, age, and character into account, to secure an embodiment full of truthfulness and grace.

In a three-quarter length much beauty may be secured by the skilful placing of the hands; and I would suggest that, showing one, you show *both*. It is a very unpleasant feeling, and it may mar the success of a portrait, if the suggestion offers itself, "Where is the other hand?"

REDMOND BARRETT.

CAPTAIN ABNEY ON HELIOCHROMY.

CAPTAIN ABNEY, in a recent address before a section of the British Association, made some brief remarks upon the subject of heliochromy which are, in my opinion, so misleading as to call for correction. I quote as follows:—"The nearest approach to success in producing coloured pictures by light alone is the method of taking three negatives of the same subject through different coloured glasses, complementary to the three colour-sensations which together give to the eye the sensation of white light. The method is open to objection on account of the impure colour of the glasses used. If a device could be adopted whereby only those three parts of the spectrum could be severally used which form the colour-sensation, the method would be

more perfect than it is at present. Even then perfection could not be attained, owing to a defect which is inherent in photography. This defect is the imperfect representation of gradation in tone.

According to those recent text-books on colour which I have seen, only such light rays as are supposed to affect only one kind of nerve fibrils in the eye, or to excite only one of the fundamental colour-sensations, can be said to form or represent primary colour-sensations, and such rays are confined to both ends, and a narrow strip in the middle of the visible spectrum.* If Captain Abney means to assert that in a process of this character only those rays of the spectrum should act which represent primary colour-sensations, he is certainly mistaken, and grievously misleading all those who accept him as an authority upon this subject.

It is certain that every ray of the visible spectrum should act, and act nearly in proportion to its power, to excite the sensation of light in the eye. It would be ridiculous to expect that a process which reproduced the spectrum as three detached and widely separated patches of colour would correctly reproduce the infinite variety of compound colours in nature, some of which are made up chiefly, and most of them partly, of rays lying in other parts of the spectrum. There are some moderately bright colours which would reproduce like black by such a process.

But it is not easy for me to believe that Captain Abney means what I have inferred from his statement, although the expressions "parts of the spectrum" and "impure colour of the glasses" certainly support this inference. When he says "those parts of the spectrum . . . which form the colour-sensations," it is possible that he may mean the light rays in proportion as they affect the different kinds of nerve fibrils, or excite the different primary colour-sensations in the eye. If so, he does not mean to divide the spectrum into three distinct parts, but aimed to state a fact which was first observed by me, and plainly set forth in my book, *A New Principle in Heliochromy*, where I showed that each heliochromic negative must be made by the joint action, in due proportion, of all rays which affect the primary colour-sensation which it represents. It does not require screens of "pure colour" to do this—quite the contrary. Screens of "pure colour" are screens transparent to single regions of the spectrum only, and would not transmit all the rays that affect a single kind of nerve fibrils in the eye. The red, orange, yellow, and yellow-green rays all affect the nerve fibrils which produce the red colour-sensation, and all of them must therefore be transmitted more or less freely by the colour-screen used in making the negative representing that primary colour-sensation. But the orange-yellow and yellow must also be transmitted to some extent by the screen used in making the negative representing the green colour-sensation.

The screens must, in short, be so graduated in colour as to secure, in negatives of the spectrum, curves of intensity like the curves of a diagram representing the action of the spectrum upon the three kinds of nerve fibrils in the eye, or upon the three fundamental colour-sensations; and it is a fact that such screens had been produced and that correct heliochromic negatives had been made in considerable number, and with ease and certainty, before the beginning of this year.

The observation that the inability of photography to exactly represent gradations in tone would affect the accuracy of such a method of reproducing colours, of which Captain Abney now makes so much, originated with myself; but I also showed that by my method of proving the colour-screens by reference to the curves of intensity in the spectrum negatives, the effect of this defect in the negative process could be so far compensated for that it would no longer seriously affect the result, if suitable sensitive plates were employed. To say that this method does not solve the problem because of this defect, would be equivalent to saying that photography has not solved the problem of reproducing light and shade.

F. E. IVES.

—*Journal of the Franklin Institute.*

THE NEGATIVE IMAGE.

No. III.

AMONG the substances named as having affinity for the halogen of emulsified silver salt, the one nowadays most commonly found in the laboratory is probably normal sodium sulphite, Na_2SO_3 , and, therefore, easily available for the purposes of experiment. It may

* "Helmholtz, Maxwell, and Rood, as well as many other physicists, have developed the theory of Wunsch and Young, and have adopted the same, or very nearly the same, trial of primary colour-sensations. These fundamental hues or primaries . . . represent three widely separated and very bright colours of the spectrum."—*Colour*, by A. H. Church, M.A. London, 1887, p. 67. See also Rood's *Modern Chromatics*, pp. 120-23.

be regarded, and is in the following notes so taken, as a type of its congeners. Besides its well-known powers as a preservative of pyrogallol in solution, it has, it is believed, a slight solvent action on the haloid, and is also a feeble developer of the reduced image; it is probably to this complexity of characteristics that we are enabled to trace its value as a precursory aid to light.

Films of silver bromide on glass were treated with sodium sulphite in solution, the precise proportions being twenty grains to the ounce of water. The solution was allowed to remain upon the plates for the space of half an hour; they were then washed in several changes of clean water and allowed to dry spontaneously. When complete dessication had taken place some interesting changes in the properties of the sensitive substance were observed.

Held in moderately strong daylight the film rapidly acquired a dark purple colour; in a quarter of an hour it became hardly less black than a developed negative, viewed from either side, and, it is unnecessary to say, quite opaque. A plate coated with normal silver bromide was exposed at and for the same time. The relative difference in the colorific effects produced was the comparison of opposite extremes. Before it had thoroughly blackened, the debromised film (the term is employed under reserve) threw off a smell of bromine infinitely stronger than that coming from the non-treated film. A slight degradation of the characteristic hue of the pure haloid was induced by the action of the sodium sulphite. The half of a plate was immersed in the solution and carefully washed and dried. Viewed by the inactive red rays it was easily seen that the untreated half was perceptibly lighter; the same effect was apparent in white light.

The visible darkening of the debromised plate in unrestrained light took place much more rapidly than the reduction of silver chloride with excess of nitrate on paper. Portions of a debromised plate, carefully masked off, exhibited no change after having been kept in the dark for several days; therefore, it must be conceded that light is indispensable to the alteration, and that the reagent *per se* is ineffective.

A debromised plate was inserted in an ordinary printing frame behind a negative and exposed to daylight; a positive image of great beauty and softness was printed out. Again, such plates were exposed in the camera when visible negative images not inferior to some obtained by development of normal sub-haloid resulted. Without exhaustive experiment it is impossible to allege a specific sensitiveness to such plates, but it may be said that under the most favourable conditions of light and lens, the original rapidity of the plates being of the medium or instantaneous kind, not more than a minute should suffice for the positive in the frame, and two for the negative in the camera; but these data are in no sense absolute, and are given solely with the view of providing essential details.

The phenomenon of the reversed image results from over-exposure, while in some comparative trials it was found that given two plates of normal bromide differing in sensitiveness the relative rapidities were maintained in the debromised state.

The solvent action of sodium hyposulphite upon these directly produced images is far greater than upon pictures that result from brief exposure and development of normal bromide; it dissolves the unaltered portions very readily, and attacks and weakens the positive or negative deposition to a perceptible degree. By prolonging the immersion for twenty-four hours the image is all but obliterated. Negatives of such a description are not adapted for printing purposes without intensification, and apparently the purplish-brown deposit that forms the image will not enter into combination with the mercuric salt.

Following upon the fact just stated, an obvious question presents itself: Are these direct impressions formed of metallic silver? Has light, foreaided by the halogen "absorbent," accomplished that which this present writer claims it will do in the future, namely, produced a direct visible negative image in metal? The evidence either way is inconclusive: sodium hyposulphite unquestionably has great solvent action upon the deposits; hydrochloric 1:10 dissolves them easily. It can be argued that upon deposited metallic silver neither the one nor the other has such a power in anything like the same degree. Moreover, a debromised plate that has been allowed to blacken spontaneously is, if we except the instability of the vehicular body, unaffected by moderately strong nitric acid, and the images obtained in the camera and the printing frame are, after fixation, insoluble in the same reagent. Such facts point clearly in one direction; nevertheless, it is open to us to assume that with allotropic forms of silver the nitric acid test is not admissible.

The debromised plates appear to lose direct sensitiveness by being kept for periods of days before exposure; if exposed wet they seem to be more sensitive than when dry. Their sensitiveness to the

developable action of light is much less than that of normal bromide plates, but, on the other hand, the impression obtained by correct exposure takes upon development remarkable density. The faint negative effect produced by under-exposing a debromised plate for a visible picture can be developed to the requisite intensity in the ordinary manner. Such deposits, in contradistinction to the visible images obtained by exposure, are readily soluble in nitric acid. The density possessed by developed impressions on debromised plates suggests that where difficulty is experienced with a particular emulsion in getting negatives sufficiently dense, a remedy, at some sacrifice of rapidity, is at hand by the employment of a preliminary treatment with an absorbent of halogen.

As establishing some similarity between the body obtained by the prolonged exposure of a debromised plate, and the substance left on such plates by development without exposure, it was found that by the latter procedure a dark homogeneous deposit, seemingly of a metallic nature, was obtained, and that it exhibited precisely the same reactions with sodium hyposulphite, nitric and hydrochloric acids, as the printed-out images.

The following equation probably represents the chemical change undergone by the sensitive film upon the application of sodium sulphite before exposure:—



The symbol for the altered haloid implies a belief in the formation of some such body as sub-haloid or sub-salt. Upon applying sulphuric acid and heat to portions of the sodium sulphite solution in which plates had been soaked, the escape of brown fumes indicating the presence of hydrobromic acid appeared to confirm the correctness of the stated reaction. But a question whether the equation was literally reliable, and also whether the actual presence of sodium sulphite in contact with the film was not necessary to the blackening action of light, led to plates, after removal from the sulphite, being (1) thoroughly washed in water and, finally, in methylated alcohol; and (2) allowed to dry without being washed. Upon exposure side by side, the washed plate exhibited by far the greater depth of blackening.

Relative to the visible action of light on modified silver bromide, others of the halogen absorbents were experimented with, but did not exhibit distinctive features that call for reference on this occasion.

THOMAS BEDDING.

THE GROTTO OF HANS.

PHOTOGRAPHERS desiring an enjoyable holiday, and at the same time searching for new fields to conquer, will find the district in and around the Forest of Arden, in Belgium, well worth attention, and as their implements of war are no more harmful than "glass, brass, and wood," with some flash or magnesium lights as a reserve, they can dispense with the impedimenta that generally accompanies an invading army.

Among the wonders of nature, some of the most fascinating are the subterranean caverns and water-courses that are to be found in various parts of the globe, but few, if any, known, are so extensive, curious, and majestic as the series of stalactitic caverns known as the "Grotto of Hans." It seems very little known to travellers, especially English, and the guide-books only mention it in a cursory manner. I was lead to include it in my round of sights by the remarks in the small guide of the London Chatham and Dover Company, in which they "strongly recommend tourists not to miss seeing the caverns." In emphasising this, I can candidly say, that if I had travelled several hundred miles out of my route, instead of fifty or so, what I saw would have fully repaid me for the extra time spent in doing so.

The cost of travelling in Belgium, as is well known, is inexpensive, and when one gets away from the low-lying country around Antwerp and Brussels, the scenery is very picturesque, not that these two cities are not well worth visiting for the capture of "light writings," for are they not the homes of some of the most celebrated artists? but in a different way do they have to receive attention from the bearer of a camera. They represent the "art" side, with the beautiful architecture, painting, and sculpture, whereas the district I wish to write about is full of "Nature." Wishing to get the greatest change possible in a holiday of ten days, I was attracted by an excellent little book entitled *Walks in the Ardennes*, and finding the scenery described and depicted in it to my mind, I looked in the Great Eastern Railway Continental timetable for a circular ticket that should touch this district, and found one that for a sum under two pounds included a second-class ticket to Spa, with power to break the journey at Harwich, Antwerp, Louvain, Malines, Liège, Pepinster, with special facilities (being exhibition year) to visit Brussels, either going or returning.

Accompanied by a friend, I left by the eight p.m. train from Liverpool Street Station on Saturday, and in two hours reached Harwich, the train drawing up by the side of Parkstone Quay, which, together with the station, was well lighted by electricity, the excellent steamers of the Great Eastern Railway Company are then readily boarded. One cannot

but be pleased with the boats, for they are large and comfortable, and several on the service are fitted with incandescent electric-light lamps, which not only give a far better light, but in the case of an enforced sojourn in the cabins the absence of the smell of oil is a great boon. On this particular night the sea was very calm, and so no trouble was given the steward, except to satisfy the sharp-set appetites of the passengers. Should the crossing take place in rough weather, it is wise to pay the extra for a first-class sleeping berth.

Without going into the minutiae of the journey in its various parts, I will at once say that the photographer will find his time well occupied in Antwerp for two or three days getting "pictures;" and from the fact that a trio of well-known enthusiasts in the photographic world returned from Antwerp in the same steamer that I did with perfect satisfaction depicted on their faces and in their manner, I am sure no one who follows their example will be sorry for spending the evening and night in train and boat to get from London (or the Midlands) to Antwerp, and vice-versa, for most passengers manage to sleep well for several hours on board. In the busy season you have to hurry up from the train to get a choice, but the first-class berths can be secured or reserved by telegraph. From Antwerp we went to Liège, and there spent the afternoon and evening. This, the Birmingham of Belgium, as far as its trade is concerned, is a very finely situated place, and has some fine scenery surrounding it, a capital river, and a very ancient and picturesque palace, now used as municipal offices; besides which there are broad and open places, and fine streets, and high-class shops.

It was from Liège we started for the Grotto of Hans, and it was reached by first taking tickets to a place called Jemelle, the train for which leaves about seven o'clock in the morning, and the journey of about forty kilometres (say twenty-three miles) was performed in two hours. This, no doubt, in England would be voted decidedly slow, but as the scenery is very beautiful on the way, one can enjoy it all the more by reason of the slow travelling; while at one or two of the stations the time would be sufficient to get some pretty pictures, and with a clip capable of attaching to the door or window of the railway carriage this could be easily done. One place was particularly charming, it is called "Comblain-au-pont," which takes its name from a bridge. The costumes again, here and there, are worth perpetuating. During the journey from Liège to Jemelle the railway rises 500 feet, and Liège being 250 feet higher than Antwerp, it will be understood that the undulating scenery, either with the charming morning tints on it, or the lovely flood of moonlight, as was presented to our gaze on returning through vale and over hill, is beautiful in the extreme.

On arriving at Jemelle waggonettes are waiting to take the travellers to the Biron Hôtel, Rochefort, where an English-speaking waiter soon attends to your comfort, and with a quiet word in his ears he will have the front seat of the waggonette kept for you, if not already bespoke; and, strange to say, it was not on this day, for here, as in other parts of Belgium, the seats beside the driver are not sought after; in fact, in the trams, &c., are considered and priced second class. How different to our English notions and the value set on box seats of coaches, &c.! The ride of eight kilometres takes about three-quarters of an hour, and is along a splendidly made road (and Belgium is noted for its well-made and kept roads), with woodland and magnificent firs on one side, and the open country with its background of hills on the other. A more charming ride on a day such as we had in September last year, with its cloudless, blue sky, could hardly be imagined if not found in reality. Presently the waggonette stopped and the passengers alighted to be joined by parties that had come from other parts, namely, Namur, Dinant, Givet (frontier town), &c.; as these towns in the Ardennes can be reached from Brussels or France, the tourist has an alternative method of taking in "the Grotto" on his journey through Belgium. In all assembled at the entrance of the Grotto was a party of fifty, and prior to leaving the splendid sunshine, an inspection and "shot" at the water course of the River Lesse must be taken, for it is a sight as it comes rushing out of the rock in which the Grotto, or rather the caverns are formed.

Should the tourist desire to get a few photographs of the "dark places of the earth," he will now prepare his detective camera, and having the flash light ready at hand in a safe satchel, with some of his friends carrying a couple of magnesium lamps, rejoin the rest of the party and gain a few particulars before entering.

Some idea of their size may be gathered from the fact that this rock, which is covered with a wood, is 5000 metres in circumference, or about three miles, and it took us three hours to explore the caverns, being on the move all the time, with the exception of a short rest about half way. The lights are provided by the proprietor, and consist of paraffin lamps of the Silber model, with two burners on one rod, and are carried by children (girls and boys) and a few women. These range themselves among the party so as to fairly illuminate the footpaths and not get too many shadows; and when all are marshalled the guide leads the way, and in a clear voice gives his descriptions and explanations in French. He is not remarkable in dress, except that he wears a curious girdle, and this, we find later, is of great practical value, for it is the hempen threads that form the wick for certain of his torches and illuminations. He is strong in limb, and, as he proves, surefooted; in fact, one can give him the credit of being a champion guide and entertainer as well.

No sooner do we enter and begin to look about than we see something to admire—beautiful stalactites, taking all sorts of fantastic shapes; and

as we pass from corridor to hall, and gallery to *salon*, fresh wonders meet our eyes at every step. It would take a volume to describe in detail all the natural beauties of the Grotto; but as my thoughts wander back, I think of the lovely alabaster-looking groups of cathedrals, fortresses, colosseums, dome buildings, thrones, animals, draperies, and birds, all formed by the dropping of water containing the potash or other calcareous matter that is imparted to it in passing through the earth and fissure of the rock above. I found by means of a sensitive watch-size pocket surveying barometer I had with me that the general level of the Grotto was about 650 feet above sea level, that is, about 400 feet above Liège, our starting point in the morning, and we are told that it is ninety-two metres, or about 280 feet above the bed of the river. No doubt in times prehistoric some great geological change caused these caverns to be formed, and they have been altered by the torrent of water that no doubt at one time passed through the different parts of the cave, but are now diverted into other channels; and from the fact that Roman medals, large quantities of money, human bones of large size, having been found, and other signs, there is little doubt that the caves have been inhabited.

G. R. BAKER.

(To be concluded.)

ELECTRIC LIGHT IN THE LANTERN.

I HAVE just seen the letter of Mr. Baker on this subject. If any of your readers have facility for getting current, they need have no trouble or delay, and very little expense, in availing themselves of such a light, as

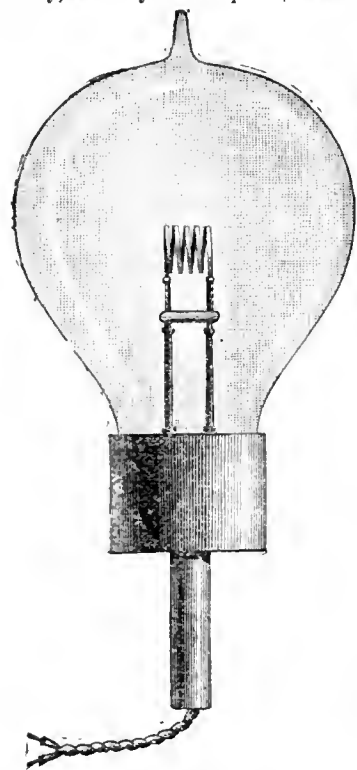


Fig. 1.—LAMP.

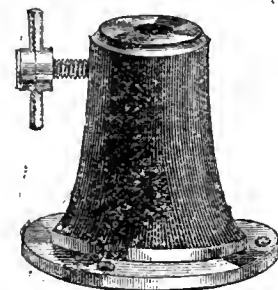


Fig. 2.—HOLDER.

power, and as it works at from 80 to 100 volts, requires 5 to 6 ampères.

These lamps are sold at 10s. each, and a little fixing is sold at option for 3s. 6d., which is simply screwed on a block of wood, or screwed or soldered to the metal bottom of the lantern. Nothing at all peculiar need be done to any lantern beyond adjusting this block approximately to the right height; the fitting itself gives ample final adjustment within reasonable limits. The purchaser who is fortunate enough to command it, has nothing whatever to do further, beyond getting in his current and arranging a switch for it.

November 4, 1889.

LEWIS WRIGHT.

[The figures appended show exactly what the lamp is, and how it is fixed in the lantern.—Ed.]

NOTES FROM NEWCASTLE.

I NOTICED some discussion still going on about the "Amateur" question. I don't think the local photographic world is troubled much in this particular, but we occasionally meet with "Amateurs" whose con-

sciences are of an easy texture; for instance, I knew of one who had some hundreds of cabinet mounts stamped with his name and address by a printer friend of mine something after this style—

JONAS SWINGBACK,
AMATEUR PHOTOGRAPHER,
RISING TERRACE,
NEWCASTLE-ON-TYNE.

"Copies may be had."

I thought this pretty good for an amateur, but now I hear of a large order for lantern slides (of local scenery) and photographs placed in the hands of another "person of the amateur persuasion," price, &c., all fixed.

Mr. John Pike, chemist and photographer, has been elected the first President of the new Chemists, Assistants, and Apprentices' Association of Newcastle, and delivered an address to the members on the occasion of the inaugural meeting the other day.

The accession of some eighteen or so new names to the membership roll of the Newcastle Photographic Association ought to be a matter of grave consideration by the Executive of that body, from the fact that these new members evidently expect to receive *something* in return for their expenditure of time and money in place of the "dry bones" which have had to do duty at the monthly meetings for some time past. After all, the members have it in their own hands to make or mar the Society; and if these eighteen mean business, they can do a great deal to improve and revivify the Association. The Executive should either do something for the members, or the members should do something on their own account. I am afraid the "wet blanket" business is too often applied by the elder to the younger and more enthusiastic of the members.

The death of Mr. Goold (photographer to Messrs. Armstrong, Mitchell, & Co., of the Elswick Works) caused some two years ago a vacancy which an experienced photographer might well have hesitated to fill. It is no easy matter to get good and perfect (as regards detail) negatives of machinery, and hardly less difficult, in a district which boasts more than one photographer of very considerable skill in work of this kind, to submit proofs which will satisfy the demands of firms of this standing, the appointment was, however, conferred upon Mr. J. E. Goold, son of the above-mentioned, at the time a draughtsman with the firm, and who had had little or no experience of photography; luckily, Mr. Goold the younger had some art training and chemical knowledge to fall back upon, aided by first-class studio arrangements and apparatus of the highest order, and very quickly mastered the *technique* necessary for success—how well these difficulties have been overcome is evidenced by the beautiful instantaneous photographs he has just taken for the Elswick firm of H.M.S. *Victoria's* gun trials at sea. Mr. Goold was despatched recently to Chatham for this purpose, and has returned with photographs which have delighted the firm, and every one who has been privileged to see them—as, for instance, the members present at the last meeting of the local Society, and others. It is to be hoped that one at least of these will soon be reproduced and published in one or more of the illustrated papers—Mr. Goold's work has been seen on the walls of more than one exhibition, and received a medal award at Cardiff recently. Mr. Goold has often large orders for photographs necessitating special appliances; and a description of the studio and suite of rooms will, I have no doubt, at a future time, interest your readers.

I dare say some of us will remember a time when such signs as "Easy shaving and photographs taken," "Hairdresser and photographer," were pretty common; nowadays, "Physic, photographs, and fiddlestrings" are not so often met with in such close proximity. I know one photographer, however, not many miles from here, whose hobby is "phrenology," and who is only too happy when a chance presents itself of trying his skill; this led the other day to something like the following dialogue between himself and a local "pit laddie":—

"Noo, then; is thoo bizzzy?"

"Not very; I shall be free in a minute or two," said the disciple of the camera.

"When thoo's dune, a'll want thoo ta strike me, an if it's a good un, a'll hev thoo ta tak wor Bill; aw wad like him teyken stealin' sugar oot o' the bason, an t'other bit laddie gawn ta slap him."

Replies the photographer: "Do you think he would stop in a mischief long enough?"

"Mischief lang enough, man; wey, he's nivver oot."

"He is evidently a sharp, clever boy; you should have his head examined."

"His head egsamined, man; wey, ma wife egsamines his head ivvory weck end ta see if there's enny big uns in't."

D. D.

Foreign Notes and News.

HERR E. COHEN, of Amsterdam, has recently succeeded in obtaining some interesting photographs of falling streams of water. He employed a vessel from the bottom of which issued a column of water one centimetre thick. The apparatus was placed in a dark chamber and illuminated by the spark of Ruhmkorff's coil in connexion with a Leyden jar. The falling column of water had a velocity of 8.28 m. per second, while the period of illumination was reckoned by Cohen at about one 82,800 of a second. The results turned out most successful—the elevations and depressions of the stream as well as the separate drops being clearly distinguishable. The definition obtained in this way was of course far superior to anything that could be reached with magnesium flash-light apparatus, as the period of illumination would be far too long to give distinctness to the impressions of the different drops. It will be remembered that Professor Mach employed the same means of illumination for obtaining his celebrated photographs of bullets during their flight, and it appears to be about the best means of obtaining sharp impressions of moving objects, provided of course that they can be got into a dark chamber.

THE *Revue Suisse de Photographie* gives an account of some experiments conducted by F. A. Forel, for the purpose of ascertaining the photographic transparency of the water of the Lake of Geneva at different times of the year. The gentleman in question, who has placed the results of his work before the Academy, employed in his researches ordinary albumen paper. He fastened upon a line 130 m. long, a number of small water-tight copying frames, each 10 m. from one another, in which the sensitised paper was contained. The whole concern was sunk in the lake at night, after the manner of the wily fisher for eels when setting a night line, but with almost more precaution. It was permitted to remain there until a sunny day had illumined the bosom of the lake, and then with similar caution and secrecy drawn up during the following night. The result proved that the water attains its maximum of transparency during winter, the action of light being then still apparent at a depth of 350 feet. In July, on the other hand, complete darkness reigned at a depth of 150 feet. M. Forel attributes the comparative opacity of the water in summer to its containing a greater amount of organic impurities.

THEORETICAL, speculative Germany is bidding fair, it would seem, to outstrip "practical England" in her own especial domain of practicality. The good town of Hamburg has recently added to other institutions a police photographic studio. Two negatives are taken in different attitudes of each criminal who gets within the clutches of the law, and being preserved in the archives of the city render future identification easier for the police, and the denial of previous convictions harder for the accused. The studio is located in part of the criminal court, and the method adopted is to introduce the individual into it, seat him upon a stool, the plate being already within the camera, which is focussed for the stool in question, and the physiognomy of the criminal is already imprinted upon the gelatine before he has had time to impart to it that air of preternatural innocence which renders the photographs of hardened law-breakers often of so little use as a means of identification, when they have had time to prepare themselves for the ordeal.

PROFESSOR EDEN sums up his experience of eikonogen in the following note in the *Photographische Correspondenz*, which explains amongst other things how eikonogen appears in this country under the varying forms complained of by one of the contributors to the *JOURNAL*. "Eikonogen" he says "was discovered by Dr. Andresen, of Berlin, and has been manufactured since the spring by Krügener, of Frankfurt: first in the form of a greyish powder, but now in the form of compact granular crystals. It is in reality the sodium salt of Amido-B-naphthol-B-mono-sulphuric acid, its formula being $C_{10}H_{13}\left\{\begin{array}{l} SO_3Na \\ OH \\ NH_2 \end{array}\right.$ It forms a white crystalline

powder, the aqueous solution of which does not get brown in the presence of sodium sulphite when exposed to the air. Its action on bromide of silver gelatine plates is to produce very beautiful gradations with delicate half tones. It never clouds emulsion plates, and acts very beneficially in relation to their degree of sensitiveness. It has been for some time employed in the Vienna experimental school of photography."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,970.—"A New or Improved Collapsible Focusing Chamber for Photographic Camera." W. TYLER.—*Dated October 28, 1889.*

No. 17,117.—"Improvements in the Manufacture of Photographic Plates." Communicated by W. REECE. S. PITT.—*Dated October 29, 1889.*

No. 17,318.—"Improvements in Photographic Cameras." F. MALL.—*Dated November 1, 1889.*

No. 17,359.—"Improvements in Photographic Cameras, more especially relating to Finders." A. S. L. ABRAHAM.—*Dated November 1, 1889.*

No. 17,378.—"A Benzoline Saturator for Limelight and other Purposes." A. W. SCOTT.—*Dated November 2, 1889.*

No. 17,406.—"Improvements relating to Permanent Coloured Photographic Prints obtained by Direct Printing from Negatives." S. V. DARDIER.—*Dated November 2, 1889.*

SPECIFICATION PUBLISHED.

No. 15,993.—"Preserving Peroxide of Hydrogen." KINGZETT.—*Dated November 2, 1889. Price 4d.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 8	Ireland	Royal College of Science, Dublin.
" 11	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 12	Great Britain	5A, Pall Mall East.
" 12	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
" 12	Derby	Society's Rooms, 3, Derwent-street.
" 12	Bradford	55, North Parade.
" 12	Manchester Amateur	Manchester Athenæum.
" 12	Belton Club	The Studio, Chancery-lane, Bolton.
" 13	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 14	Birkenhead	Free Public Library, Hamilton-st.
" 14	Cheltenham	
" 14	Manchester Photo. Society	36, George-street.
" 14	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 31.—Mr. H. Haddon in the chair.

Mr. C. H. COOKE showed some negatives on Carbutt's celluloid films. They had been given him by a friend who wished to know the cause of a number of semi-opaque spots appearing on them.

The opinion of the members was that the spots were caused by pressure of the films against each other, probably in conjunction with some friction.

A question from the box was read:—"What is the best colour for the walls of a dark room?"

Mr. A. L. HENDERSON said that he would line a large dark room with white and a small one with black.

Mr. W. E. DEBENHAM and Mr. A. MACKIE considered yellow to be better than white, as it reflected nearly as much visual light when lighted by the dark-room window, but did not reflect powerfully acting rays, some of which might enter by the window.

The CHAIRMAN suggested that Mr. Henderson might have something of interest to tell the members on his return from Australia.

Mr. HENDERSON said that he had brought back a very fine collection, principally of New Zealand photographs, which he would bring to a future meeting. He had also a print by a New Zealand photographer—Morris, of Dunedin—in which there appeared something of the natural colour in the face of the sitter. That he would also bring.

Mr. J. HUBERT then read a paper commenting principally upon the report of the proceedings of the previous meeting that had appeared in a contemporary. He also said that after the meeting he tested the water in the zinc can from which he had taken his supply, and found it to be strongly acid—apparently with acetic acid; this would account for the slow and imperfect appearance of the image when he attempted to develop it.

The discussion of the previous week's paper being open, Mr. DEBENHAM noted that it was advised to lower the light or use a coat of coloured varnish over the negative if there was insufficient intensity. Did Mr. Hubert affirm that with a proportionately short exposure to a strong light the result was less vigorous than with a sufficiently long exposure to a weak light?

Mr. HUBERT replied that it was at all events easier to give correct exposure with a weak light than with a very strong one.

Mr. F. A. BRIDGE maintained that there was an essential difference in the results from a weak and from a strong light; some negatives were so dense that a weak light would not get through them, no matter how long might be given. He had negatives that he could not enlarge by limelight.

Mr. HENDERSON said that in making transparencies in the camera he got more density by stopping down the lens.

The CHAIRMAN inquired whether Mr. Hubert had tried other developers than ferrous oxalate.

Mr. HUBERT replied that at the previous meeting he had submitted several pictures developed with hydroquinone and with pyro. He had tried eikonogen that day both for bromide enlargement and for negatives. For the latter purpose he did not like it, as it took so long to develop with it.

Mr. HENDERSON inquired whether any good developer could be recommended for plates that had been exposed for several days to an atmosphere containing seventy-five per cent. of moisture and at a temperature of 90°. He had tried carbonate of lithium instead of ammonia. With the usual method he had obtained a reversed image.

Mr. L. E. Morgan was elected a member.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

At the Committee meeting held on the 11th ultimo Mr. W. M. Ashman was elected on the Committee.

On the 25th ultimo and the 1st instant the Committee were engaged in considering the revision of the rules of the Association, with a view to enlarging the scope of its action and the rights and conditions of membership. At the latter meeting the Committee dealt with an application for assistance, and made a grant to meet the case.

PHOTOGRAPHIC CLUB.

ANNUAL MEETING, Auderton's Hotel, Wednesday, November 6, 1889.

The following officers were elected for the ensuing year:—*Trustees*: Messrs. W. Ackland and T. Charters White.—*Committee*: Messrs. W. F. Benham, W. P. Cembrano, H. E. Davis, E. W. Foxlee, F. Haes, A. Mackie, J. B. B. Wellington, and J. W. Zaehnsdorf.—*Librarian*: Mr. C. D. Hesse.—*Curator*: Mr. H. M. Hastings.—*Recorder*: Mr. E. Clifton.—*Hon. Secretary and Treasurer*: Mr. F. A. Bridge, East Lodge, Dalston-lane, London, N.E.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 5.—Mr. J. TRAILL TAYLOR (President) in the chair.

This being the annual meeting, certain proposed alterations in the rules were adopted.

The Council's report, together with that of the Treasurer, showed great activity and financial prosperity as the result of the doings of the past year.

The election of officers and Council then took place, the following being elected:—*President*: Mr. J. Traill Taylor.—*Council*: Rev. E. Healy, Messrs. W. Bishop, G. J. Clarke, J. Douglas, A. Mackie, L. Medland, J. Oakley, F. G. Reader, H. Walker, W. Few.—*Curator*: Mr. W. T. Coventon.—*Secretary and Treasurer*: Mr. N. Percy Fox, 2, Princess-terrace, Primrose-hill, N.W.

A new member was admitted.

Next meeting will be a lantern night.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

OCTOBER 28.—Mr. J. HUMPHRIES in the chair.

Mr. S. HERBERT FRY gave a lecture and demonstration upon *Bromide Paper and Enlarging*. In the course of an hour's address he touched upon the salient points of the process, remarking that his object was to give the benefit of his personal experience, and not to give the members an elaborate essay. A portrait negative enlargement was then made and developed, and the method of vignetting and exposing in the draperies illustrated. Afterwards Mr. Chang passed up a landscape negative which Mr. Fry enlarged to 15×12, and then demonstrated his method of printing in a sky from a separate negative.

The lecture and demonstration were full of practical interest.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

FRIDAY, November 1.—Mr. F. W. EDWARDS (President) in the chair.

Mr. Aland elected as member.

The business of the evening consisted of a demonstration of *Development* by the President and Mr. Dowling.

Some positives on ground glass, by Mr. Dowling, handed round for inspection, were much admired.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held at the Masonic Hall on November 5.—Mr. B. J. Taylor (President) in the chair.

Mr. J. Hawkley was elected a member.

A demonstration of lantern slide making was given by Messrs. T. J. Hibbert, Furness, and Brown, the two former using the Alpha plates and developer as sent out by the makers, and the latter using Thomas's plates and Mawson's developer. Mr. Hibbert also exhibited the acme camera by Watson & Sons.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 1.—Colonel Playfair in the chair.

A suggestion was made that negatives which have done their work and are no longer in use by members should be brought to the monthly meetings and exchanged for mutual benefit. This received the favourable consideration of those present.

Dr. HARMAN BROWN read a paper on *The Eye considered as a Camera*.

The next meeting will be held on Friday, December 6, when Mr. H. A. H. Daniel will read a paper.

DARLINGTON PHOTOGRAPHIC SOCIETY.

NOVEMBER 4.—Annual meeting.—Mr. G. NEWBY WATSON presided.

The annual report was of a very satisfactory character. The number of members showed an increase of ten during the year.

The following gentlemen were elected to the Council for the ensuing year:—*President*: Mr. E. Ensor.—*Vice-President*: Mr. G. Newby Watson.—*Council*: J. A. Fothergill, H. W. Holmes, R. A. Luck, W. F. K. Stock.—*Treasurer*: Mr. T. Howlett.—*Hon. Secretary*: Mr. W. Ganitte Brewis.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

OCTOBER 31.—Mr. A. W. Beer in the chair.

The following gentlemen were elected members:—Messrs. T. C. Morris, J. O. De Wolf, and J. H. Swift.

Announcement was made that Mr. H. P. Robinson, of Tunbridge Wells, had kindly promised the loan of his valuable collection of pictures on the close of the exhibition in the Camera Club. The pictures will be on view in the rooms for a month or six weeks.

Mr. J. S. BROWN read a paper, *From Cairo to the Cataract*, illustrated by a number of excellent lantern slides; after which a selection of slides were

projected on the screen. These had been developed by hydroquinone on the new Hord plates, showing the peculiar warm colour obtained by different exposures to gaslight, explanations being given by Messrs. W. Tomkinson and F. A. Schierwater.

Attention was drawn to a communication from the Hon. Secretaries to the Association of the Literary, Scientific, and Art Societies of Liverpool, that a *soirée* will be held in St. George's Hall on Wednesday, December 18, requesting the co-operation of the members of this Society.

A smoking social concert will be held at No. 3, Lord-street on Friday, November 15, at a quarter to eight, the musical arrangements for which will be under the direction of Mr. H. H. Williams. There will also be a lantern evening on Thursday, November 21, at seven o'clock; subject, *Normandy and Brittany*, by Messrs. J. A. Sinclair, W. Tomkinson, and E. M. Tunstall. One hundred and fifty slides will be shown.

BATH PHOTOGRAPHIC SOCIETY.

OCTOBER 30.—Mr. W. PUMPHREY (President) in the chair.

After the disposal of preliminary business, a discussion was opened by the *PRESIDENT* on *Stops and their Value in Photography*. In the first place, he pointed out that advantages were gained at times by admitting a large amount of light through a given lens, especially if the subjects were near at hand, as in portraiture, or for instantaneous work. The flatness of field in such cases would be greatly restricted, as the elementary principle of a stop was to reduce the effect of marginal rays and so increase flatness of field; this was clearly illustrated by means of diagrams showing the course of parallel and oblique rays with and without a diaphragm. The following points were dealt with:—The primary use of stops to flatten the field; and, secondary, to give proportionate exposure. To do this it was necessary that the diameter of stop used should have a definite relation to the focal length of the lens; that the plate shall have a definite sensitiveness; that there be a definite standard of light; and that a ready measure of small lapses of time be provided. The standard adopted by the Photographic Society of Great Britain of numbering stops was referred to, *f*-64, &c., meaning that the diameter of *f*-64 stop is equal to one-sixty-fourth of the focal length of lens, and, other conditions being equal, this was constant. Regarding rapidity of plate the speaker deprecated the practice of shifting from one make of plate to another without good reason, as it led to uncertainty. As a measure of time, mechanical means must be resorted to, for no one could expose by hand so short a period as one-twentieth of a second, much less one-sixtieth. A time shutter—working at one-sixty-fourth of a second and adjustable to slower movement, three seconds—was shown in action. Some remarks upon the iris form of diaphragm were also made.

In the discussion which followed the President's address, Mr. BRAHAM contrasted the human eye and the eyes of animals with a lens—the iris being the natural stop or diaphragm, adjustable more or less according to the power exercised by the muscles. He also sketched the passage of rays, forming an image in a pinhole camera to illustrate the smallest diaphragm.

Mr. AUSTIN J. KINO gathered from the Chairman that for landscape work a small diaphragm was to be preferred, but wished to know why it was not the practice to use the smallest stop the subject and light would admit of?

The Chairman generally worked at *f*-32, which gave him a sharp picture, and when the nearest object was not less than thirty yards away there was no occasion to alter the focus of the camera.

Mr. W. M. ASHMAN (Secretary), in answer to Mr. King, said that in portrait work small stops diminished the brilliancy and rotundity of the image; here flatness of field was not essential or desirable. In the case of certain outdoor subjects a moderately large stop was thought by many to yield a more natural representation than when a small stop was used—one gave an idea of atmosphere, the other was map-like.

Mr. Perren used the largest stop he could compatible with good definition.

Mr. RUDGE inquired whether the stop did not in the case of oblique rays merely check the passage and cause them to be forced with the more parallel rays through the aperture.

The CHAIRMAN replied that if such were the case colours would be produced.

Mr. BRISCOE said a new stop had been suggested by a Mr. Zimmer to work diagonally in the lens tube, the object being to increase the exposure of foreground and diminish that of the sky.

This led to a discussion on the shape of stops.

Mr. HARbutt spoke of a disc of perforated zinc being used with satisfactory effect in front of a lens.

Another member had seen such stops with a central opening of the usual size employed between lenses of portrait combination.

The question of circular *versus* rectangular diaphragms was also considered, the Chairman, Messrs. Braham, Harbutt, and the Secretary, giving their own views as to whether openings of equal area were similar in effect upon the plate or the reverse.

The next ordinary meeting will be held on November 27.

ASSOCIATION FOR THE PROMOTION OF PHOTOGRAPHY IN BERLIN.

In the meeting of October 18, Mr. E. Vogel delivered a lecture recording his experience in regard to dark chamber glasses. He showed by a series of experiments with red glass, with the assistance of a spectroscope, that light rays exactly similar when considered optically may act in a very different manner actinically, as part of the red glass keeps back the effective rays while the remaining portion does not, and lightness of hue gives no indication whereby this might be determined. The lecturer produced very good perfectly black enlarged views on bromide of silver paper, developed by means of eikonogen. This agent, he said, by the way, is no longer put on the market as a grey powder, but in the form of fine colourless crystals. The lecturer would rather recommend it for positive than negative development.

Dr. ZENKER described a method of taking photographs through a small opening without an objective; also through two intersecting slits, whereby

considerably distorted or caricatured images might be obtained; the process being otherwise of no practical value.

The meeting finally adopted the resolution, "That the library of the Association be enriched by the addition of a number of new Journals and Year-books."

CLUB DER AMATEUR PHOTOGRAPHIEN.

Is the general meeting, October 12, a panoramic view from Paris, taken by means of Moxsari's apparatus, was the principal object of interest.

Herr GOLDMANN, jun., gave a description of the instrument employed, confining himself, however, to its principles only.

Two platinum *genre* prints from Georg Brockesch, of Leipzig, excited admiration both by the beauty of the composition and the effective treatment of the positive prints. The platinum prints of Mr. W. Winter, of Derby, exhibited by Herr C. Ulrich, did not surpass the well-known picture, *My Mummy*, by the same author. The photographs taken during a journey through India and China, by Baron Joachim von Brenner Felsach, were really excellent productions for an amateur; the same might be said of the views produced by Mr. Putz. But the *pièce de résistance* of the evening unquestionably was the lecture delivered by the Imperial Councillor Luckhardt on the retouching of negatives. None of the subsequent items of the programme could attract the general attention in the same degree, though the leggel-stand of Dr. Ed. Suchanek for detective cameras was remarkable for an instrument which is compressible into the smallest possible space.

Correspondence.

Our Correspondents should never write on both sides of the paper.

MR. H. P. ROBINSON'S PHOTOGRAPHS AT THE CAMERA CLUB.

To the Editor.

SIR,—There has of late been a good deal of controversy about the comparative merits of sharply focussed and out-of-focus photographs, which would not have been less creditable to some of the disputants, nor less useful to the readers, had there been less personal feeling manifested in the discussion.

By reading the very clever letters on both sides of the question, I have got some instruction and a little amusement, but the strongest impression they have left with me is regret that a better and more amiable tone has not characterised them. If the discussion was started in the interests of photography and photographers, as it ought to have been, that laudable end seems to me to have given place, in great measure, to ill-feeling and a desire to write a clever letter. I am neither able nor willing to make the expression of an opinion an excuse for smart writing, nor do I intend to discuss the vexed question of realism or any other ism. By the courtesy of the Committee of the Camera Club, I have had the privilege of seeing the outcome of Mr. H. P. Robinson's years of what I am disposed to think earnest and, without doubt, clever work now exhibited at the Camera Club, and it is about this exhibition that I ask your permission to say a few words.

Let me confess at once that I am but an indifferent worker with the camera, and that, rightly or wrongly, I have as great an admiration for Mr. Robinson's photographs as he has himself—perhaps a greater considered as photographs; but we should probably each put a widely different value upon them, considered as pictures. I grant that the science of them is great, but I think the art of them is small. If a picture does not suggest nature, it is, as a picture, bad; and if it claim to be an example, misleading.

Mr. Robinson's work is so notoriously important in size that it must command attention, therefore, it is of no little moment to young amateur photographers to ascertain whether it is or is not worthy their study, as the works of the "Old Masters" are worthy the study of art students. That is the question I ask, and I should like to see it dispassionately discussed. Does the Committee of the Camera Club exhibit Mr. Robinson's photographs for educational purposes, or from feelings of courtesy and personal regard for him?

Mr. Robinson has earned, and justly, both money and fame by his photography, and he could scarcely be expected to call the bridge rotten that has carried him safely over. His photographs have served their purpose and his, but the *raison d'être* of their existence is a thing of the past. They are photographs, and not pictures, and that is what photographs now aspire to be, what they ought to be, and what they must be, or photography will never be worthy to be called an art-science, nor a photograph a work of art. What would be the effect upon an artistic mind and temperament if its owner had to live in a house the walls of

which were adorned as the Camera Club's rooms now are? Silver prints as large as those exhibited by Mr. Robinson must always be unpleasant, even if the prints have not other and greater objections.

The combinations are more deftly done than, perhaps, any other person could do them, but they are not naturally done; that is to say, not in a way to suggest nature; they are unnatural (if not impossible) and, therefore, unpleasant and worse. The figures are too evidently models, dressed as peasants, fisher-girls, &c.; but they are not, and do not look like, peasants and fisher-girls. They are posed by the photographer, and not posed as the occupations represented would have posed them. In some cases they are out of scale with the surroundings. In others, shadows seem to be thrown from more than one source of light. The sun-bonnetted model is repeated *ad nauseam*. Having read some of Mr. Robinson's writings, I am almost sorry I have seen his photographs.

Mr. Robinson would be, perhaps, the photographer before all others I should like to consult in any manipulative difficulty, be the process what it might; but I should avoid, rather than be led by, his silver-printed combination photographs, because I do not think they have good art qualities. There may be others who think and feel much as I do about them—I may even venture to say, I know there are—and I hope they will more fully and ably discuss the question than I am able to do.

Doubtless this letter will bring down the thunders of Mr. Robinson's wrath upon me, if he do not affect to consider it beneath his notice. Had these photographs not been exhibited at the Camera Club, I should probably never have seen them; and if I had, I should not have expressed my opinion of their claims to be considered works of art. An exhibition of "Old Masters" at Burlington House is instructive, and so should one at the Camera Club be. The present one may claim to be that, if it be understood to be an exhibition of what not to do.—I am, yours, &c.

BART ROUS.

The Arts Club, 43, Bloomsbury-square, W.C.

[Do not the generalisations indulged in by Mr. Bart Rous apply with equal force to some of the cartoons of Raphael and other works of acknowledged "Old Masters"?—ED.]

LANDSCAPE ART.

To the Editor.

SIR,—It is exceedingly disagreeable to be obliged to reply again to our Liverpool friend, "F. B." Instead of being duly thankful for the specific information vouchsafed in the article, and to which objection has not been offered by any other person, he has attacked a casual general observation, on which he thinks he has caught the writer tripping. The way this is done would almost lead to the idea that the toes of a great landscape painter had been unintentionally trodden on the tender, corny point; if so it is a pity, as the mere side issue which he raises has been for general purposes sufficiently answered. If the article is worth looking at again, it will be found that the true meaning of the sentences cavilled at is, that since the advent of photography the general taste for, and knowledge of, the aspects of external nature has been so much more widely diffused that the worst, as well as the best, of the painters have been obliged to represent nature or landscape much more truthfully than had been their wont in consequence of the educative influence which photography has exerted upon all—artists as well as the public—who are the purchasers of artists' work, and who will not now submit to receive the productions of the blottesque school either as works of art or as representations of nature. If this has not been made sufficiently clear before, it is to be hoped that it will now be made so, even to the sharp sight of the objector. Doubtless other influences have also been at work in the same direction; even he may have come under them. If "the landscape art" was as highly developed before photography was thought of as it has been since, and as it is now, that may be, and was granted, so far as the mere painting thereof is concerned, but it is an undeniable fact that the careful study of nature was very rarely attempted in the earlier centuries of its practice; and when it was, with the exceptions indicated its more truthful attempts were confined to the schools mentioned—"Holland and the Low Countries."

Nicholas Poussin, one of the most gifted of the French painters, had to seek, or sought, the services of Gerrard Lairesse, of Liège, one of the great Flemish men of his time, to paint his landscape backgrounds, and the result to Lairesse was that his more truthful early work had to be discarded for the fictions of the grand style to please the debased taste of the period. Richard Wilson, who was probably the first British artist who devoted himself to "the landscape art," and than whom there have been few better artists, was so slightly appreciated from the prevalent

ignorance of the public, and his works found so few purchasers, and at such prices, that he practically died of starvation. The public eye and taste had not yet been educated sufficiently to appreciate his attempts at truthfully depicting nature. The well-worn quotation of Sir George Beaumont, the connoisseur, patron, and art critic of his time, may help our friend's memory—"Yes, the picture is good; but where is your brown tree"—and may show the purely conventional notions that existed as to the truthful aspects of nature among the most cultured people of the end of the last, and well into the beginning of this, century; and this ignorance exists among many even to the present day. Witness the comparative failure of the Art Congress which has just been held in Edinburgh, which is reputed to be one of the most artistic cities in the empire, and of which the leading journals say that the last of the Art Congresses have been held. The entire contention is simply that photography has taught, and is teaching, artists and their patrons alike, that truthful representation of the world we live in must be much more carefully attended to than has hitherto been the case. That the extremely modern school of landscape workers now go to nature and patiently study to represent her various phases is only convincing proof of the general accuracy of the statement that photography has revolutionised landscape art. As previously stated, this is perhaps a too sweeping assertion, but is sufficiently to the point, and was never meant to be a tag whereon to hang a dissertation or a discussion.

Relative to what was called the second points of the indictment, where the veracity of my statements were questioned, if the cases quoted are not sufficiently clear, or can in any way be controverted, then, if it should be absolutely necessary, many similar cases can be quoted with all the requisite names and authorities which would convince even the redoubtable champion of landscape art, "F. B." All his verbiage as to "colour," "vegetable life," "line overreaching the sky," "harmonious unity," and the like, has nothing whatever to do with the question, and may be passed over without further notice.

W. H. DAVIES.

THE SURVIVAL OF THE FITTEST—PROFESSIONAL *VERSUS* AMATEUR. TO WHERE ARE WE DRIFTING? TO PERFECTION OR ITS ANTIPODES?

To the Editor.

SIR,—The amount of energy pressed into photography seems to baffle computation, either as to bulk, quality, or count. Forty years ago we only spoke or wrote of excellence of result, but now that the art has reached its jubilee of manhood, it is fashionable to bespatter productions *à la* photographic as the result of "quick exposure," "done by a thirty-shilling set," "So-and-so's first attempt," "done ten o'clock at night by the flash lamp;" and every one of these precious productions so paraded are only fit for the residue box of ashes, and are a disgrace to the art, yet notices of such attempts occupy much of the literature of photographic journalism, and a large amount of wall space at our exhibitions. In looking for the cause, we discover no less than three caterers for this unnatural and undesirable appetite—namely, the publisher, the apparatus maker, and the merchant or dealer. These trio are the nursery wherewith the newly fledged swarm of amateurs assume wings and fly forth to deluge the world with their would-be works of art.

Those whose avocation it is to produce photographic blocks for the printer are much incensed by the rubbishy photographs which are being continually sent to them for reproduction. An architect sends a photograph of a pulpit, the top burnt out, and the lower portion as dark as thunder. We expostulate. He retorts, "Why, I did it myself, and you reproduce it, that's all." An engineer brought us some photographs of machinery, the details of which were hopelessly fogged. In his case he tells us that "they have trained one of their clerks to do the photographing," and he seemed to intimate that my object in complaining was to get hold of the taking of the negatives myself, and of course at a tradesman's scale of charges.

The cry was long and loud, "Oh, if you could only give us a *block* or a *lithographic transfer* direct from the photograph, we will make your fortune for you!" Well, experience has discounted the offer sadly. Now that we can do both, they refuse to supply us with suitable photographs or to pay the cost of their proper production, and hence my query, "To where are we drifting?" A hundred years ago there were pinchback watches. We have now pinchback photographs, and pinchback photographers as a matter of course. I now ask, Can nothing be done to preserve the character of our art? It is manifestly to the advantage of the manufacturer, the engineer, and the architect, that if they wish to reap the full advantages of photography they make a fatal blunder by cheese-paring at the primary step of making the negative. The camera maker assures his customer that a boy or a girl can operate with it to perfection. The dealer warrants his dry plates and patent developer as absolutely self-acting. Turning over the leaves of the latest journal, he points to testimonials of the work done by "some schoolboy who took a medal;"

and so forth. The purchaser believes and pays his money, taking the result as gospel. Now if this easy-going, alip-shod fashion be allowed to go on without effectual protest, it seems evident that photographers who now pride themselves as such will in the near future be ashamed of their connexion with it.—I am, yours, &c.,
JOSEPH LEWIS.

Dublin, November 2, 1889.

To the Editor.

SIR,—Now that a discussion on the relations of an amateur to the profession is fairly afloat, I venture to express the opinion that amateurs generally are too satisfied with their own and their fellows' work. I hold thoroughly the opinion that the best of us amateurs can only approach and not reach the better class of professional work. I say this not out of regard to retouching (for I hate it used on any other than female heads), but because the experience gained by constant practice in lighting, pose, and development, added to the use of the finest lenses, give the best results.

I hold, too, that professional portraits, in differing from our own, are things of such value that when amateurs seek fewer of them of their family and those dear to them than they would were they not amateurs, they make a mistake. So much have I ever felt this, that although I took two-inch heads over thirty years ago, and have by myself scores of portraits of myself and my family, I possess portraits of these by Mayall, Hawkins, and Schultz, of Brighton, Bullock of Leamington, Burton of Leicester, and this year my daughter has sat to Caldwell, of Nottingham, more than once. These things I prize at over twenty times their cost to me, as high class registers of times gone by.—I am, yours, &c.,

W. A.

To the Editor.

SIR,—I was glad to see in your last issue an outspoken letter from a professional photographer. By this, my aim in writing you a letter the previous week was obtained. There are hundreds of men with large interests at stake who feel deeply as Mr. Barnes, of Windsor, the wrong done to them, and it would, I am sure, be well for them to express their views openly as that gentleman has done.

Many so-called amateurs—amongst them your correspondent, Mr. Story—pretend to ignore the fact that the professional man is either injured or thinks he is by amateurism. Let this be settled by a score of traders writing to the journals in the terms they speak to each other and the ground will be cleared. A letter over the signature "Anti-Monopoly" has no covert meaning. It proclaims what the writer thinks amateurs have the right to do, and this is what he and hundreds of others are doing. Let the professionals take his letter as a text and give their views on the subject. The claim of the writer to be considered an amateur seems to be absurd. Your readers may adjudge his claim to be considered a gentleman after they have read the fifth paragraph of his letter to you last week, and so will—

AN AMATEUR.

EXHIBITION MATTERS.

To the Editor.

SIR,—For nearly twenty years now I have journeyed up to town with the double object of keeping old friendships alive and noting the progress made by our best workers. This year my anticipations of a greater treat than ordinary had been stimulated by the various *critiques* of the Exhibition, and also by the many announcements published during the year of new and improved processes, giving the photographer greater power in effectually working our "art-science." The re-adoption, too, of the system of giving medals seemed to point to the present Exhibition being thoroughly representative of the very best that the photographer of to-day can accomplish. I am disappointed. Many of the names of our foremost portraitists are conspicuous by their absence. But not only does the Exhibition suffer from the want of the finest portrait work, the places on the walls are filled by contributors who, whatever may be their other merits, have certainly not done much to assist the Hanging Committee in producing an impressive effect. Instead of the good old English gilt frame which used to be the rule, the cheapest oak mouldings, together with the commonest German, seem to be considered by the majority of the exhibitors good enough to be subjected to the tender mercies of the Committee. I well remember an occasion when I had done my little best by sending about 10*l.* worth of frames to grace the walls of the Exhibition, but, alas! they were returned to me utterly useless. How many others have suffered the same experience? It is very likely, I think, that the dismal and cheap get-up of the present year is due to this cause.

There appears still another reason why first-class men should not trouble themselves to send their work. In a few cases I notice that one man's work is grouped as much as possible together, but this is the exception. Why, if good for one, should it not apply to all? There is very little inducement for most portraitists to send if their works are dotted over the walls here and there. I think there ought to be an understanding that a certain space shall be allotted to each exhibitor, and his works kept

together within that space. I believe that, if they would speak out, such men as Lafayette, Wane, Lafosse, Slingsby, and others have withdrawn in consequence of a grievance of some such sort as the above, and the loss to the profession is great. We are told that progress is being made. Well, I cannot compare the best work of what I may call the old school with that of the new, but I have confidence in asking the old names once again to show if the portraits on the walls of the present Exhibition are really the finest that we can produce, or say if the time has come for a new organisation and a new Exhibition.—I am, yours, &c.,

AN OLD MEDALLIST.

PERMANENCE OF SILVER PRINTS.

To the Editor.

SM,—I should like to raise the question in your columns as to the best means of ensuring greater permanency of "silver" prints on albumenised paper. I feel most keenly this blot on the fair escutcheon of photography, and, as a professional, its serious commercial aspects. No doubt our plate makers have tended to reduce the permanency of silver prints by putting on the market plates that, at best, will only give thin, weak negatives. Then our mount and paper makers are not blameless.

But I would point out a few causes and remedies in my own experience.

(a) Mounting and spotting room being damp. Remedy obvious.

(b) The use of paste without the addition of pure carbolic acid.

(c) The keeping of silver prints by photographers and customers in damp rooms. I always advise customers to keep all their photographs in a really warm living room.

(d) Rolling prints before they are dry (this I found necessary to avoid cracking of the surface of "doubly" albumenised papers) and consequent packing off to customers in a somewhat damp condition. This was done by my assistants without my knowledge, and in a few months I had a large number returned, and covered more or less with spots. I now thoroughly dry each print after rolling—in front of a stove in winter, and in summer by laying out in a warm room.

My own practice is as follows:—1. I avoid too thin negatives. 2. Use a silver bath of at least "60." 3. Only to use the best and most reliable paper, as Tropp's doubly albumenised "permanent pink." 4. Clean pads for frames. 5. Careful washing and "roasting" after hypo. 6. Use good blotting boards, and even then remove as rapidly as possible from blotters. 7. Paste made from Brown & Polson's corn flour (I do not believe in starch), with the addition of pure carbolic acid, and made fresh each day. 8. Only to use mounts of best quality. 9. Rolling before prints are "bone dry," and thoroughly warming and drying after. 10. Only to use a mounting room that is thoroughly warm and dry. 11. Perfect cleanliness all through.

I am also of opinion that "ready" sensitised papers of good quality are more permanent than that sensitised daily by the printer for the day's use, and that prints on "enamelled" mounts are more permanent than those on mounts that are not enamelled. I hope to see some really permanent printing process, as platinotype, in universal use, but as that "won't be yet," I am extremely anxious to make the most of the useful and simple silver print, though personally I prefer the beautiful and artistic platinotype print.

Hoping to see some suggestions from practical photographers, and enclosing my card—I am, yours, &c.,

MORE LIGHT.

A CLAIM.

To the Editor.

SIR,—Having observed recently several suggestions for the use of bisulphites, or "acid" sulphites, mixed with "hyposulphite of soda" (thiosulphate of sodium), for fixing and clearing photographic plates, I wish to direct attention to the fact that this mixture or composition for above and allied purposes forms the subject of a patent taken out by me and completed on December 23, 1887, No. 17,693, and entitled, *Improvements Relating to Means for Fixing and Clearing Photographic Pictures or Images*.

Since the foregoing date the state of my health has largely conduced to the delay in introducing this compound and its functions to photographers. The material, however, will be issued shortly in convenient form by the Platinotype Company, until which time I will not trouble you with further particulars, which would probably savour of an advertisement.—I am, yours, &c.,

HERBERT B. BERKELEY.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.—A conversation and exhibition of photographs, cameras, &c., will be held in Castlegate Lecture Hall on Monday, November 11, 1887, Sir John Turney, Knt., presiding, with selections of vocal and instrumental music, lantern display, and shadowgraph. A refreshment buffet. Members' exhibits to be delivered at the Society's Rooms on Saturday evening, November 9, or at the Castle Gate Room on Monday morning before eleven o'clock.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Head and body-rest, two deep 10×8 frames, office copying press; want lens or shutter.—Address, W. C. CHIPPER, 39, Highgate-hill, N.

A Dallmeyer's 2a patent 8½×6½ portrait lens, equal to new, to be exchanged for rapid rectilinear, 20×22.—Address, TAYLOR, Optician, Nottingham.

I will exchange a whole-plate Dallmeyer wide-angle landscape lens for a good lantern, four to six inches condenser.—Address, GILL, 7, Hillside Villas, Hornsey, N.

Will exchange a few books (for amateurs) on photography, also a few cabinet photographs, for fireworks or Godey's *Mechanics*.—Address, J. R. RIGBY, Howick House, Burscough, near Ormskirk.

Will exchange a good violin, bow, case (lock-up), and Farmer's *Instructions*, for good magic lantern, three and a half or four-inch condenser.—Address, W. VARNET, Bridge-street, Buckingham.

Wanted, half-plate bellows camera with double slides, in good condition, for quarter-plate camera and stand and a quantity of Stramonium cigarettes.—Address, JAMES SAVILLE, Sandy-lane, Middleton, Manchester.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY from 1873 to present date (except the year 1885), the *Photographic News* from 1869 to 1886 (except the year 1885), and about a score ALMANACS and Year-books, for good portable apparatus.—Address, HALTON, Photographer, Dowsbury.

Will exchange the first three volumes of the *Amateur Photographer* (complete, unbound), six volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY (1875 to 1880 inclusive, unbound, a few numbers missing), and a quantity of odd numbers of ditto, for Meldola's *Photographic Chemistry* and Emerson's *Naturalistic Photography*.—Address, BAIME, Littlehampton.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPH REGISTERED:—

G. Frost, Alton.—Photograph of Rev. Canon Bernard.

W. W. R.—An eight and a half inch condenser will be necessary; anything less will not answer.

C. BALE.—Foreign matter settling on the paper whilst it is drying no doubt. See answer to "S. R. Stevenson."

J. A. R.—Under-exposure, over-development, with a too great flatness of the lighting, are the faults of the negatives.

J. PORRIT.—1. For printing-out we should recommend you to employ a colloidal-chloride emulsion.—2. Abney's work, *Photography with Emulsions*.

J. VINE.—Messrs. Marion are the agents for the new developing agent, eikonogen. But we believe it may now be had through most of the dealers. If you cannot obtain it in your town, send for it direct.

W. KITMAC.—The second light in the eyes of the sitter is evidently due to a reflected light, but where it proceeds from, of course, we cannot say. When you notice it again, if you cannot detect where it comes from, take the place of your sitter. You will then find out easily enough.

A. SOMERS.—You have been misinformed. The ordinary benzoline of the oil shops will not dissolve indiarubber. Obtain some benzole. This need not be the most expensive kind; the commoner quality answers every purpose, provided its odour is not of much consequence.

YORKS.—Of the two prints sent the bromide one is far better than the platinum. But you must bear in mind that the bromide print is a good one, while the platinum one is an exceedingly poor specimen of what that process is capable of producing. In fact it is a very bad print.

L. R. B.—You have made a mistake in using rapid plates for copying engravings. To obtain the lines as "clear glass," slow plates are best with a developer well restrained. Mawson & Swan's "photo-mechanical plates" are specially prepared for this class of work, and they answer the purpose admirably.

C. BANYARD.—The best lens for large direct heads is either one of the "Group or Universal" series, or one of the "Rapid" type. The latter will answer quite as well as the former, but it is somewhat slower in action. You do not give us any idea of the size head you desire to take, or we would say the most suitable focus lens to employ.

J. S. T.—Neutralise the bichloride of platinum by the addition of a solution of bicarbonate of soda.

JUSTIA.—If the person who engaged you undertook to pay your railway fare and you made the journey, you can recover the amount in the County Court; you can also recover the value of the specimens retained, as well as a week or a month's salary, according to the terms of the agreement, in lieu of notice. We are, of course, supposing the conditions are as you state.

DEALER writes thus: "Is it lawful for a photo-dealer, other than a chemist, to retail such poisons as cyanide of potassium, bichloride of mercury, &c.?"
—No. Any one, except a properly qualified chemist, selling poisons such as those mentioned in the Schedule of the Poisons Act, renders himself liable to heavy penalties. Those named are amongst those included in the Act.

ELSH wishes to know what is a "magazine" camera, and whether it has any relation to the taking of photographs for illustrating magazines.—A magazine camera is one in the interior of which is stored away a supply of plates ready to be used one after the other. There are now many forms of this class of camera in the market, each containing about one dozen plates. They belong for the most part to the hand or detective class, although there is no reason why the magazine system should not be applied to cameras of large dimensions, more especially now that glass plates may be so successfully superseded by celluloid films.

T. B. ALLANSON writes: "Will you kindly inform me through your 'Answers to Correspondents' the best light to employ in taking photographs at night? I have been using one of —'s lamps, but find the shadows are too dense. Should like to know the best way to obviate that."—The best artificial light for photography is the electric arc. Good portraits may, however, be taken with the magnesium light, and the lamp named is as good as any for burning it in the flash form. The dense shadows are to be obviated in several ways—by the judicious use of reflectors, employing two or more lamps, placing the light at a greater distance from the sitter, &c.

LEONI ANGIER.—I. Several articles on artificial light in photography will be found in our last volume, and also in the previous one.—2. No work is published on the methods of painting backgrounds and making accessories. As a rule, photographers prefer to employ those who make a business of this work rather than attempt it themselves. For distemper painting, ordinary dry colours, as sold at the oil shops, and common size are employed; for flattening, the colours as ground for paint are used, the flattening being done with turpentine and colour alone without the addition of oil. Several articles on this subject will be found in back volumes. These you have, no doubt, in the library of your College.

DR. J. L. FLEISHMAN, of Vienna, sends us a letter in imperfect English in which he expresses his indignation somewhat strongly, that one of our contemporaries has spoken of him as a "fictitious individual," seemingly, as he expresses it, "to cast ridicule over another contemporary which does give information over the most advanced science of the day, and which it is conducted by one *reducteur* whose knowledge extends to widest spheres, even also outer spheres."—Dr. Fleishman will kindly excuse us from espousing any quarrel he may have with other journalists. We thank him for his promised article on the *Newest Chemistry*. Will he kindly write it in his native language? We will get it translated.

G. SMITH writes as follows: "1. In THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1888 you recommend a double name alba-carbon light, stopped down with a plate of metal, with an half-inch opening, as an excellent light for enlarging. Will you kindly tell me whether further experience satisfies you as to its superiority over paraffin and other oil lamps? I want to avoid having the latter dangerous lamps if I can.—2. Would the same flame (alba-carbon) used full on without any metal plate do well for showing lantern slides up to a moderate size? We have no facilities here for obtaining oxygen in cylinders, and it is troublesome to make, and I wish (if I can satisfactorily do so) to do away with the danger and stink of mineral oils."—In reply: 1. Yes, decidedly.—2. Yes, provided the flames be kept rather small. Of course, the illumination is not to be compared with the oxy-hydrogen, but it will answer very well for a small screen.

S. R. STEVENSON writes: "Could you oblige me with some suggestion as to the cause of the abominable black spots on the specimens of paper enclosed? The smaller pieces are sensitised, and the portrait fixed—all prepared and sensitised at home on the best paper. The following brief particulars will, perhaps, assist in arriving at a conclusion. The paper is kept flat in a cool room, between boards, under pressure. Several different makes of paper have been tried, but all seem liable. A varnished wood dish, with glass bottom, is used for sensitising, and the sheets drawn over a glass rod; the dish and rod are always well washed both before and after sensitising. The specks do not appear at first, but during drying, and at times are as large as a large pin's head. Sheets which are absolutely free on being taken from the bath, are sometimes covered when dry. The specks seem to attack front and back of paper indiscriminately. Is it possible that minute blacks from a conservatory flue some 30 or 40 yards from the room (and which are occasionally found in the room) could be the cause of the evil? My books state that minute particles of iron in the paper are generally the cause of black specks (Abney, Burton, and others), but makers write me to say this is impossible with their paper. The specks sometimes very much intensify on toning and fixing."—From the fact that the spots appear alike on several different papers, it is pretty clear that the fault does not lie there, and this is further corroborated by the fact that the spots do not make their appearance till some time after sensitising. All the circumstances seem to point to foreign matter, floating particles in the atmosphere settling on the paper while it is drying. We doubt, however, if the "smuts" from the conservatory so far away are the cause. We should rather suspect particles such as pyrogallie acid, sulphate of iron, &c., from the workroom as being the source of the trouble. Thanks for the promised communication.

AFRICA.—1. Any of the published formulae answer very well; we find very little difference with them in practice.—2. Simply by using more or less restrainer, exactly as in the case of pyrogallie acid developer.—3. Certainly.—4. Hydroquinone is now supplied by all dealers, and it is very uniform in quality. Probably in your experiment the plates were over-exposed, or the developer was not sufficiently restrained. A few tentative experiments with the developer will, no doubt, make you *au fait* with its working.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, November 13, *Copying and Enlarging*.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Next meeting, Mosley-street Café, Newcastle, Tuesday, November 12. December meeting, Tuesday, December 10.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Thursday, November 14, Mr. A. L. Henderson will exhibit his albums of photographs collected during his recent tour in Australia, &c. This is also a lantern night. Visitors invited.

POLYTECHNIC INSTITUTION.—On Tuesday evening next Mr. Howard Farmer will give the introductory lecture to the special course on the Theory and Technology of Photography. Subject—*The Young Photographer: His Training and Prospects*.

FRENCH EXHIBITION HONOURS.—Among the list of British subjects who receive promotions in, or are nominated to, the Legion of Honour in connexion with the Paris Exhibition we find the names of Mr. Trueman Wood (to be an officer) and Mr. W. England (to be an officer of the Academy).

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Tuesday, November 12, at the Exhibition Gallery, 5A, Pall Mall East, at eight p.m., when the medals awarded will be presented, and papers read by Captain Abney, C.B., R.E., F.R.S., on *The Density of a Negative after Intensification*, and by Mr. W. E. Debenham, on *The Estimation of the Efficacy of Plate Bleaching*.

"A LION STUDY."—Mr. Gambier Bolton writing on this, says: "In thanking you for your very kind and flattering notice of my 'Lion Study' at Pall Mall, I could just mention—to give some sort of idea of the difficulty of this class of work—that I was fifteen hours getting this negative—three consecutive days of five hours each (the limit of time in the Zoo), during which time I could have taken some hundreds of photographs of the lion, but not in the position I had selected. I need scarcely say that it was *not* taken by a hand camera, but with a whole-plate one. I have since then beaten this by taking eighty-four half-plates of a dog's head before getting one that I considered fit to issue in any series of animal studies.

CATALOGUES RECEIVED.—An *Amateur Photographer's Complete Outfit*.—This being a descriptive catalogue and price list of photographic appliances, stereoscopic in the main, although other things are included, manufactured or sold by Mr. W. J. Chadwick, St. Mary's-street, Manchester. We are much pleased to find that Mr. Chadwick has tackled the stereoscopic problem so earnestly. This tractate contains everything requisite in both binocular and monocular photography, in addition to several pages of useful hints. Mr. Chadwick has also sent us a sample of a new form of division for a camera, by which it is immediately converted into a stereoscopic one. This consists of an opaque screen which can remain attached to the front if desired, and be instantly unwound and stepped into its place at the back, being always kept strained within a long focal range by a spring in the interior of the roller in front. This is very useful and effective.

A new catalogue of their celebrated optical productions has been received from Mr. W. Wray, optician, North-hill, Highgate. This contains a full description of the various lenses which this firm manufactures, including rapid and wide-angle rectilinears, casket lenses, single stereoscopic and landscape lenses.

RECEIVED.—Messrs. Mawson & Swan have sent us a photograph of the Lerwick Town Hall, taken on one of their plates at midnight, in June last, by Messrs. Valentine & Co. Lerwick, we may state, is the chief town in the Zetland Isles, and being in a latitude between 60° and 61° it will readily be understood that there is a bright twilight at midnight in the month of June, sufficiently so to enable a photograph to be taken.

FROM the London Stereoscopic Company we have received samples of their new transparent flexible negative films (Carbutt's patent), together with an assortment of Barnett's universal film carriers.

THROUGH Mr. W. Jerome Harrison we have received from Messrs. E. & H. T. Anthony & Co., of New York, a packet of their "climax" films, which, together with those of the Stereoscopic Company, we shall take an early opportunity of trying and reporting upon. This also applies to some samples of Edwards's special transparency plates for lantern slides received from the makers.

LASTLY, Mr. Ethelbert Henry, of Derby, sends for the editorial album four charmingly taken views of exterior and interior of Lichfield Cathedral, including the famous masterpiece of Chantrey's chisel, *The Sleeping Children*. These are beautifully printed in platinum.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1541. VOL. XXXVI.—NOVEMBER 15, 1889.

PHOTOGRAPHING INTERIORS.

No. I.

To produce a really successful photograph of an interior sometimes taxes all the resources of the most experienced practitioner, as the difficulties of standpoint, illumination, and angle of view may all present themselves at once, and in the most exacting form. So many occasions arise when this kind of work is required, that a few general hints will be of service to many of our readers. The first consideration is, naturally, the apparatus,—and here it may be said, that wherever a considerable amount of photographing of this kind is anticipated, the outfit will be of the most expensive, for there is at the outset no use attempting it without a supply of lenses of different foci. Taking, for example, a common size—twelve inches by ten—the outfit should consist of not less than four lenses of six or seven, eight, ten, and twelve inches focus respectively. It would be better to range inch by inch, but the above four may be looked upon as a necessity; for in the majority of cases there will be only one possible standpoint for a given view, and it will almost always be the best policy, whatever the angle embraced, to retire as far as possible, to avoid that strained perspective effect inseparable from views embracing a wide angle. We purposely speak of “strained,” rather than adopt the common form of expression “exaggerated,” perspective, the fact being that if the lenses are of rectilinear type, the pictures they produce would be identical with those which would be obtained by interposing a piece of glass between the spectator’s eye and the view, and drawing lines upon it exactly covering the corresponding lines in the subject to be represented.

Further, it will be absolutely necessary that the lenses be suitable double compounds, and not of the landscape type, which, unless for what may be termed “peeps,” are useless indoors, where straight lines abound in all directions. From the foci indicated it will also be seen that at least the first three, but preferably all, should be of wide-angle type. This is a much-abused term, and notwithstanding the repeated explanations given in these columns and elsewhere, much misunderstood; but for the present purpose it will be sufficient for us to say that any lens capable of taking a satisfactory picture, the longest side of which is more than three-quarters of the equivalent focus, may be classed as a “wide-angle.” This kind of lens also is of a different type, working with narrower apertures, and, in consequence, requiring greater exposure when worked at their quickest. It will be observed that we have given six inches as an alternative minimum, for some makers now advertise their wide-angle lenses to be capable of covering a plate as long as the focus of the lens; and a good lens will do this with a small stop, though the extreme corners

may be open to criticism. Such ranges, however, cannot but be looked upon as straining a lens to its utmost.

We may now pass from the subject of lenses to cameras, and here, undoubtedly, trained judgment must be exercised in selection. Let us say, *en passant*, that we do not by any means suggest a special camera for this work, as one suitable for interiors is also applicable for general exterior and landscape work, though, unfortunately, the converse is not true, for many an old, tried, favourite, outdoor camera will be found wanting when put to the uses we are considering. Still, taking, for example, a “twelve by ten” camera, there are, we may say, many of excellent construction in constant use that will not close sufficiently to allow of the use of a six-inch focus lens, and in some of which even a seven-inch cannot be used. To some extent this difficulty may be encountered successfully, especially when the lens employed is of the portable symmetrical type (the back and front of which are alike), by screwing the lens from the inside of the camera. There is then a gain of the whole length of the lens in approaching the plate. One photographer of our acquaintance possesses a most useful camera, which even this expedient does not quite render serviceable for the purpose; but he has conquered the difficulty by sinking a second flange on the inside of the moveable front; he thus gains the thickness of the wood front, and can then just focus the image on his ground glass when the lens is screwed inside (with, of course, the front pointing inwards).

This point seen to, the means of focussing is next to be looked at. Now all who have experience in this work are uniform in their praise of a camera the ground glass of which is always free from backward projections, *i.e.*, of tailboard or similar structure. The reason of this preference is simple: interior work so often embraces badly illuminated subjects, that when a wide-angle lens is employed it is impossible to get a satisfactory view of the image with the tailboard or other projection preventing the eye being placed in a suitable position for scrutinising it. There are means for partially avoiding the difficulty, which, later, we shall allude to; but unless the back be free and unencumbered, it is impossible to obtain a satisfactory ocular impression of the view on the screen.

This difficulty being overcome by choosing a suitable form of camera, another very grave one is apt to step in. The framework removed from the back of a camera is generally placed to the front, and when the image is focussed an ominous dark patch is seen, which no amount of adjustment will remove when short-focus lenses are used, the framework itself being included in the view embraced. We have seen many excellent pictures spoiled from this cause alone, and it not infrequently happens that, owing to the general obscurity of the image, the

encroachment is not observed till the plate is developing, and it is too late to take other steps. Unfortunately, the effect cannot be eliminated by raising the rising print; for, when straining the powers of the lens to the utmost, its axis must be opposite the middle of the plate. If the camera will not admit it, there is no resource but either to put up with the presence of the encroaching obstacle, or to work always with a camera a size or two larger than necessary, so as to get a free view; though here, again, the difficulty of getting the plate close enough to the lens is almost sure to intervene.

AMATEUR DARK-ROOM APPLIANCES.

No. III.

CIRCUMSTANCES not unfrequently render the construction of an extemporised dark room, either of a fixed or more or less portable character, preferable to the adaptation of an ordinary dwelling room. Such an erection may be for outdoor use, or it may take the form of a cupboard or smaller chamber partitioned off from a larger apartment, in either of which cases it will most probably be a fixture, though easily removeable when required. Or the structure may be of a portable form, to be erected only when required for use, and capable of being stowed away into a small space when out of action.

For the latter purpose, perhaps the most elegant, as well as generally convenient arrangement, is a portable dark tent, as formerly employed for wet-plate work out of doors, of course suitably modified to meet the requirements of dry plates. This is useful not only at home, but may accompany the amateur in his travels abroad, adding little to his baggage, and affording every convenience of a perfect dark room wherever it may be needful to develop or to change plates. Such arrangements are supplied complete by many of the leading dealers and manufacturers, notably by Rouch & Co., who have adapted their well-known "Model" tent to the special requirements of dry-plate workers.

But such contrivances are necessarily comparatively costly on account of the labour and ingenuity expended on the construction in securing the combination of strength and portability. In the same manner that the portable tourists' camera exceeds in price the old "sliding-body" instrument, so the portable dark tent costs more than many an equally efficient arrangement for home use, simply that the amateur may "rig up" himself without much trouble. Portability—that is to say, the degree of portability necessary in a travelling tent—entails the utmost economy of working space; and this needless confinement of the operator may—perhaps undoubtedly does—prove an objection when the tent is only required for home work.

We will suppose, first of all, that the developing room is required for home employment solely, and that it is required to fold up or to stow away into a small space when not in use. To fulfil these conditions in the simplest and most efficient manner, nothing, perhaps, excels an arrangement similar to the old "Sararti" tent of wet-plate days. For outdoor use this consisted of four uprights of bamboo or other light material, jointed for the sake of portability, and braced together when erected by cross pieces reaching diagonally from the ends of the opposite uprights. At a suitable height, a light but strong platform or table, itself folding into sections, was attached to the framework, and the whole, when covered

with opaque material, formed a commodious tent, inside which the operator stood with plenty of room to manipulate the largest plates.

As a travelling tent, Sararti's was principally useful for the larger sizes of plates, owing to the freedom gained by the operator being bodily within the tent instead of inserting only his arms or head and shoulders. But this advantage, of course, brought with it the counterbalancing objection of bulkiness. This objection, however, is of less weight when the tent is only required for home use, and may be considerably reduced, while at the same time adding to the comfort by adopting the sitting instead of the standing position when working. If this be done, the height need not be more than five feet at the utmost, and an internal floor space of three feet square for small plates, and three feet by four for larger sizes, will prove ample.

For the uprights provide eight pieces of bamboo, each two feet six inches in length, and fitting together in pairs, with fishing-rod joints. The upper halves may be of slightly thinner material than the lower, and each should be provided with a short projecting spike on which to fix the cross stays. These consist of two narrow strips of ash or hickory, an inch wide, by a quarter or three-eighths of an inch thick, and of the length of the diagonal of the square. A screw passes through the centre of each, by which they can be clamped firmly together, and in each of the four ends there is a hole, into which the spikes of the uprights fit. One pair of cross stays fixed to the top, and a second at the bottom, or, preferably, as a support for the table, will, when the centre screws are tightened, brace the framework firmly together, and give it great stability.

The table consists of two or three sections of half-inch deal hinged together, so as to fold, for portability's sake, when the arrangement is out of use. The width of the table, or depth from back to front, will depend, to a great extent, upon the bulk of the operator himself, but it should be so arranged that the corners come up to the four uprights, so as to be attachable to them, while the front is hollowed out to receive the operator's body. The height of the table will, of course, be arranged to suit individual convenience.

The covering is made of black twill or silesia, in two or three thicknesses, cut to the exact size of the framework, so as to fit tightly, and so further brace it together. The front is made double, the two portions folding one over the other, so as to exclude light, and fitted with buttons, tapes, or hooks and eyes *inside*, to enable the operator to make all secure. The window will be of the ordinary tent form, and consist of any suitable fabric let into the opaque cover. The sink will be best made of the light and portable form, consisting of rubber cloth stretched on a frame, either fixed or folding, though, of course, if extreme compactness be not a necessity, a stronger wooden sink, such as we have already described, may be utilised. A rubber tube leading into a bucket provides for the waste, while the water supply may be provided for in a variety of ways, either using from a jug, or introducing it from a suitable source outside by means of a flexible tube.

The advantages of such an arrangement as the above are—that it is easily constructed of any convenient size; is strong enough to constitute a permanent dark room within a larger one if desired; or, if necessary, can be erected when required in a few minutes, and taken down in an equally short space of time when done with, and packed into a small compass. It is not by any means too bulky or troublesome to carry about.

when travelling, as the various parts will roll up into a bundle, fastened together with straps, and not greatly exceeding the dimensions of a cricket bag.

THE Paris International Exhibition is now a thing of the past, and, without question, it has, in every respect, been the most successful one that has ever been held. Twenty-five million visitors, without counting some thirty thousand daily free admissions of the exhibitors and their assistants, speaks for itself. With regard to photography, there was nothing very novel shown. But it is gratifying to know that English photography not only held its own, but in some instances took a decided lead, particularly in the higher branches. Those of our older readers who visited the Exhibition of '67—when the late Adam Salomon's famous portraits created such a *furor*—will well remember the sorry figure which British photography cut, particularly in portraiture. In the '78 Exhibition it had to some extent recovered its lost ground. But in the late show English photography decidedly came to the front, as the number of awards prove. The weakest part in British photography, as compared with that of other countries, was in the photo-mechanical department. This is to be regretted, particularly as some of the processes now most employed owe their inception to this country.

Now that platinum-toned silver prints appear to be coming somewhat to the front, several questions have arisen as to whether such prints are permanent, or whether they are really likely to prove more stable than gold-toned ones. Platinum-toned silver prints are scarcely likely by any of our readers to be confounded with "platinotypes," where the image is composed entirely of platinum. Silver prints toned with platinum stand in precisely the same category as similar prints toned with gold. Toning by either method is simply a substitution of a portion of the silver forming the image by gold or by platinum, as the case may be. The question, therefore, is, Will the thin superficial coating of platinum on a basis of silver better resist the action of time than a similar layer of gold under like conditions? This is a debatable point among theorists, which we shall not enter upon here.

THERE is a very good practical reason why the modern-toned platinum prints are likely to prove more permanent than those toned with gold. At the present time gold toning is confined exclusively, or nearly so to albumenised paper. Here, owing to the system of preparing the paper—a thick coating of albumen, lightly salted, and sensitised in a comparatively weak bath—the image is confined almost entirely to the superficial film. Platinum-toned prints, however, are, as a rule, on a matt surface paper; and here the conditions are widely different. The paper is more heavily salted, to begin with; then it is sensitised in a stronger bath. This, however, is not all, for the salting solution is absorbed by the paper itself, and so is the silver solution. Therefore the image is not an attenuated one on its surface, as in the case of albumen, but is a vigorous one in the body of the paper; in fact, the image is composed of a far larger quantity of reduced metal in the latter case than it has in the former. This may be easily demonstrated by tearing a matt surface print and one on albumen. The image of the former will be seen to be of considerable thickness, while the latter is a mere superficial layer in the albumen. Indeed, with some of the more thickly coated papers, the albumen may be removed without leaving scarcely a trace of the image on the paper. It goes without saying that the larger the quantity of metal, whatever it may be, that composes the image, the more there will be to resist deleterious influences.

ONE of the principal reasons why so many of the prints of old—those of thirty or more years back—have stood so well, is due to the then use of very slightly albumenised paper. This was always highly salted and strongly sensitised, so that the image was not, as at the present time, confined simply to the albumen, but was well in the substance of the paper, and then, too, in a good body. As similar conditions to the above exist in the matt paper employed for platinum

toning, we may expect the prints to prove far more permanent than the gold-toned ones on modern albumenised paper.

COLLOTYPE printing is now becoming more recognised in this country as an industry than it was a few years ago. Not long ago machine printing was confined entirely to the Continent, but now most large firms who work collotype employ machines as a cheaper method of production than printing by hand. It may be true that, at present, machine work, unless it is slowly executed, is scarcely equal to that done by a skilful printer with a hand press, but, on the other hand, it is considered quite good enough for commercial work—for trade purposes, for example. This is proved by the number of machines which are now so fully occupied on this class of work. However, we cannot imagine that further improvements will not be forthcoming in collotype machines, and then, perhaps, hand printing will not be considered so much superior. It must be borne in mind that when lithographic machines were first introduced—and collotype machines are very similar in principle and construction—the work done with them was very different in quality from that now produced with the most improved appliances.

WE have just received a letter from a photographer in a large provincial town in the north, asking for information with reference to the number of proofs submitted in different London establishments. He mentions that it has hitherto been his custom to submit only two proofs when a dozen portraits are ordered, but one of his townsmen is now sending three, and another one sometimes four, on approval. He says, on remonstrating with them, he was told that it is the custom in London houses to always send three or four proofs in different *poses*, and even then to give resittings, free of charge, if the pictures are not considered satisfactory. Our correspondent adds that when so many proofs are sent on approval it materially reduces the profits of the photographer, and asks what is the recognised custom with regard to proofs in first-class London houses.

THERE has, apparently, been a growing tendency on the part of photographers to take their sitters in a greater number of *poses* than was formerly the case, and then let them see proofs from all the negatives. Some houses, we are told, at times send out as many as four, five, and even six, different proofs for selection. This practice, of course, considerably enhances the cost of production, and therefore reduces the profits. Whether the practice is good policy or not is certainly open to question. It naturally leads the customer to imagine that the photographer's labour and material can be of little value—by no means a desirable idea to be encouraged.

ON THINGS IN GENERAL.

AMATEUR *versus* Professional polemics are now raging with a fierceness we have not been familiar with for some time, and many hard and true things have been said or will be. Fortunately, however, the true things are not always hard, nor the hard true; a little "give and take" on each side will clear the air, and do good rather than harm from the ventilation of grievances and the provision of that opportunity for a good grumble so dear to the heart of a Briton.

The chief grievances are, first, that many "amateurs" sail under false colours; and, second, that their doings injure the profession. It may be; but professionals should not want to pocket all the pelf and leave to amateurs the trouble and expense of inventing and improving processes which the latter simply exploit when in working order. No one can grumble justly at a rival starting a business in opposition: it is better for him to do it on a small scale and call himself an amateur than to have a man of equal skill starting over the way to "run a studio," and run down prices at the same time. Further, in the former case there is the great advantage of knowing the rival is mean, and of calling him a sneak behind his back, if he be of robust physique. But why this envy, hatred, and uncharitableness? How many amateurs are there in the whole country who can take a decent portrait when asked? Many of them can show one or two such, but

that does not count: "one swallow does not make a summer." Every professional of skill knows that it takes him all his time to keep abreast of the age in variety of pace, excellence of *technique*, and general finish in his work; and it requires time, knowledge, and skill to be able to produce portraits that will possess these qualities, and also be generally liked. The average amateur cannot approach a good professional, and an indifferent worker has no privileges conferred upon him by virtue of his calling. His work must justify his existence. The editorial remarks a short time ago, suggesting to amateurs to remember when they call upon a professional that "time is money," should be laid to heart by all, and much unthinking evil would be avoided. There are, of course, amateurs who go about the country asking permission to change plates, simply for the purpose of seeing all they can and picking up scraps of information. One of this class once called upon me with the plate-changing request, and made an appointment for an hour (fixed for his convenience) when I would have my second dark room ready for his use. He learnt in the course of our talk that this did not involve seeing me at work, nor my usual routine in process of work. He never came at the appointed time, though I went out of my way to prepare. Another wished to engage me to develop some plates for him, and then desired to buy some plates, his "stock being run out." I told him I did not sell plates, but recommended him where to go. He, also, never turned up for me to develop his plates. I did not want to, and he never intended me to; it was simply a *ruse* to know what plates I used, and to have a "look round."

In last week's JOURNAL, among the columns of the amateur fever, appears a letter *in re* exhibitions, suggesting that the various pictures of an exhibitor should be put together instead of being scattered abroad. The idea is good and reasonable, and, though not always possible, might be carried out much more frequently than is the case. Notably at the Pall Mall Show, the works of one gentleman in particular were very badly treated in this respect; they possessed individuality of style and of treatment, and yet scattered about the room their merit was much less conspicuous than would have been the case if they had been placed in one huge frame, which alone at present seems to be the means of keeping one man's work together. But I do not forget the difficulties and anxieties of hanging. The hangers have done their duty this year; another year they may, perhaps, please still more in this regard.

One or two "Answers to Correspondents" lately have shown that the schoolmaster has still to be abroad in regard to matters of copyright; but it is really small wonder that this should be the case, for the small act, covering only three pages of paper in large type, is by no means a model of clearness; it requires much explaining, though its main features are easily enough understood. The main difficulty, however, is the practical remedy, and this is, humanly speaking, so impossible of attainment, that some famous publishing photographers never make their pictures copyright at all. It is certainly very annoying, as has been my own experience, to walk along the streets and see copies of one's own pictures (properly registered in accordance with the Copyright Act) hawked on a barrow at a penny a-piece, or sent you by post with a request to know whether one could supply a gross for seven shillings; but it is just as well to keep down one's cholera, for the man with the barrow snaps his finger at the law, and would have no money to pay costs if even he could be caught and fined. It is well, however, to remember that where copyright is desired, it is purely academical to talk about whom it is inherently vested, for there can be no copyright unless there is a distinct agreement made at the time of purchase to whom the copyright is to belong, and this agreement and its date has to be disclosed to the registration officer. If some change could be made to simplify the proceedings to recover damages or fines, and to alter the wording of the Act, it would be far more useful.

Touching a question of lenses: I notice in an otherwise excellent and readable paper, read at the Birmingham Photographic Society, the statement, "The widest angle lens I have yet met with is four inches focus to the half-plate," &c. Now I have in my own possession a four-inch focus lens which has covered a whole-plate and enabled me to get a good picture very considerably in excess of a half-plate in size; in fact, I can mount nearly the whole of the print from the negative. I append an extract from the catalogue of a

manufacturer of eminence, and others who make lenses of equal power, if they do not claim it for them: "The diameter of the circle illuminated is rather more than double the focus of the lens, and is covered sharply with the smallest stop, equal to $f-64$."

FREE LANCE.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

No. VII.

G. WATMOUGH WEBSTER (No. 87), "*Where's Mother?*"—This is a very quiet picture of a little maiden rising from her sleep and asking for mother. The picture has been well arranged for light and shade, and the young model has done her share in the work very nicely. The lighting and treatment of some white drapery has been very carefully and effectively managed.

Miss Constance Frances (No. 616), *Out-of-door Studios*.—Although these ten small pictures do not merit noticing from the photographic point of view, yet the arrangement of the figures show an artistic capability which, with improved scientific results, would eventually result in some good work in the future.

Rev. C. Hope Sutton (No. 617).—Some exceedingly interesting photographs of the tombs at Thebes. They are, without doubt, worth the study of those learned in Egyptian lore, and show much care and knowledge of the original work in depicting them for historical study.

The transparencies sent in for competition are very good this year, and show how gradually the manipulative skill necessary for such work has produced slides which, when shown on the screen, are veritable pictures. The Society's medal has been awarded to a few slides by E. P. Cembrano, who, in some views of the old Moorish coloured architecture in Spain, has produced picturesque and exceedingly well-manipulated slides, which when enlarged on the screen become most realistic. Probably the most attractive set of transparencies in the Exhibition are those by Mr. George Smith, of the Sioption Company. These, however, were prevented from competing for the medal, inasmuch as the negatives from which they are made were not in all cases taken by the exhibitor. Other transparencies—all of a high average of excellence—are exhibited by F. H. Evans, A. R. Dresser, Major Nott, A. Chancellor, H. Little, T. E. Freshwater, W. S. Anderson, and S. Fry & Co.

In closing our review of this year's Exhibition, we cannot but express the great satisfaction that arises, after a close and careful investigation of both the pictorial and scientific specimens shown, at the great progress that has been made in the quality of the various photographs exhibited—from the pictorial, in a greater latitude in the selection and care in the treatment of subjects—and a far greater evidence of the adaptation of the present method of producing negatives, but more especially in the production of prints by the platinotype process. These scientific investigations in photography are gradually effecting a complete revolution in results; and singular though it may seem, it undoubtedly shows that just as the improvements on the scientific side become more expanded and easier in working, so the attention of the photographer becomes thereby free to bestow his thoughts upon the artistic, and it is now evident that in the future photography must become one of the means whereby art—properly studied—can realise both in figure and landscape subjects much that the most ambitious student could desire to produce; but this can only be realised by those who will devote more of their time and thoughts to that artistic study, without which photography remains but an easy way of recording nothing but uninteresting facts.

This subject is one which should meet with that attentive consideration which the present aspect of photographic capabilities holds out to those who cultivate artistic tendencies.

It is rather singular that so few results have been forthcoming in connexion with the capacity which photography now undoubtedly holds out for the production of unique and interesting studies of figures which the advanced capabilities of mechanical apparatus have brought before our notice. Let us anticipate that viewing the many very clever and amazingly ingenious specimens in that department, which have been one of the attractions of the present Exhibition, that they will result in some interesting studies being forthcoming where

close attention will have been given to artistic results as well as to the simple record of ordinary facts.

This year's Exhibition of the Photographic Society of Great Britain has been one which may justly be looked upon as a fresh epoch in its career; and as possibly a pause in the scientific aspect, as regards modes of production, may be assumed, it only remains for the same capacity and executive skill to be now turned to productions which will show that art can be assimilated with science in the production of works which will redound in the future more and more to a higher status of photographic capacity.

Writing this within a few hours of the closing of the Exhibition, we are enabled to state that the numbers who have passed the turnstile are just about thirteen thousand, and that the amount of money received far exceeds that of any former Exhibition.

ANOTHER CAUSE OF FOG ON DRY PLATES.

I HAVE lately been much troubled with fog on my negatives. This expression will probably raise a smile on the faces of the older photographers, and a sympathetic sigh from the breasts of our more recent neophytes.

I need hardly say that it was not my first acquaintance with this unpleasant visitor, and I was therefore immediately able to determine that its effects had not anything to do with my chemicals, but were apparently due to the action of light.

The fact that the portions of the negative covered by the rebates of the dark slide remained clear conclusively proved also that the illumination of my dark room was not at fault. This practically left nothing to be investigated but the camera and the lens. As I was working with a large single landrap lens, having all the stops turned out, I naturally ascribed the prevalent fog to reflection from the sides of the camera or the edges of the bellows, and I went to some trouble to insert a series of diaphragms in the interior of the camera, but this had no effect on the enemy, who reappeared—sometimes only slightly, sometimes in force. A leakage in the camera was such a natural deduction, that it can hardly be necessary to state that I very quickly reassured myself that such was not the case.

I was now getting fairly interested in the matter, and set to work to really differentiate the results. I was for some time under the impression that there was enough dispersion or aberration from the unstoped lens to cause a general reduction of the surface of the film, as the longer the exposure the greater the fog. This deduction was, however, knocked on the head by my obtaining the worst case of all with an almost instantaneous exposure.

Although pretty confident that a leak was not the cause, still, on no other hypothesis was it to be accounted for, so taking the camera out of doors, I put my head right into it—it is a 12 x 10—and covered up every chink with a voluminous focussing cloth. Needless to say, I found no leak, but my nostrils made me aware of an unpleasant fusty smell in the interior of the camera.

On coming to examine the interior, I found that, through having been stored in a damp place, the paste with which the bellows had been glued up had gone mouldy, and the whole interior of the cloth was covered with a fine growth of one of those virulent hypomyces, or mildews as we generally call them. That this mildew should have any action on the sensitive plate did not occur to me at first. That mildew itself was injurious to dry plates or paper in the long run I knew, but during the two minutes a plate remained uncovered in the camera, it seemed most unlikely that any action could take place, not from contact with the mildew itself, but only from its spores.

However, on going back over my previous experiences, I found that the greatest amount of fog was to be found in those cases where some time had elapsed between drawing the dark slide and uncapping the lens.

But a short time was necessary to test this hypothesis. The camera was conveyed to the dark room, all light excluded, and then sensitive films inserted and left for different times within the body of the closed camera. They were then all developed, together with a piece that had not been in the camera, in the same solution.

To my surprise, all the films that had been in the camera, even that one that had only passed one minute in it, were considerably fogged, varying more or less with the length of their visit. The fogging, too, was of a very considerable extent, far more than could possibly be tolerated on any negative, seriously interfering, indeed, with its printing power.

That the minute spores of this fungus should have such an instantaneous effect on a sensitive plate, I must confess, considerably surprised me. That after a certain time the effect on the plate would

be evident was to be expected, but that the action should be instantaneous will, I think, be novel to most photographers, and may indeed throw some light on the behaviour of dry plates hitherto unexplained.

From a physiological point of view, the action is also extremely interesting. It is evident that since the effect on the film is of the same character as that produced by light, then the destructive action of these hymenomyces is of a deoxidising character. It is also worthy of note that the action of light, which exerts a similar action as they do, should destroy them, for, as far as I can remember, I don't think mould of any sort can exist in the light. It may be, of course, that light has nothing to do with it, but its destruction be simply due to a supply of fresh oxygenated air, that undoes the mischief as fast as it is commenced.

But whatever, however, may be the cause, the fact indubitably remains that a mildewy camera will fog a dry plate as rapidly as an overdose of alkali, and I should advise photographers, therefore, who are troubled with fog, to examine a little into the state of their cameras and double backs.

LYONEL CLARK.

EIKONOGEN.

[A Communication to the Photographic Society of Philadelphia.]

EIKONOGEN is the name of a new developing agent recently placed before the photographic public. It is the patented invention of a Dr. Andriessen, of Berlin, and is a chocolate-coloured powder showing a crystalline formation of a small laminae, and has no taste or odour. It is said to be non-poisonous. It is sparingly soluble in water, about eighteen grains dissolving in an ounce, and forming a solution of a bright grass-green colour. In chemical composition it is said to be an amino-B-naphthol-B-monosulphonate of sodium. It is claimed for this new developer that, while its developing action is much quicker than either pyro or hydroquinone, it brings out the most perfect detail in the picture, even though a very short exposure has been made. It gives a clear negative of a bluish-black colour, and is especially recommended for instantaneous work. It is also said to give excellent results in developing lantern slides and transparencies.

During the past week I have made some few experiments with eikonogen, particularly as a developer for lantern slides, and I propose to discuss briefly this evening the results of these experiments. The developer used was a slight modification of the formula given by the inventor, Dr. Andriessen, that having been found to be almost too strong to give the best results. It was prepared according to the following formula:—

No. 1.

Eikonogen.....	$\frac{1}{2}$ ounce.
Sulphite sodium, crystallised	1 " "
Water	1 pint.

No. 2.

Carbonate sodium, crystallised	$\frac{3}{4}$ ounce.
Water	1 pint.

For normal developer, take of No. 1 and No. 2 each one part; water, two parts.

The results obtained with this developer have so far seemed to justify all that has been said in its favour. Two lantern plates were given the same exposure (a rather short one) upon a given negative, and then placed in separate dishes. To one was added the eikonogen developer mixed as above, to the other a hydroquinone developer prepared with phosphate and carbonate sodium. With the eikonogen the image began to appear in about ten seconds, and in two minutes was fully developed, ready to be washed and fixed. With the hydroquinone developer the image began to appear gradually at the end of the first minute, and at the expiration of five minutes was not fully developed. It required nearly five minutes more to complete the development, and the resulting plate lacked density and detail, and was evidently much under-timed. On the other hand, the plate developed with eikonogen had good density and was full of the most exquisite detail.

The colour of lantern slides produced by eikonogen varies according to the strength of the developer. With the formula previously given, the colour is a clear bluish-black in the deep shadows, graduating down to a beautiful grey in the lighter portions of the picture. If a developer is used containing one-half the quantity of No. 2, and twice as much water, and a longer exposure be given, the tone obtained is much warmer, and is of an olive-brown or grey colour, very soft and pleasing. With both developers the most beautiful detail was obtained, and I consider that, for lantern slides, this developer, when properly used, will give results far superior to those obtained with either hydroquinone or oxalate. These experiments were merely tentative, and more familiarity with this new agent, and possibly

some modification in the formulæ, will be required before the best results can be obtained. It works quickly, does not stain the film, and can be used for a number of plates before becoming exhausted. The six lantern slides I show you this evening were developed with one ounce of this developer, and with the last plate it showed no signs of exhaustion.

As a developer for negatives and instantaneous work, eikonogen will probably prove as excellent as it has for lantern slides. The negatives I show you now were made this afternoon about four p.m. with a Hawk-eye camera, using Cramer plates, sensitometer 35. Although the light was rather weak, and the plates not very fast, I think you will find that they show excellent detail, and seem, if anything, to appear a little over-timed. I am now experimenting with eikonogen as a developer for negatives, and especially instantaneous work, and trust to make a further report at some future meeting.

As far as its price and developing power are concerned, it is probably quite as cheap, if not cheaper, than pyro. It costs now about forty cents per ounce, and in developing power it will probably go much further than the pyro, while as an additional attraction it does not become dark and discoloured, nor will it stain the fingers, and hence will be much preferred by the amateur.

As a developing agent, I believe that eikonogen has come to stay; and where its use is fully understood, I believe it will be found to be the most formidable rival to pyro that has yet appeared.

CHARLES L. MITCHELL, M.D.

THE IMPROVEMENT OF FAULTY NEGATIVES.

It frequently happens, no matter whether the operator be professional or amateur, that in the course of their working they meet with annoying cases of eyesores—faults or failures in the negatives they produce. Who cannot bring to remembrance some negative which has caused them to ejaculate, "If it were not for just this or that it would otherwise be a perfect result?" As a rule, the sound old standing advice holds good, viz., that of taking a new negative, but as it very frequently happens that the opportunity is not forthcoming for a fresh exposure, the operator is compelled just to battle with what he has got and make the best of it. Then follows his having recourse to some means of doctoring, whereby the eye-ore, fault, or flaw, of whatever form the failure should happen to assume, is minimised or removed altogether. So numerous and varied are the troubles met with in this respect, that it is not always an easy matter for an operator to make up his mind as to what, under the circumstances, is the best course to follow. As a rule, however, I think it will be found that these defects may be divided into two classes, viz., those caused by some overlook or error on the part of the operator, and those defects inherent in the sensitive plate, over which the operator when working has really no control.

I propose to deal, first, with a few cases of the former class, viz., those cases for which the operator is responsible. As I write, I have before me a very glaring case of this kind; it is the negative of a lady. This plate is perfect in almost every respect in the way of lighting, expression, exposure, development, &c., but, unfortunately, in the posing an error was committed which entirely mars all the rest, causing as it does a very noticeable eyesore. I have said in this case that the fault lay in the posing, this has been done by so turning the head that the off ear projects beyond the line of the cheek, and is just a case in point, showing as it does how a careful operator, by dint of a little forethought, can so deal with weak points in a sitter's appearance as to considerably assist towards the production of an harmonious picture. Here, undoubtedly, the worst point with this sitter was the unusually large ears, and when such are met with, it is just about almost certain they will be found to have a tendency to droop or fall forward. This is just what took place in this instance, this leaning forward taking such a shape as to spoil the contour of the face.

Now here we have, when viewing the negative, a dark deposit relieved by a light background, and the question comes to be, "How is the objectionable dark deposit to be got rid of?" Some may imagine that in such a case a clever modeller would have no hesitation in having recourse to a scalpel, and with its aid remove the eyesore; but where is the average professional retoucher, I ask, who would care to trust himself with such an operation? not to speak of the vast army of amateurs who know really nothing about the use of the knife or pencil, as practised by an expert modeller. Doubtless in many instances the knife becomes a very handy tool to use in cases where the flaw or fault lies on the surface, such as slight flashes of fog, &c. (and to this I hope to refer later on), but in cases like the one we are considering, where the dark deposit has entered and gone

deep down into the film, but few experts with the knife would be found so bold as to use it in such an instance. Therefore, some other means must be devised for the removal of the eyesore, if the negative in question is to be utilised.

Having referred to a case in point where the fault lies in the shape of an opaque deposit in the film, I may remark that, as a rule, most flaws of this class generally assume one of two forms, viz., they either appear in the negative as opaque or transparent, and but little consideration will be required at the hands of my readers to understand that the treatment of a case of transparency must differ widely from a case of opacity. At all times I think it will be found that even an average worker has but little hesitation in tackling a transparent flaw in a negative, for it is so easy to spot or block out with the aid of pencil or brush any little defect, and then work up its surroundings with the pencil, so as to make its appearance non-observable in the finished print. Not so, however, with opaque markings; it is in such cases that I have invariably noticed my pupils seem completely balled in their ideas as to how they are to get rid of them, and, doubtless, many are the cases where good negatives are discarded entirely, just through such opaque flaws being found by amateurs in their results. They get an idea in their heads that such faults are incurable, and, in many instances, when observed on development, they simply consign the negative at once to the ash pit, and make up their mind to try again, expecting better luck next time.

In my next, I hope to refer to a method of treating negatives containing opaque flaws, whereby any average worker can so set about the operation as to materially improve the same, if not to entirely remove the fault.

T. N. ARMSTRONG.

COLOURED PHOTOGRAPHS.

XIII.

In our last paper we treated on the general posing of the head and figure. The next point to claim attention is the dress or costume. This is a much more weighty consideration than may appear possible at first sight. Believe me, there is considerable artistic taste required, not only in the selection, but also in the general disposition, of what we may comprehensively term the *draperies*. There are many who treat this portion of their picture, in conjunction with the *background*, as quite a secondary consideration. This is, however, a mistake, as will be seen by observing any of the masterpieces of our best painters. There is no end of artistic skill and feeling expended in the working out of these points, and truly some of the best qualities of many acknowledged gems in portraiture are dependent upon their successful treatment.

There are many forms of dress which to us appear absurd and almost ludicrous, yet in their own day were the very height of fashion, and looked upon as the acme of all that was beautiful. The same feelings that we have to-day regarding the costumes of twenty years ago will, no doubt, be entertained regarding ourselves by those who will follow us twenty years hence. What changes have not come to pass during the last twenty or thirty years in this department! Take the bonnet, for example. See what a whole line of bonnets may be traced between the aristocratic coal-box of years gone by and that wonderful head-gear which rules the fashion to-day, and which may be a hat or bonnet at will. I am always making mistakes, although I should not; for my lady friends tell me that a *bonnet* has *strings* and a *hat* has *not*. This is a nice distinction.

The form of dress, too, of both ladies and gentlemen has undergone no end of changes. We have had the long waist, the short waist, the no waist at all; wide, flowing sleeves, as if material did not cost anything; then the tight ones, as if we could not get another sixteenth part of an inch more to save our lives. How often have we laughed at some of the portraits of our ancestors, as handed down by the portrait painters of bygone days. Some we have absolutely thought *frights*, yet we will in a future generation appear just as ridiculous to those that come after us. All this is not owing to the innate absurdity of the costume, but to the fact that the eye is not accustomed to it. I have a photograph of H.R.H. the Princess of Wales, taken during the reign of the *turban hat* and worst form of *crinoline*, and really one can scarcely believe one's eyes. It is really hard to imagine that this photograph is a faithful representation of one whom to-day we all regard, and justly so, as the most graceful and best-dressed lady in the land. As she is now, so was she then. It is only the change of fashion that causes us to smile at the records of the past. I only mention this matter so that we may never be led into extremes when painting a portrait, but rather try to make our costumes as little assertive as possible.

Beyond a doubt we should endeavour to secure an arrangement of

dress that would not too clearly carry a date with it. Any dress which gracefully indicates but does not display the form of the sitter, must necessarily be the most acceptable. Such a dress can never be, as it were, entirely out of fashion, and per consequence look ridiculous. It is never well, too, to overload your costumes with ornaments. Of course, these remarks are mainly applicable to portraits of ladies. If ladies intend having a portrait painted, I would always advise them to let the artist who is to paint it arrange as to the dress to be worn; and if to be photographed first and painted after, he might come to an amicable understanding with the operator, who, if an artist himself, will duly appreciate his suggestions.

I think there is more taste generally to be found among the wealthy classes of to-day than there used to be; a painter has not to struggle to produce a satisfactory harmony between all the most glaring colours, as was the case in the olden times. So much for the general dissemination of art principles, which have had a beneficial effect upon the arrangement of the colours and contrasts even of an every-day costume. I think I can do no better than advise all who have to paint coloured draperies to make a study of the portraits by Sir Joshua Reynolds and, perhaps, Vandyck. There are no better examples, that I know of, to illustrate the most artistic and harmonious arrangement of colours in regard to draperies and backgrounds.

If we visit the National Gallery and other important collections of the best works of art, we will find, as a rule, that in the works of Rubens, Vandyck, Rembrandt, Correggio, Murillo, and Velasquez, and a host of other great painters, white is always placed next the skin of women and children. It will be remarked that Sir Joshua Reynolds was rather partial to dressing his children and ladies in white muslin, or, if not, in some light drapery of a more or less warm neutral tint. For strong colouring we must turn to his portraits of men, who in those days disported themselves in much more lively colours than they do to-day.

It will be found on examination that Vandyck used more positive colours in his pictures than did Sir Joshua Reynolds. It was nothing unusual for him to introduce the three primary colours—red, blue, and yellow—and supplement them by the tertiary neutrals (drabs and browns). Green and purple do not seem to be such favourites with him, but he has introduced some very splendid orange-coloured draperies, and has heightened them in tone until they almost became scarlet, and these he contrasted with blue.

As everybody knows, blue is a very favourite colour with the ladies, but to a young painter there is nothing much more difficult than to skilfully and successfully arrange a quantity of this cold and not over-sympathetic colour. Sir Joshua has left it to us as his opinion, and I don't think we could have a better, that the principal lights in a picture should be of the warm and mellow kind, such as reds and yellows. As is usual when one great man lays down a certain principle, another great one tries to prove it wrong, or, at least, not altogether right. So it was with this theory; it excited a desire in the mind of the mighty Gainsborough to prove its fallacy. The result was that he painted his justly celebrated picture in the Grosvenor Gallery, which is known to all fame as the *Blue Boy*. Most people who take an interest in art have heard of, and perhaps seen, this splendid work. It is a full-length of a little boy in a blue satin dress, the adjacent colours being a variety of warm and rich browns. It was quite the topic of the time in artistic circles, and many leading artists considered that he had successfully refuted Sir Joshua's theory. This opinion, however, was not shared by Sir Thomas Lawrence, who considered that Gainsborough only succeeded partially—that the difficulty was grappled with, but not surmounted.

I do not think any portraits will be found more instructive than those by Vandyck; we may as well, then, consider how he treated this colour whenever he was obliged to use it in any of his draperies. He invariably placed linen next to the skin, and contrasted the blue with warm browns. Into the same picture he usually introduced a red, or, if not, an amber-coloured curtain, and often an armchair or other drapery of the third primitive colour. In this manner he maintained a perfect balance of the warm and cold colours, and harmonised the whole picture by a skilful use of the warm browns and greys. It will be remarked that he often, too, introduced a *drab* scarf on the neck of some of his figures, but I have no doubt this was done in order to give value to the tints of the flesh.

Rembrandt usually concentrated the light on the upper part of his figures. It may be to carry this out successfully that he showed such a marked partiality for black draperies.

The next point to require consideration is the general arrangement of light. In this the artistic feeling of an operator can be exercised to the fullest. Of course, when we are given a photograph to paint upon, we must be contented and go ahead upon what we have before

us, but still it may be useful to know what we should do if not so aided. As a rule, it will be found that most studios are lighted from above. It is considered advisable that the light should enter the studio of the painter from a window at least six feet from the ground. This is in order to throw all the shadows downwards. In the case of ordinary windows, an arrangement can be put up which will have the desired effect. A moveable shutter, or dark blind, pulled up and down by means of a rope and pulley, would not be very difficult to fix up, and would be found to suit the required purpose. In arranging the light, it should be so directed as to secure the greatest possible breadth of effect. If the face be turned to the light, the shadow of the nose must be more than ordinarily deep, or else it will lack its due prominence. In such cases, too, a dark background will be found advantageous in order to give a general tenderness to the other side of the face. This latter arrangement is sometimes found in really good pictures, but, as a rule, the first-mentioned position is the one most generally selected. What I am going to say is, I fear, already known to all, namely, that the painter should sit in such a position that the light should enter from his left.

The figure is the next study which we must consider. As with the face, so with the figure, when we have a photographic base to work upon. It is well, however, to know just a little of what we would have to do if we had to paint the picture unaided. It is just in this regard that a photograph is so useful. There is nothing of such importance as a good and correct *outline*, for it is the foundation, as it were, of the entire picture. For this purpose, what a help is photography! for where is the artist's sketch that will be so true and full of detail as is the photograph?

It is never well to make our sketch on the paper direct that we intend to colour upon. If we do we are likely, in rubbing out and making corrections, to injure the surface upon which we have to work, and this would greatly injure the quality of our picture when finished. It is better, then, to make our sketch on another piece of paper, and then transfer it by tracing on to the stained paper which is ready for colouring. In making a sketch of a head, we should, in the first place, draw a line to mark the natural inclination of the head. If we are about to draw a full face, this line will be straight; if three-quarter face, it will be somewhat curved. Then draw a line crossing the first exactly at right angles, which will indicate where the eyes are to be placed. Also sketch lightly another line or two below this to show where the nose, mouth, and chin are to be. No one should neglect this rule, as on it depends the truth and solidity of our future picture. Without taking these precautions we are likely to get our mouth and nose awry, and our eyes on anything but the same plane. Having these lines, however, as a base, we can block out the various features with a certain freedom. Care should be taken to place them in their true positions, just proportions, and having due regard for the governing influence of perspective. Having thus marked in the general form, we must again go over the drawing, carefully giving every feature its true form and natural expression. A good way to judge if our drawing be good is to hold it before a looking glass, and if there be any bad drawing it will at once strike the eye.

When we are perfectly satisfied with the correctness of this drawing we can place a sheet of French tracing paper over it, and then mark out the drawing either with a pencil or a brush dipped in water colour. This done, take a sheet of tissue paper rubbed over with charcoal, or powdered red ochre, and place it on the stained paper, powdered side down, over it place the tracing, and, having fastened the corners so it cannot change its position, proceed to pass over the outline with an ivory or agate style, lifting the corners occasionally to see if we are getting on all right. The style must be used with sufficient firmness to secure a mark, but not in any way to indent the paper. When all the lines are secured we can take off our tracing paper and the one with the powder; we must then proceed to strengthen and correct with a fine-pointed pencil, beginning at the lower right-hand corner in order to avoid any chance of the hand obliterating any of the tracing. Having thus secured the entire drawing, dust off the remnants of the powder, or charcoal, by flapping the paper with a clean and soft cloth. This completed we are ready to begin our colouring, and will try to produce a work of art, whether it be on our own sketch or a photographic base.

REDMOND BARRETT.

PROFESSOR LUCKHARDT ON NEGATIVE RETOUCHING.

THE following data are gathered from the lecture delivered by Professor Luckhardt at the Amateur Club of Vienna, on October 12 last:—

The arrangement of the retouching table, above all things, is of an importance which cannot be too highly estimated. It is suggested that it should be so constructed that the operator should receive all

the light through the negative; and, in accordance with this rule, besides a shade of sufficient size advancing the required distance above and in front of the operator's head, a black background should be provided behind, so as to intercept any reflected light.

The retouching table should also, to protect the eyes, be furnished with a blue glass, of the same colour as ordinary eye-protecting spectacles, whereon the negatives under operation may be placed. A piece of light-green or light-blue paper, too, will prove a good substitute for the reflecting mirror. A turning-plate should further be arranged to enable the position of the negative to be altered as required, whereby "hatchings" will especially be facilitated, no matter whether they are made with a pencil or a Nadel needle.

Not only should every retoucher of negatives possess some preliminary knowledge of the anatomical relation between the various parts of the body or head (a knowledge acquired by practising figure drawing and by a careful inspection of picture galleries), but it is also essential for a beginner *not* to confine himself to work with negatives, but from time to time to operate on positive copies as well, so as to exercise his eye and prevent it from becoming one-sided. To all inquiries addressed to the lecturer with regard to the method of becoming proficient in retouching, he invariably directed the attention of the querists to the importance of *cultivating the taste*, which is only feasible by dint of a frequent and attentive examination of pictures, and of constant practice in drawing from good models.

It is also advisable to cover the negative with a "mask," with an opening of about the size of half-a-crown, whereby the work is materially facilitated, while, on the other hand, such a mask affords additional protection to the eyes, inasmuch as it counteracts the dazzling effect of the light. A rough print should in every instance be given to the retoucher, so that, on the one hand, he may guard against any mistake in regard to outline, and, on the other hand, avoid producing wrong effects in modelling. The comparison of a retouched negative with an unretouched print should in no case be omitted, as it enables the operator to control his own work.

An excellent method of practising the art of retouching for a beginner is this: He should take a negative containing a scale of various shades—somewhat like a photometer—and retouch the lightest shade, so that, when printed off, it may produce the same effect as the next darker shade. This is all the more essential, as differences of shade in the negative—such as are almost imperceptible to the eye—will distinctly show in a print, owing to the difference in the extent to which actinic light is admitted through the colour, nay, even through the pencil marks. The great mystery in retouching lies in always observing the right proportions in endeavouring to increase the artistic effect; and, to be able to do so, it is necessary for the retoucher to be able to tell, from the mere inspection of a rough print, what features are characteristic, and what is simply the result of accident or an incorrect representation of the respective value of the colours by the chemical process. A yellow shade in the skin, for instance, often looks like a cavity, and thus interferes with the working up.

In most cases the negative should only be covered with a film of varnish, or simply of a solution of gum, and should the film interfere with the work of the pencil, the part to be operated upon may be rubbed over with oleine. This course should, however, be avoided as much as possible, as not only does it affect the neatness of the negative, but it also causes the silver of the paper to stick and alters the retouching. There is, at present, a special negative lac in the market which generally requires no subsequent preparation before it can be operated upon with the pencil; but in case it should not prove quite serviceable at once, the portion to be retouched may conveniently be rubbed over with powdered pumice stone or "ossa sepiæ." To protect the retouching, the negative can also be, in the first place, covered with ordinary amber lac, then retouched, and, lastly, receive a coating of ordinary varnish.

When it is necessary to go over the negative with the eraser, this should be done with the least possible delay, before the coating dries and hardens, or the lac may be rendered elastic by the addition of a little castor oil.

Retouching may also be considered as including methods of obtaining, by optical means, delicacy of outline and equality in tint. For instance, after accurate focussing, one may employ the whole of the lens, and during the exposure introduce a small diaphragm, which is most easily done by means of a clip-diaphragm. Denier, in St. Petersburg, is said to have caused a vibrating action of the air by placing a spirit lamp in front of the objective.

It is often necessary, in the case of portrait and landscape negatives, to cover the back of the plate with translucent lac or coloured collodion.

INSTRUCTING THE PUBLIC.

THE people need instruction as well as the photographers. There are many writers on their duties and obligations. "How and where shall I get a good picture?" is the question often asked by persons intending to sit. They desire a good picture, and should be told how to get it. And yet there are so many people this year that the attempt to instruct all of them seems a large contract. In an address in the Academy of Music at St. Louis, I said, "Go to a man of well-known ability—a man of taste, who has a reputation for reliability—pay him his price, and do not patronise the meaner man around the corner because he gives you a larger lot of trash for smaller amount of money." This advice carried out would ensure the sitter good, and, in most instances, satisfactory work.

A large number of people seem to think a photograph is only a photograph, and it makes no difference who takes it. A greater mistake was never made. The results are as wide apart as the poles. One man poses your face to the best advantage, sees that the light and shades are right, and manages to get your best expression; the other tells you to sit down and keep still, and does not trouble himself about anything, except to open and shut his camera, and you are dismissed with the assurance that it is all right and "looks just like you." When the so-called pictures are received, you feel like committing suicide if you look like that, and perhaps you would be justified in doing so.

A good story is told of Mr. Lincoln. He was in the woods gunning, and meeting a stranger on the same errand, the man raised his gun and pointed it at Mr. Lincoln. "What are you going to shoot me for?" was the inquiry. "Because," said the man, "I was always told if I met a homelier man than myself to shoot him." "Well," said Abe, looking at him, "if I am homelier than you are, *blaze away!*"

Further, the man you patronise should be a man of truth and veracity, that you may rely on what he promises, and one who feels that your future patronage depends on the quality of his work. Tell him if they finish well to send you two or three dozen, and he will see to it that they are right.

Again, always dress and wear your hair as you are accustomed to do. Do not go to a hairdresser and disguise yourself by being "done up" as you never appeared before. Your own husband and children would hardly know you with those extra puffs and furbelows. Just try and *look like yourself*, and then the well-executed picture will look like you. It will be worth your having, and a pleasure to your friends.

If people would use the same amount of judgment in getting a picture that they do in buying a watch, good results would follow. When you buy a watch, do you go to a Chatham-street old clothes dealer, who in loud tones declares "it is de finest watch in der city," or do you go to a house of reputation, where you can be sure of getting a reliable watch?

Do not show your proofs to everybody for an opinion. Often they are submitted to the cook in the kitchen, and then all the way up to grandma in her specs, and perhaps the first opinion given is acquiesced in by all the crowd—"It don't look a mite look you!" or if the likeness is conceded they will select the one in which the dress is most satisfactory, and you may get the best-appearing dress and the poorest face. Let your photographer decide which will finish the best.

It is not desirable to be in a hurry to have your pictures finished. It does not require much hurry to spoil what would otherwise be a good picture. Any one part of the process slighted by too much haste makes the entire operation imperfect. All of us photographers have yet much to learn, so do not hurry us, but give us time to do what we have learned to the best of our ability.

It is well not to have your expectations raised too high. People sometimes imagine that by some incomprehensible means the skilful artist is going to furnish them with pictures that are a great improvement on nature. Some faces do photograph better than they are in reality, but they are very few. The skilful artist can and will help things by careful retouching. He can remove the frown that should never have been there. He can take out the strong lines if any are there. He can straighten mouths that are awry because of the continued use of "chewing gum," or *some other cause*. But do not let him do too much, or your nearest friend may ask "who the picture is intended to represent?"

"I always go to the best photographer," says one, "yet my pictures are never so good as Amy Brunett's; hers are always good." That may be so; her face is strongly marked, her features regular, her eyes black, and eyebrows strong, and more, she has perfect control of her expression; while your eyes are light blue, eyebrows very light, or perhaps white, and when you sit for your picture you lose all control of your expression. There is an old saying, "It takes *two* to make a

bargain;" as I have before said, it also takes two to make a picture. The operator cannot do it all; you must do your part in the very important part of keeping an expression. The capable operator will exert himself to obtain your best. You must neither look as cross as if you were angry at yourself and "the rest of mankind," nor smile so much as to look silly.

It has been remarked that some persons are most desirous of getting a pretty picture than they are of getting a good likeness, and there are cases where the beauty is in the form, the vivacity, the behaviour, or the tasty dress, but, alas! not in the face. Unfortunately many of us are not born either rich or handsome. The "biddy" with red blotches on her face said "beauty was only skin deep." When mouths and noses were given out, some of us seem to have received more than our share, and you and I must be content if we hold position with the general average.

A. BOGARDUS.

—Con. Number St. Louis Photographer.

Foreign Notes and News.

THE remnants of the Berlin Jubilee Exhibition have been removed to Königsberg, where a three weeks' subsidiary Exhibition is being held under the patronage of the Hereditary Princess of Sachsen-Meiningen, who figured as the protecting deity of the Berlin Exhibition. This exalted personage has recently written to the committee to express her sense of the advantages derived by the Exhibition from their indefatigable exertions, an opinion in which any who have practical experience of the difficulty attending the organization of undertakings of such magnitude will doubtless re-echo. Her Royal Highness further regrets that she was unable to pay the Exhibition a personal visit, but states that she has been sufficiently kept *au courant* by the copious reports furnished her by Dr. Vogel. The German periodicals have been unanimous in attributing a large share of the success of the Exhibition to its having taken place under the patronage of so distinguished a lady. Happy country in which such august personages take interest in matters photographic, and succeed in ensuring the success of exhibitions at such a small expenditure of personal energy!

HER ROYAL HIGHNESS also sends her congratulations to Dr. Vogel on his receiving the "prize of honour" from the Committee—congratulations in which readers of the JOURNAL will heartily concur, as Dr. Vogel's great services to photography are probably as fully appreciated in this country and America as they are in his native land.

THE following method of making a permanent, colourless hydroquinone solution is given by M. Pétry in the *Progrès Photographique*, and appears to be thought well of on the Continent. 40 grammes chemically pure sodium sulphite are powdered in a porcelain dish, and 80 grammes carbonate of soda in another dish; 8 grammes of hydroquinone are placed in a litre flask, and the powdered sodium sulphite and sodium carbonate are added to it quite dry. The salts are mixed by shaking the flask, when it is filled up with rain water and shaken till solution is complete. M. Pétry adds that by momentarily immersing a gelatine plate in this developer and drying in the dark its sensibility is considerably increased.

THE civil courts of Berlin have appointed Herr H. Riffarth, the owner of a well-known photographic establishment in that city, to the post of legal specialist in all matters connected with photographic printing. No better proof could be needed of the constantly increasing importance of photography in all departments of civilised life.

THE wonderfully successful photographs of wild animals, apparently taken in their native fastnesses, which from time to time issue from the camera of the indefatigable Anschütz, may not be as well known in this country as in Germany; but any who have seen them will be willing to admit that the science of zoology owes almost as much to his untiring energy as does the art of photography. The way Herr Anschütz goes to work is a proof, if any were needed, that he does not stick at expenditure to attain results. In the Zoological Garden at Breslau he has had a large den of 140 square metres extent built at his own cost, enclosed by walls some 6 metres high. Its surface is strewn with pebbles, blocks of stone, trees, plants, &c., which are varied with the nature of the beasts to be "taken." The walls are adorned with suitable landscapes. Into this *plateau* the animals to be photographed are driven, and permitted to remain there sufficiently long to make themselves thoroughly at home, whereupon a suitable moment is awaited for obtaining an impression by means of a camera inserted through an opening in the wall. The amount of patience required in awaiting a suitable opportunity, the various dodges and devices required for fixing the attention of the

animals and inducing them to assume suitable positions, are more easily imagined than described, but that Herr Anschütz succeeds in surmounting them with signal success will be admitted by all who have seen his unequalled results.

DR. STOLZE'S *Photographische Nachrichten* remarks, *apropos* of Newcomb's receipt for a monochromatic flash light, viz., five to seven of nitrate of soda and one part magnesium powder, that the proportion of nitre is much too high, for in the case of the much more energetically acting chlorate of potash three parts of the latter to one of magnesium burned only with difficulty, and by no means instantaneously, the excess of potash acting as an inert mass interfering with the combustion. The best light was obtained with equal proportions of magnesium and chlorate of potash. It would, therefore, appear advisable to employ not more than those proportions when making a flash-light mixture of magnesium and nitrate of potash.

THE same periodical points out that in regard to testing orthochromatic plates by means of Warnerke's sensitizer, it is only the sensitiveness for blue, and not for yellow, that is registered. As good orthochromatic plates are from ten to twelve times more sensitive for yellow rays than blue, it is important to bear this fact in mind.

AN illustration in the *Photographische Mittheilungen* serves to point out a rather curious fact in instantaneous photography. The illustration given is that of a photograph of a passing bicyclist, in which the time of exposure was evidently too long. The image was, as a necessary consequence, blurred—all except the spokes in the lower portion of each wheel, which came out comparatively distinct. It would be interesting to know if readers of the JOURNAL have noticed anything similar.

THE GROTTTO OF HANS.*

ONE naturally thinks of a grotto as some place where pretty stones, shells, &c., can be seen; but little did I think I should go through a series of halls—fourteen in number—many the size of small theatres and concert rooms, and one larger than the Albert Hall, all hewn and formed by nature, and by her decorated in such a way that no artist could imitate. The names of the halls convey some idea of the leading characteristic, and it does not require much fancy to connect them with the subject of the title; they are as follows:—

Antiparos, Priapee, Scarabees, The Foxes, St. Nicholas, The Frogs, Vigneron, The Gulfs (Holes), Mamelon, Vault of the Lance, Alhambra, Marvellous, Mysterious, Boudoir de Proserpine.

These halls were reached by magnificent terraces hung with draperies of such delicate and exquisite design that nature, as if by magic, touches man's brain and quickens his imagination in order to perceive at a glance how great an artist it would be possible to become, either by the wonderful agency of light and photography, or by the skilful movement of his hand and brush. We had passed through some pleasant stages of excitement and surprise, but had now reached a point, the solemnity and impressiveness of which bade every heart be still. We were standing in the cathedral upon its solid floor and beneath its majestic dome, whose height no building ever made by hands had reached, and whose boundaries from wall to wall were past the power of our vision to discern. On one side stood the organ, stalactite and stalagmite combined, fluting upwards and downwards in beautiful and perfect symmetry of form, awaiting only a seraph hand to set its music floating through the lofty vaults above, while ranged before it stood the company of spell-bound souls lost in an effort to realise the majesty and vastness of the wonderful surroundings. Notwithstanding this, the climax of immensity was not yet reached, for we were led on by our sturdy guide through corridors and passages, ascending and descending by rugged paths and steep inclines, by steps and stepping stones, or by sudden and eccentric turns, always lighting on something new to stimulate our wonder and excite our admiration, when, lo! we have arrived within the Hall of Mystery. The Mysterious was indeed attested by the breathless awe that overcame the party, and it is difficult to describe the weird sensation forced upon us, completely shut out as we were from the world with its glorious light and life. The impenetrable space and darkness was only made more noticeable by the lights carried by our lamp bearers, for the illumination seemed only a tiny spot of ground beneath our feet, while beyond us on every side the unknown distance, and the cold and dismal gloom were elements of awe and fear. Here, however, in this hopeless, cheerless, boundless place (thanks to our indefatigable guide) we had the highest entertainment of all during our journey in the caves. Strong in the determination to please, as well as strong in limb, he left us for a little while, and then divesting himself of his coat and taking a hempen string from his girdle, he lit his torch made of it and paraffin, and leaped and bounded up the rocks 200 feet or more. Here at the summit, standing like a spectre amid the surroundings that would be considered elsewhere supernatural, he lit a *flambeau* that heightened this fantastic picture, and made our memories revert to poems and scenes of *Manfred* and *Faust*; for was it not a natural Brocken

* Concluded from page 734.

with all the rugged and eccentric cliffs and peaks? and very little imagination was required to people it with the characters with which it was associated.

Our wonder was not yet satisfied, for from this height a green light or Roman candle was fired, which described an arc over our heads like a shooting star in the firmament, and falling through space showed that the darkness below represented a depth of 200 or 300 feet more. The assistant guide having wended his way to the bottom of this abyss and lit a kind of beacon light, we now had details of the extremes of the area. So well was this arranged that a stage manager could well get some useful hints, for no situation in any dramatic representation that we have witnessed would at all approach this for surprises and enchantment. A hearty round of applause greeted our guide on his returning down the rock, which he descended with the agility and surefootedness of a chamois.*

The end had not yet come, for we continued our journey along the remainder of the seventeen galleries which had such typical names as the Swallow, Grand Central, Precipice, Adventurers, Lost, Hope, Hogard, Imprudent, Incomparable, Cascade, Styx, Capitole, Broeche, Trophy, &c., and as we wandered through these endless pathways it seemed as if we had been weeks instead of hours in them; each mind having full opportunity of giving scope to its own imagining and conjuring into reality every nightmare or fancy of the brain. A new light was, however, dawning upon us, for we were about to leave the pitch darkness of the stoney cavern, with all its weirdness and secrets of the past, and like the tempest-tossed mariners coming home, felt hope strongly ascendant.

This light was to be the acme of our pleasure; but the guide, well knowing the power of his surprise, and how our sensitive nerves and eyesight, already strung and strained to the highest pitch, could not withstand the sudden transition to daylight—for the burst of sunlight upon us would have made us mad—by slow and easy stages, always changeful and exciting, schooled our senses for the contrast. By careful grouping the party were ranged at the edge of a rock, the protecting ledge preventing a fall of sixty feet or so into an abyss. The guide taking one of the lamps, we saw him gradually descend a pathway in the rock until his diminished figure reached the edge of a subterranean lake. Here he entered a boat, and there was little water to be seen, save where the lamp's reflected light revealed it, but the splashing of the oars in the profound stillness told us that it was vast and far-reaching. While thus standing, out of the darkness came the sounds of sweet melody, resounding from rock to rock, echoing and re-echoing, sometimes near, and then far off, and our guide's song in good baritone was completed on his way back to us. The greatest enchantment now awaited us, for it was our turn to follow the winding path the guide had just trod—lamp bearers and visitors, a goodly throng—down to the water's edge. Good accommodation was here found for all in three flat-bottomed boats, holding twenty-five persons each, the lamp bearers occupying a boat by themselves, and their lamps lighting up the roof and the walls of the water cave. In an instant the lights were extinguished, and we realised what the darkness of the cave was. The impression was supreme, for in this cavern on the dark lake, with no apparent outlet, we were helpless and hopeless. A few seconds and the whole surroundings are changed, for the boats have glided a few yards past a projection, and the cave is lit up by the silver rays of the moon. But where do they come from? It is moonlight apparently, and that of a harvest moon, but as it is only three o'clock and autumn—what is the meaning? A little thought and we understand it is the reflection of the rays of daylight again and again broken up by the water and sides of the cave. It was a light that spoke of hope and love once more, and brought joy to our hearts.

One silent corner there is yet to pass, and then we are face to face with a vision seen never on *terra firma*, and rarely conjured up in dreams; in fact, the finest transformation scene ever set up is but a poor attempt to imitate what nature here supplied. It was fairyland—I had almost said paradise—for description fails to convey the idea, or tell why tears ran down from every eye that saw this magic splendour and the bright mingling of colours, prismatic hues, translucent and glorious light from sky, foliage, rustic bridge, and mountain, reflected in the water of the lake beneath, all seen through the distant opening of the cave. It was a sight that would arouse the dulllest mind to an appreciation of the beautiful, and would soften the hardest heart. This sight was no doubt tenfold more effective after so long an absence from daylight than it would have been if witnessed from the same spot directly after being brought in from the water entrance.

The wonderful reverberations of the report of a small cannon fired in the mouth of the cave, echoing and re-echoing again and again, closed this wonderfully entertaining journey, and it was now only left for us to pay the fee (five francs each person), and give the guide some practical proof of our pleasure and thanks prior to returning to the waggonette. This we found outside a village hotel, and wishing to see what had been already done in the way of photographs, which it was understood were on sale here, we looked through the collection, and were disappointed to find no real pictures among them as photographs, for although so many beautiful, natural pictures had just been witnessed, none had been published

* This hall is one of those where the flash lights and magnesium would have to be used to get an idea on the extra sensitive plates of the vastness of the natural exactions.

worth bringing away as *souvenirs*. I should advise the photographer to first go through the halls and galleries and witness the effects, making mental notes of the opportunities of photographing, and one or two trial exposures, and then on a second or third journey through the caves secure negatives of those subjects most fancied, when the previous experience of exposure, &c., could be brought to bear on the result. A treat is in store for all who visit the Grotto of Hans.

G. R. BAKER.

EDWARDS'S ISOCHROMATIC PLATE COMPETITION.

PRIZE WINNERS.

Class A. Landscape.—1st prize, *Long Focus*, Francis William Edwards, 87, Bellenden-road, Peckham-rye, S.E. 2nd, *Tulipe Noir*, Frederic d'Arcis, 6, Brent-villas, Hendon, N.W. 3rd, *Carolus*, Charles Ariel Brightman, 61, Lyndale, Redland-road, Bristol. 4th, *The Rose Queen*, Albert Joseph Clark, 157A, Graham-road, Dalston, N.E.

Class B. Instantaneous.—1st, *Aurora Borealis*, Lyd. Sawyer, New-castle-on-Tyne. 2nd, *Paulatlon*, Ralph W. Robinson, Redhill. 3rd, *Infant*, H. Dudley Arnott, Gorleston, Great Yarmouth. 4th, *Home*, Alfred Price, 26, King-street, Great Yarmouth.

Class C. Interiora.—1st, *Autumnus*, Edward Brightman, Lyndale, Redland-road, Bristol. 2nd, *Dum Spiro Spero*, Wm. Ellis, 25, Clapton-square, London, N.E. 3rd, *Floreat Cantabrigia*, Rev. F. C. Lambert, Ruberdoms, Cambridge.

Our Editorial Table.

ILFORD BROMIDE PAPER.

Britannia Works Company, Ilford.

WHEN first trying this paper, we made several prints which were perfect in all save one respect—there was a certain marking visible in every print, and which was not to be seen in some others made on paper of another maker. Puzzled at first to account for this, we examined the negative by holding it up against the light, observing nothing therein to cause such mark. We then examined it more critically against a backing of opal glass, when we found that the Ilford bromide paper had been quicker at detecting and giving effect to a barely visible detail in the negative than we were. Here at once we perceived a great virtue in this paper, viz., that of recording such delicate gradations of tone in a negative as were unappreciated by the eye. The sensitiveness is great, the tone is excellent, and the gradation all that the most fastidious could possibly desire.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,519.—“Improved Means and Apparatus for Taking a Succession of Pictures in a Photographic Camera.” M. A. WIER.—*Dated November 4, 1889.*

No. 17,548.—“Improvements in Cameras for Photographic Purposes.” F. BEAUCHAMP.—*Dated November 5, 1889.*

No. 17,555.—“Improvements in or pertaining to Photographic Cameras.” H. W. B. BRUNO.—*Dated November 5, 1889.*

No. 17,590.—“New or Improved Apparatus for the Mounting of Photographic Prints.” W. T. WARBURTON.—*Dated November 5, 1889.*

No. 17,708.—“Improvements in Photographic Cameras.” Complete specification. T. R. DALLMEYER and F. BEAUCHAMP.—*Dated November 6, 1889.*

No. 17,729.—“An Improved Photographic Detective Camera.” T. KERR.—*Dated November 7, 1889.*

No. 17,767.—“Improved Means or Apparatus for Washing Photographic Films, Prints, Plates, and the like.” W. H. WARNER.—*Dated November 7, 1889.*

No. 17,773.—“Improvements in Photography.” E. H. FARMER.—*Dated November 7, 1889.*

SPECIFICATIONS PUBLISHED.

1888.

No. 15,063.—“Cameras.” GRAHAM.—Price 6d.

No. 16,046.—“Magic Lantern Slide Frame.” BEAUCHAMP.—Price 6d.

1889.

No. 56.—“Photographic Cameras.” ANSCHÜTZ.—Price 8d.

No. 12,343.—“Mounting Lenses.” NOAKES.—Price 6d.

PATENTS COMPLETED.

IMPROVEMENTS IN THE METHOD OF MOUNTING PHOTOGRAPHIC AND OTHER LENSES.

No. 12,343. DAVID WILLIAM NOAKES, 9, Billingsgate-street, Greenwich, Kent.—October 19, 1889.

My invention relates more especially to double or combination lenses, where the stops or diaphragms or exposure shutters are introduced between the lenses. Hitherto most lenses fitted with a series of stops or diaphragms have been so mounted that the stops have been introduced between the lenses by means of a slot cut in the lens mount, with the consequent tendency of the light to leak in to the interior of the lens. Again, when exposure shutters are used, especially those working between the lenses and without means of adjustment, so as to reduce or enlarge the extent of their opening, there has been difficulty in limiting the aperture of the lens to the intensity ratio required. To obviate these and other defects, I mount one or more of the lenses of the combination (preferably the front lens or lenses) in a distinct and separate tube. This is made to fit the outer or jacket tube in such a manner as to withdraw easily. A stop of the largest aperture intended to be used is fixed at C (which in the drawing represents the inner end of the short tube in which the front lens is fixed). Other stops of varying intensity ratios are easily introduced by withdrawing the tube and inserting a stop of the character and shape desired.

IMPROVEMENTS IN AND CONNECTED WITH PHOTOGRAPHIC CAMERAS.

No. 15,068. THOMAS PERCY GRAHAM, St. Mary's, Belfast.—October 19, 1889.

The object of my present invention is to improve the appearance of the well-known photographic camera, and to render it an object of interest to children sitters, obviating the necessity of fixing their attention upon anything outside the camera itself.

For this purpose, I place in front of the camera an ornamental structure of a pleasing design, and in which a hole is cut for receiving the lens tube. Above the hole is an arrangement very similar to the ordinary cuckoo clock, although I do not confine myself to any particular bird, beast, or figure. Sound is emitted by such figure by a bellows forming part of the arrangement. In front of the lens are doors for exposing the plate. These doors or shutters, together with the speaking figure, are worked automatically by any approved method, but I prefer the pneumatic ball and tube, a method of rapid exposure well known to photographers. The movement may also be given to the several parts by an electric current, or by hand.

The action is as follows:—The sitter is placed before the camera in the usual way and told to look full at the camera face. The design of this face is sufficient to create an interest, and to produce a natural expression of countenance so desirable in a portrait. While the attention of the sitter is so fixed, everything being otherwise prepared, the pneumatic ball, electric button, or hand connexion is actuated, simultaneously releasing the speaking figure and opening the lens shutters. The figure appears. The bellows produce the necessary sound. The shutters open and expose the plate, and the picture is taken.

[The invention here described is nearly allied to that long employed for a similar purpose in America, which latter is in the form of a handsome ornamental case with an aperture in front, at which, by means of clockwork, various sensational pictures appear in succession, but differs from it in this respect that the American one does not form "part and parcel" of the camera, but is mounted independently on a separate and adjustable stand.—Ed.]

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 59. OTTOMAR ANSCHÜTZ, Lissa, Posen, Prussia.—October 19, 1889.

My invention relates to photographic cameras principally designed for taking instantaneous photographs, and its object is to provide means—firstly, for producing photographs of the said kind which are clearer than those heretofore made; secondly, for altering the time of exposure; and, thirdly, for facilitating the adjustment of the lens to the focus corresponding to the distance of the object to be photographed.

For the first purpose I provide the camera with a shutter, having a slit, and so located within the camera as to move with the slitted portion along the rear wall of the camera, i.e. the wall containing the exposure opening. The shutter may be carried out in different manners. It may, for instance, consist in two pieces of antransparent cloth, so connected together as to leave the required slit between them, the outer edge of one piece being fastened to a winding barrel, having combined with it a catching and disengaging mechanism, while the outer edge of the other piece is attached to indiarubber cords. Or the shutter is constituted by a light box open at two opposite sides, and arranged in the camera so as to be directed with the said sides respectively towards the lens and towards the exposure opening. This box is connected to the camera by guiding devices adapted to conduct the same with its slit across the exposure opening, and it is provided with a catching and disengaging contrivance and springs or indiarubber cords as in the first arrangement.

By means of a shutter which moves with its slitted part close to the sensitive surface, as described, the said surface is exposed in successive strips to the full action of the concentrated rays of light forming the picture, while dispersed rays are excluded.

For altering the time of exposure the shutter is provided with an adjusting device, whereby the width of the slit can be varied. In the shutter of the first arrangement the edges of the pieces of cloth forming the slit are fitted with narrow metal mountings, one of which constitutes a guide for a resilient sliding pall, arranged to engage with ratchet teeth formed on the said guide. From the top of this mounting a cord is passed through eyes at the ends of the other mounting, then through an eye at the bottom of the first mounting, and finally to the pall, to which it is fastened. The cord thus forms an adjustable connexion between the two parts of the shutter, the distance between the said

parts being reduced when the cord is drawn upon, by means of the pall, whereas, when the cord is slackened by disengaging the pall and shifting it backward, the aforesaid springs or indiarubber cords cause the said distance to be increased. The same contrivance may be applied to the shutter of the second arrangement, provided only the walls forming the slit or the ends of the said walls be made moveable in respect to each other.

For the purpose of facilitating the adjustment of the lens, the easing thereof is provided at one end with a screw thread, with which it is screwed into a ring fixed to the camera, so that the lens may be focussed by screwing the casing more or less in or out. Besides this, the casing is fitted with a pointer, and on the ring marks are made, which show the position the pointer must have when the picture surface is in the focus corresponding to the distance indicated by any of the marks.

[Herr Anschütz when taking his patent was doubtless not aware that shutters, with a slot, working immediately in front of the plate have long been known in this country.—Ed.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 19	North London	Myddelton Hall, Upper-st., Islington
" 19	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
" 19	Bolton Club	The Studio, Chancery-lane, Bolton.
" 20	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 20	Bury	
" 20	Hyde	
" 20	Manchester Camera Club	Victoria Hotel.
" 20	Edinburgh Photo. Club.	5, St. Andrew-square,
" 20	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 21	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

NOVEMBER 13.—Mr. J. Glaisher, F.R.S., in the chair.

A paper was read by Captain W. DE W. ABNEY on *The Density of a Negative after Intensification*, in the course of which he remarked that whilst the question of intensification had been dealt with by many writers, it appeared to have only been considered from a qualitative point of view. He proposed to treat it in a quantitative manner, examining the intensity added to the various gradations of the negative image from the faintest up to the strongest. Thus examined, he found that the relations between the several gradations did not bear the same proportion to each other after intensification as before. The intensifying formula that he had used in his experiments was that in which the negative was first treated with a bath of bichloride of mercury and bromide of potassium, followed, after washing, by one of nitrate of silver and cyanide of potassium. He found that in the result the gradation at the end of the scale was not proportionally rendered, and that, in fact, about one-third of the range of gradation was gone.

Mr. W. E. DEBENHAM inquired what would be the result with other modes of intensification. He remembered to have considered in the collodion times, when silver and pyro intensification was in general use, that there was some distinctive difference between the result when this method was employed from that obtained with a mercury intensifying process. With the latter there appeared to be a more complete bringing up of the fainter shades, whilst with the pyro and silver method these shades seemed not to take the intensifying proportionally to the action upon the more exposed portions. Thus pyro and silver would appear to be advantageous for a somewhat over exposed negative, whilst it would accentuate the failings of an under exposed one, for which the mercury method would be more suitable. He would also suggest that Captain Abney, with his experience of measuring density, should repeat his experiment on two plates, intensifying one by the method mentioned in the paper, and the other with iodide of mercury, followed by solution of Schlippe's salt, and report the result at a future meeting.

Captain ABNEY agreed with Mr. Debenham as to the characteristics of silver with pyro intensification as compared with that by means of a mercury solution. As to the experiment suggested with iodide of mercury and Schlippe's salt, he would willingly undertake and report upon it.

Mr. CHAPMAN JONES inquired whether the formula stated to be used by Captain Abney did not first intensify and afterwards reduce the intensity of the negative; and, if so, did not that circumstance account for the want of range of gradation in the places of greatest deposit?

Captain ABNEY replied that he stopped the process before reduction set in.

Mr. JONES said that it was a question whether it was possible to proceed to full density in one part of the scale before the commencement of a reducing action in other portions.

Mr. W. BEDFORD inquired whether Captain Abney had tried the converse of intensification, namely, reducing intensity, and, if so, whether he had found the same curve of altered relation to occur.

Captain ABNEY had not experimented in that direction.

Mr. FRIESE GREENE wished to know whether Captain Abney had made experiments with emulsions prepared respectively with hard and soft gelatines. He believed that the results would be different in the two cases.

Captain ABNEY had used commercial plates and some of his own preparation, the latter being made with soft gelatine. He had not observed or expected to find difference of result from that source.

The PRESIDENT then distributed the medals that had been awarded at the Exhibition, and speaking of the Exhibition itself, then about to close, expressed his satisfaction with the progress in science, in art, and in photographic results

that had been displayed. The only thing that he did not like was the preponderance of great white margins to the pictures; with that exception, he had been exceedingly well pleased. The Exhibition had been visited by 12,600 persons, and had been financially, as well as in other ways, a success.

It was announced that at the next ordinary meeting, on December 11, Mr. W. E. Debenham would read a paper on *Estimating the Efficiency of Plate Backings*; and Mr. Whipple, of Kew Observatory, one on *The Application of Photography to Meteorology*.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 7.—Mr. J. J. Briginshaw in the chair.

A circular which had been received by the Secretary was laid before the meeting. It contained proposals for the formation of a new photographic society.

The meeting unanimously directed the Secretary to reply that the Society would take no action in the matter at present.

Mr. A. COWAN brought some transparencies which had been developed with different samples and quantities of sulphite of soda, and without that addition. One of the plates, which by several members was considered to be as good as any of the series, was found to have been developed with the old formula of pyro, two grains; bromide, two grains; and ammonia, four minims, to the ounce of solution. This plate had also not been treated with alum or any clearing solution. The plates were of a special make for lantern work, and slower than the ordinary bromide negative emulsions. One, as a curiosity, had been developed with eikonogen without the addition of any other substance to the solution; the image was apparently all out, but thin. The eikonogen was of the new variety, in comparatively large white crystals; a sample of it was shown, and it was stated to keep much better than the originally issued brown, powdery compound. The use of plain eikonogen without addition was not recommended, as in time the plate would develop all over.

A question from the box was read:—"In using the back combination of a rapid rectilinear lens, is the sharpest image procurable on the screen the best for photographic purposes? if not, what is the correction necessary?"

Mr. W. E. DEBENHAM said it was conceivable that a rectilinear doublet might be constructed, one of the elements of which was under and the other over-corrected, and in that case there would be a necessity for making an allowance when either was used separately. He was not aware that any of the commercial lenses were made in this way. Certainly each part of the combination was generally achromatised in itself, and could be used without any alteration of focus becoming necessary.

Mr. A. HADDON noted that when he had at times endeavoured to develop an image with pyro and carbonate of soda or potash and failed to get an image, and had then washed off the mixture and applied a fresh developer composed of pyro and ammonia, he had got green fog; whereas commencing with the pyro and ammonia the plate would remain clear. He attributed the green fog to a little of the originally used alkali remaining in the film.

Mr. F. W. COX had met with a similar result.

Mr. HADDON suggested that some samples of sulphite of soda might contain a quantity of carbonate of soda, and so be the cause of green fog.

Mr. G. W. ATKINS asked for a formula for varnish for transparencies that could be used cold.

Mr. COWAN suggested gum sandarac in ether.

Mr. F. A. BRIDGE said dammar in benzole.

Mr. DEBENHAM would use mastic dissolved in benzole or turpentine—the latter if time in drying was not important. A weak solution would suffice for transparencies, say one part of gum in twenty of solvent.

The subject of *Eikonogen as a Developer* was announced for discussion on the 21st instant, and on the 25th Mr. P. Everett will discourse upon *The Action of Ferripyrocatechol of Potassium upon Developed Plates*.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

On the 8th instant the Exhibition at Pall Mall was, by kind permission of the Photographic Society, open during the evening for the annual benefit of the Photographers' Benevolent Association. A lantern display from slides lent by Messrs. Combrano, England, Freshwater, Hastings, Pilkington, Smith, and Wright, concluded a very satisfactory evening's entertainment.

CAMERA CLUB.

OCTOBER 31.—The subject for discussion was the new developer, *Eikonogen*. Papers were read by Messrs. H. M. Elder, M.A., and Lionel Clark. Mr. A. Strohl occupied the chair.

Previous to the lecture Mr. J. H. Williams handed round a lantern slide on one of the Alpha plates introduced by the Ilford Company. With these plates variety in colour is obtainable by toning as with the Alpha paper.

Mr. G. DAVISON also showed one or two pieces of the Eastman Company's new thin celluloid film for the roller slide, which excited much interest.

In treating of the subject of the evening, Mr. ELDER confined his remarks to dealing with the chemical constitution and characteristics of the substance known to photographers as eikonogen. Mr. Lionel Clark's paper was devoted to a description of practical tests made for the purpose of comparing the merits of eikonogen with those of pyro, and it was illustrated by a set of negatives showing the results of these sensitometer tests. Both the lecturers appeared to agree that eikonogen gave density with difficulty, and had a tendency, under some circumstances, to eat away the film.

Only eight or nine of those present had tried the developer.

Mr. CHAPMAN JONES had not found that it rendered the film of negatives tender.

Mr. A. COWAN exhibited some good negatives to show the results obtainable, and some negatives and prints lent by Mr. H. M. Hastings, which illustrated the use of the developer for exceedingly short exposures. He also exhibited a sample of eikonogen in white crystals, and made some interesting remarks as to formulae and practice.

Remarks were also made by Messrs. Noel-Cox, Grimshaw, and Charters White, the opinions as to the qualities of the developer being very divergent.

The subject on Thursday, November 14, will be *Films*, when Major J. F. Nott will read a paper.

NOVEMBER 7.—Mr. A. PRINGLE gave an address entitled *One Hundred and Thirty Exposures*. Mr. Francis Cobb occupied the chair. There was a full meeting.

Mr. Pringle's lecture dealt with the advantages accruing from the use of orthochromatic plates in landscape work. To illustrate his points, Mr. Pringle had prepared a large number of prints and lantern slides; these were handed round and shown in the lantern. In most cases the lecturer had taken three negatives of each subject—one upon an ordinary plate, one upon an isochromatic plate, and one upon a plate dyed by himself; from these negatives transparencies had been prepared and were now shown together on the screen. The conclusion arrived at by Mr. Pringle was that some slight advantage was gained by the use of dyed plates without a screen in landscape work.

After the address some conversation took place; in this Messrs. B. J. Edwards, Webber, Birt, Aeres, Davison, and others took part.

The subject for Thursday, November 21, is *The Progress of Hydroquinone*, when a paper will be read by Mr. A. Maskell.

WEST LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 8.—The President (Charles Bilton, B.A.) in the chair.

Mr. LYONEL CLARK described his new method of toning with salts of platinum, and gave a practical demonstration of the process, and numerous questions were asked by members.

Mr. BLACKMORE thought everybody must admit that Mr. Clark had brought before them a very beautiful process; the only doubtful point appeared to be the question of permanency. He hoped Mr. Clark would continue his experiments until he arrived at a result which might compete with any known process in that respect. He would ask: Would the result of over-printing and over-toning be to effect a more complete interchange of molecules—a point in favour of increased permanency?

Mr. E. W. FOXLEE inquired whether Mr. Clark could give an idea of the composition of the platinum-toned image, i.e., the proportion of platinum to silver.

Mr. CLARK, in reply, said that no doubt the over-printing and toning referred to by Mr. Blackmore would conduce to the permanency of the result, but the effect of considerable over-toning was to reduce the intensity of the print, as was the case with gold toning. To arrive at the relative proportions of platinum and silver in the image would necessitate having recourse to an abstruse analysis. There was, however, some silver present, for a print on being treated with an oxidising agent would lose intensity. No greater degree of over-printing was required than when toning with gold, except when using matt surface paper. One point must be observed—the bath must be always slightly acid, if at all alkaline the toning would be extremely slow. A bath smelling faintly of ammonia would have very little toning action.

In answer to the question, Has a landscape lens any advantage over the back combination of a rectilinear? Mr. FOXLEE thought that the old form of landscape lens would give a better result, inasmuch as it could be used with a larger aperture, but the back lens of the rectilinear would cover a larger field.

Mr. WHITING thought Dallmeyer's new landscape lens was a distinct improvement.

Mr. FOXLEE did not quite agree. The chief advantage of the single lens lay in the fact of its having but two reflecting surfaces, but the new lens had four—it had, however, rectilinear properties, which was a gain.

Mr. CLARK did not favour the employment of the back combination, inasmuch as the angle given was generally too small for pictorial effect; further, the position of the stop was not correct, and if an adapter had to be used it would save time to employ a proper lens.

The next meeting, which takes place on November 22, will be a lantern night. Members are requested to bring slides.

LEWES PHOTOGRAPHIC SOCIETY.

NOVEMBER 7.—Mr. G. J. Wightman in the chair.

The evening was devoted to a discussion on *Developers*, which was opened by Mr. P. MORRIS, who described in detail the methods of development by ferrous oxalate, alkaline pyro, and quinol, and concluded by saying he thought pyro-developed negatives gave the best prints, but that quinol was preferable for lantern slides and transparencies. In the discussion the general opinion seemed to be that the merits of quinol had been rather over-rated, and that photographers were gradually coming back to pyro.

The HON. SECRETARY spoke in favour of quinol for negatives, and thought its capabilities of giving gradation had been very much lessened by trying to hurry its action by the use of the caustic alkalis in combination with it. He preferred the fixed alkalis, and used carbonate of potash.

Mr. G. J. WIGHTMAN passed round negatives of the same subject developed by pyro, without a preservative, and quinol, also platinum prints from same; and the print from the quinol-developed negative was thought to be the best.

Mr. A. R. Dresser will read a paper on *Detective Cameras* at the next meeting to be held on December 3.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

NOVEMBER 6.—Annual meeting.—Mr. Councillor Andrews in the chair, and a fair number of members present.

The consideration of the annual report was postponed until next meeting.

The following officers were elected for the ensuing year:—*President*: Mr. Councillor Andrews.—*Vice-Presidents*: Messrs. H. Stumey, G. Winstanley,

F. W. Hardy, and H. W. Jones, F.C.S.—*Council*: Messrs. A. B. Clarke, C. H. Waters, J. Mountfort, and W. R. Goate.—*Treasurer*: Mr. W. L. J. Orton.—*Secretaries*: Mr. F. W. Dew, The City Studio, Coventry, and Mr. F. J. Harker, 40 Smithford-street, Coventry.

Several schemes for increasing the utility and membership of the Society were mooted and referred to the Council for them to consider and report thereon at the next meeting.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 6.—Dr. Anderson (Vice-President) in the chair.

The proposed exhibition it was agreed should be deferred until the autumn of next year.

Mr. GEORGE MACKIE, A.Ph.S., then read a paper on *Microscopic Objects, and How to Photograph Them*, which was illustrated by lantern slides—photographic and hand drawn. Thereafter a diatom was photographed, being magnified to three inches in diameter.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 7.—Mr. W. D. Valentine in the chair.

Seven new members were elected.

The following were declared the prize winners in the bromide print competition:—Equal firsts—Mr. D. Ireland and "Ignotus"; second, Mr. W. Salmond; and third, Mr. V. C. Baird.

The method adopted in this competition was as follows:—Packets containing six marked pieces of Mawson & Swan's bromide paper were issued to competitors at the previous meeting; the paper could be cut down to suit the competitor's negatives, but the distinguishing mark might not be obliterated, and only three prints had to be sent in.

In a discussion on eikonogen several members gave their experiences, on the whole not very favourable to negative work, but that it promised well for transparencies used with soda carbonate as the alkali.

Specimens of Vèrel's printing-out opals, Friese Greene's opal carls, and Marion's lantern-slide cameras were exhibited.

Two silver prints on albumenised paper were found in the question box; the first had the following written on the back:—"What is the cause of blistering on this print? Blisters commenced in toning bath (bicarbonate of soda) and increased in fixing bath and washing."

The only solution propounded was that too much bicarbonate had been used. The second print:—"What is the cause of the white clouding over all this print? The negative shows no such clouds, and the print was all correct when it was washed after fixing."

The print must have come in contact with copper or brass while washing. This solution is probably correct, as the print was washed in a basin fitted with a brass plug and chain.

The meeting to be held on December 5 has been postponed till December 12.

PHOTOGRAPHISCHER VEREIN, HANOVER.

ORDINARY meeting, October 2, at Bruin's Hotel. There was a numerous attendance at this first meeting of the present winter season, and a great many points of interest were discussed.

Major VON HAMMARSTEIN, the President, after having welcomed the members present, called upon Herr KARL WUNDER to open the discussion, who accordingly gave the assembly a description of the Anschütz camera. The members listened to the opener's disquisition with great attention, and, by inspecting the fine negatives Herr Wunder had obtained by means of the camera in question, once more satisfied themselves of the practical value of Herr Anschütz's apparatus. The only drawbacks pointed out by the speaker were that the construction of the apparatus is not quite as strong as may be desired, and that some time is lost in adjusting the shutter according to the time of exposure; also, that in case of lengthened exposure care must be taken that no clouding takes place, due to the camera not shutting out the light thoroughly.

The arrangement of the shutter right in front of the plate occasioned a lively debate, and Dr. J. KNORRHAUKE notably endeavoured to demonstrate theoretically the distortion that "cannot fall" to result from the arrangement of the shutter, a position confuted by Herr KARL WUNDER, who called attention to the marvellous results obtained in practice—especially by Herr Anschütz himself—among which there were even enlargements on a considerable scale, free from any distortion.

Herr GEORG ALPERS, jun., then produced Tiessleke's monochromatic camera lamp, exhibited by Baron Brentano, and this, too, gave rise to some difference of opinion, as many members feared lest, in operating with very sensitive or with orthochromatic plates, clouding should occur.

Baron BRENTANO next proceeded to show a collection of very pretty landscapes, &c., taken by him last summer in Hungary.

The President then made a report of the present condition of the Hanover Professional School of Photography. Owing to the continued courtesy of the authorities, a fine lecture room is now exclusively placed at the disposal of the students, which is to be shut up after each lecture, which will enable both lecturers and students to leave in the room any articles they may require during the lectures, which they could not do before. A motion for the purchase of various instruments, &c., calculated to facilitate study was carried.

Lastly, the contents of two travelling portfolios of the German Photographic Association were examined, and excited so much admiration that a resolution was taken to order in future a travelling portfolio every month, and exhibit it for inspection on the day appointed for the meeting at Bruin's Hotel, and on the three succeeding days in the lecture room, so as to enable the general public to see it. The exhibition organized by Herr Georg Alpers, jun., was largely visited by the public, and generally approved of. Several artists especially expressed their sense of appreciation of many of the pictures exhibited.

Correspondence.

Correspondents should never write on both sides of the paper.

NOVEMBER MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—CAMERA FOR FOCUSING CORRECTLY.—GIFT OF 1500 FATTY INK PROOFS.—ENLARGED PORTRAITS OF THE TWO CELEBRATED PHYLLOXERA.—TABLE OF EXPOSURES FOR THE "PINHOLE" CAMERA.—TONING WITH PLATINUM.—M. ANDRA ON ICONOGENE.—SULPHITE OF SODA ADDED TO THE HYPOSULPHITE OF SODA BATH: ITS ADVANTAGES.—A SCIENTIFIC ACTINOMETER AND A PRINTING APPARATUS.—ICONOGENE DISTRIBUTED TO THE MEMBERS.—CLOSE OF THE PARIS EXHIBITION.

THE Photographic Society of France held their first meeting after their vacation on Friday evening last, the 8th instant, M. Davanne in the chair.

After the general business of reading letters and useful extracts from foreign photographic journals—in the which, by-the-by, the old BRITISH JOURNAL OF PHOTOGRAPHY always takes the lead—the presentation began. Several cameras were presented; one of them, an instantaneous hand camera, had a very ingenious appliance for focussing. It consisted in the adaptation of an instrument of a scissors form, which, opening more or less, advanced or drew back the tube of the lens, and so the focus is immediately changed. At the end of the blades of the scissors are two elevated points fixed at right angles. In a few words this is what the inventor says can be done:—

In taking an instantaneous view of a street, with persons promenading therein, one of those persons is selected by the operator, the scissors are opened, and the two points are made to coincide with the height of the person chosen; when the top point is on the head and the bottom on the feet, the trigger of the instantaneous shutter is pulled and the view is obtained.

To understand the working better, supposing the person chosen be at a distance of twenty yards, the points will be very little apart, but when this person has advanced to five yards from the camera, the mouth of the scissors will be full open, and the tube of the lens very much advanced.

This appears a good idea, and a progress on the system employed upon the kind of cameras called "detective," on which is a lever to adjust the focus according to the distance the object is from the camera, this distance to be appreciated by the operator at once, which is no easy thing to do without great practice. In fact, the sole value of this invention is to enable the operator to focus with certainty, and to do away with guessing work.

M. Balagny offered 1500 proofs of the prize negative in the Concours of 1889. These proofs were printed in fatty ink by his new process, which has not yet been made public. The President thanked M. Balagny in the name of the Society, and said that a print should be inserted in each "Bulletin," so that all members would receive a specimen.

M. Balagny was called upon by the President to renew his demonstration of his "Contretype Process." This he promised to do fully at a future meeting.

M. Donnadien presented a series of enlarged microscopic proofs of that destructive little animal, the phylloxera. Its history was thus given from the lava to the perfect insect; but what would have interested us more would have been to know how to destroy that plague, which has already ruined a great part of France.

M. Vidal, who has devoted so much of his time to photographic photography and calculations on the time of exposure, has compiled a new table of exposures to be used with "pinhole cameras," in which he has given the sizes of the pinhole, and for each of which he has calculated the time of exposure required for a fixed focal distance. No. 10 in the tables represents a fully lighted landscape; the actinometry of the light falls down to No. 1. It is intended to be used in conjunction with his actinometer, the principle of which is as follows:—A piece of sensitised albumenised paper is exposed in the shade for one minute; according to the intensity of colour obtained at the end of the minute, one or the other of the ten columns is chosen. Even without the actinometer these calculations may be useful. M. Vidal presented me with one, which I send on to THE BRITISH JOURNAL OF PHOTOGRAPHY.

M. Gastine presented a great number of proofs toned with platinum. This gentleman does all he can to introduce platinum toning in preference to gold. The proofs exhibited had certainly a marked superiority over the gold-toned ones.

The formula he recommends is as follows:—

A.	
Water	300
Sodium chloride	20
„ bi-tartrate	10

B.	
Water	100
Bi-chloride of platinum	10

Add 7 c.c. of B to A and tone. "It is advisable," said the author, "to eliminate the silver salts from the paper by one or two washings before toning. If bi-tartrate is not at hand, take five parts of tartaric acid and mix with four and a half parts of carbonate of soda."

M. Andra made a lengthy communication on Iconogène. He said he had been experimenting on it during the holidays, and was of the opinion that it is the best developer that ever came before the public. The tone it gives to the negatives makes them appear as the old bath plates developed by the iron solution.

The formula he succeeded the best with was composed as follows:—

A.	
Water	1000
Sulphite of soda	75
Iconogène	15 to 16

B.	
Water	1000
Carbonate of soda	150

The proportions to be employed are three parts of A to one of B.

M. Lany proposed the addition of soda-sulphite to the hyposulphite bath when the addition of alum to the latter was thought necessary. "The soda-sulphite," said he, "prevents the precipitate so disagreeable in the alum-hypo bath."

M. Dessendier gave a description of his photometer, which is based upon the following chemical reaction:—"If an equal volume of chlor and hydrogen be mixed together in the dark and kept there, the two gases will not combine, but if the mixture be exposed to light hydrochloric acid is produced proportionally to the light received." M. Dessendier entered into a long dissertation—impossible to get into the limited space I have at my disposal—and then exhibited his printing-press arrangement. It consists of ten iron boxes, side by side; a spring allows the cover of each box to rise; in the cover is a hole of the size of the negative to be printed; the negative is held to the inside of the cover by means of springs. Ten negatives can thus be placed. In each box is placed a few yards of the sensitive paper to be employed; the end is placed in a clamp attached to a cylinder, whose duty it is to draw on and wind up the paper exposed to light. To set to work, all the negatives are fixed to the interior of the lids, the paper is passed over a bed of black velvet and seized by the clamp, the lids are closed, and all is ready for work. Supposing albumenised paper be chosen, in the first part all the negatives must be regulated to print in the same time, so the operator chooses those which are thin and transparent, and places them so that the thinnest is in box No. 1 and the most dense is found in box No. 10. The machine is now set out to light. As soon as the positive under the thinnest negative is visible the action of light must be subdued to allow the others to come out; this is done by covering the lid with a blind made of fine woven silk—each lid has ten blinds. No. 2 box is now visited, and if it has obtained the same density as No. 1 a blind is pulled over the negative, and a second one over the first box, and soon until the last box be visited, when the positive from the most intense negative is fully exposed. The first box may be covered by six or more blinds. No. 3 may have two or more, and so on. All are now printed; a handle is turned, all the ten lids are lifted about the eighth of an inch, and the paper is immediately changed. Now here is the advantage: the operator only wants to look at one box; as soon as the proof is sufficiently printed all the others are the same—the handle is turned and all changed once more. Continual printing can thus be done without trouble and fatigue. Carbon proofs or gelatino-chloride paper proofs can be printed with ease and certainty, especially if the photometer of the invention be employed with the apparatus.

M. Schaeffner distributed a certain number of bottles containing pure iconogène manufactured by Dr. Andriessen, asking the members to experiment upon it.

A member called the attention of his colleagues to the fact that several chemists had their medicines placed in graduated bottles. These bottles will render great service, he said, to amateurs and others for measuring liquids.

At last the magnificent Paris Exhibition has closed its doors. In the British Photographic Section, though the exhibitors were few they were choice ones, and obtained deserved praise. The jury granted them rewards; receptions were offered them by the President of the Republic, and all was done to make their sojourn in Paris agreeable and pleasant.

196, Rue Legendre, Paris.

PROF. E. STEBBING.

GLASS POSITIVES.

To the Editor.

SIR,—I have read your article on the Alabastrine process. In years past I knew it well. I agree with you, very beautiful results were obtained. The reason the process was given up was—because they turned as yellow as a kite's claw. It is a fact that these pictures in this state, if exposed to the sun for a week or so, would lose this yellowness and regain their former whiteness. In this state they remained, not turning again. I never could account for it; no doubt many who used the process will bear me out in this statement. Can you throw any light on the subject? In the hands of an artist I have seen lovely things produced.

Your remarks as to positives are quite true, and I wonder they have never been taken up again. To take a really good positive was no mean task. If clear glass were used they could be looked at through the glass,

backing up with fine cotton velvet. I think there is a fine field for positives, if taken up by an artistic photographer. There is no doubt—as you say—they are as permanent as anything in photography.—I am, yours, &c.,

Cardiff, November 11, 1889.

H. D.

LENS MAKING.

To the Editor.

SIR,—On the 1st inst. there appeared a letter in the *English Mechanic* appealing to amateur opticians for some practical information in lens making, and on the 8th there is a letter in reply from another correspondent doubting the probability of such information being given, he having looked in vain for it for some fifteen years in the *English Mechanic*.

Now it seems to me that you, Sir, might, in the pages of our *BRITISH JOURNAL*, hasten to the rescue. Probably amongst the numerous readers of the *BRITISH JOURNAL* there may be some optical amateurs who could assist, and I have no doubt that any of your scientific and mechanical correspondents who took the subject up as a hobby would be only too pleased to communicate the results—successful or otherwise—to the pages from whence they first obtained their information.

I presume the appeal was made to amateurs in consequence of the apparently jealous way in which such matters are guarded by professional opticians; yet I really do not think the latter would suffer in the least—rather the contrary—were the information appealed for generally known. That standard formulae for calculating the achromatic and chemical corrections for lenses must be known to some of our clever amateur opticians there can be little doubt, and knowing how liberal advanced amateur photographers have always been with information for the benefit of their brethren in the black art, I think it possible that in the optics there may be found some one equally liberal with the particular facts in question.

If such articles or correspondence are likely to appear at all, there could be no better place for them than in your columns, at least so far as photographic lenses are concerned; and yet why not telescopic and microscopic as well?—they are used photographically every day; indeed, so far as photo-astronomical work is concerned, the wonder is where it will stop.

To many readers of THE *BRITISH JOURNAL OF PHOTOGRAPHY* I am sure the subject of lens making would be both interesting and instructive.—I am, yours, &c.,

Cosmos.

ELECTRIC-LIGHT LANTERNS.

To the Editor.

SIR,—With reference to my communication respecting electric-light lanterns, and Mr. Lewis Wright's remarks thereon, I should like to add the following:—In the hope of having, as he states, "no trouble or delay and very little expense" in availing myself of the light, I purchased one of the Edison-Swan incandescent lamps, and it was because it could not be used as issued with ordinary lanterns that I wrote about the matter. The lamp was made, as I understood, at the suggestion or to the design of Dr. Fleming by the Edison & Swan Company and is called the Focus Lamp. The stand supplied is a simple one, and answers very well if there is sufficient height between the base of lantern and centre of condenser to get the light in proper adjustment; but it was because the majority of lanterns have only a distance of about four and a half inches from the base or tray, while this is about five and a half inches, I had to scheme another way of doing it, and then had the gibbet arrangement made. Even with a six-inch condenser lantern there was not sufficient room, and so it can be understood that the general run of trade lanterns having four-inch condensers and paraffin lamps will not allow of its use as illustrated in last week's *JOURNAL*. Your readers and Mr. Lewis Wright will no doubt find when they come to try this incandescent lamp that the heat generated surprises them, as it did me, and that arrangements will have to be made for a different kind of lantern body of extra size and better ventilation if they wish to use it in comfort. Hence Dr. Fleming's design.—I am yours, &c.,

G. R. BAKER.

SNOW SCENES AND CLOUD EFFECTS.

To the Editor.

SIR,—Will you allow me to suggest two subjects for the *JOURNAL* which would, I think, be of much interest to your readers just now when ordinary photography is seldom possible—I refer to snow scenes and cloud effects?

As regards the first subject, viz., snow scenes, the amateur's usual difficulties may be summed up as follows:—

1. In the choice of a subject (say a fir-tree covered with a frost rime, which is a favourite one), should an endeavour be made to obtain a dark background, such as a distant hill?
2. Ought slow plates and a small aperture to be used, or *vice versa*?
3. In development should the action be stopped earlier than with an ordinary negative, to prevent obliteration of the snow effects?

4. Should the developer be weak or strong, or modified in any special way?

As regards *cloud effects*, the questions most frequently asked are:—

1. How near the sun should be the part selected?
2. Should slow plates and a small aperture be used?
3. Is there any special development needed?

And as most amateurs will desire to reproduce their cloud effects on film negatives (which are so much more convenient than glass), how is this done? Paper negatives almost invariably show the grain of the paper notwithstanding every care, and are very unsatisfactory.—I am, yours, &c.,

ACCIPITER.

Goring-on-Thames, November 7, 1889.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—Having read a letter over the signature "Bart Rous," I am led to ask whether the object of the Camera Club in their one-man exhibitions should be more to give instructions to young amateurs than to give pleasure to older ones in seeing the accumulated works of such a celebrated master as Mr. H. P. Robinson? I am less a disciple of the Robinson school than that of which Mr. Davison is the champion, but I think the thanks of photographers generally are well won by the Camera Club in exhibiting works that have had admirers many years, so that they may be more generally known than even now.

If, Sir, it is held the special duty of the Camera Club to instruct sucking amateurs, let a recommendation go to its Committee to buy and distribute a gross of the most popular shilling manual amongst them.

That in an exhibition of Mr. Rous's work faults many and merits few, compared with Mr. Robinson's work, might be found is the opinion of—
Yours, &c.,

A MEMBER OF THE CAMERA CLUB.

To the Editor.

SIR,—I am sorry Mr. Davies feels it so disagreeable to answer my questions, but he will excuse me when he considers that it is not a mere matter of *personality*, but a matter of fact we are discussing, as such "casual general observations" are liable to mislead in many directions. "External nature" is just the same as it always was, long before the "extremely modern school of landscape workers" existed, carefully studied, and can by the painter only be studied after nature, not after any engraving or painting, less by a photograph; as it is well known that photography never gives that which is called by the artist the *air tone*. But if this was not so, and photography could give the painter any information, this would not be "revolutionising" the landscape art, because the latter is that in painting what the lyric is in poetry; and to express this sentiment is the only problem of the art, not to give a minute description of a tree, or a cornfield, &c.

I am very sorry Mr. Davies does not comprehend that "colour, vegetable life," &c., have very much to do with landscape painting, and therefore stand in immediate relation to the question, more so, I should think, than any quotations from letters or art critics, &c., which bear no relation whatever to the points at issue.—I am, yours, &c.,

F. B.

EXHIBITION MATTERS.

To the Editor.

SIR,—An Old Medallist may congratulate himself that he is not the only one by very many who have journeyed up to town to see the "big show" in the hope of refreshing their artistic appetites and accumulating a little more knowledge, but who have been signally disappointed. Conspicuous by their absence, he says, are some of our best workers. Why? Have they received their prescribed share of favour, and now retire silently to digest the feed of a few years? or have they seen the red light, and have flown from the danger ahead? If so, for why? And to whom have we to look for a remedy?

"A dismal and cheap get-up" is the graphic description given by an old friend of the *tout ensemble* of the Exhibition. Common to the lowest degree are some of the frames that surround many of the pictures, and so out of keeping with the subject, that the careful study and manipulative skill that has been brought together to produce these pictures have, by the careless framing, been totally spoilt. But while committees do not appoint responsible persons to look after valuable pictures entrusted to their care, cheap and trashy frames will be the order.

Yet another and more serious grievance stares us in the face—I allude to the hanging of exhibits. If my memory serves me rightly, one of the conditions laid down in every prospectus is that the number of square feet required shall be stipulated at the time of applying for space. In compliance with this rule, and having paid the "necessary," is it too much to expect that the space required shall be all together? or are we to accept a few feet near the skylight, a few more feet on the ground, and the remainder wherever a vacancy occurs, while a chosen few can have

their pictures nicely hung and all together? In all cases, perhaps, it is not practicable, but in the majority it is. The duties of a Hanging Committee, we all know, are, under the most favourable circumstances, onerous. But when the spirit of fair play and a conscientious determination to do right be not with them, their duties then indeed are hard, and, with "An Old Medallist," it will be for us to ask for a new organization and a new Exhibition.—I am, yours, &c.,

WYRALL.

"AT HOME" PORTRAITURE.

To the Editor.

SIR,—May I be allowed to say in reference to your kind criticism on my Pall Mall exhibit that your assumption is quite correct—the portraits are absolutely free from retouching?

Though retouching is often necessary to the extent of taking out freckles and "sieh-like," which would otherwise make the face look unnaturally "spotty," to retouch characteristic lines out of a face is little short of criminal, especially in an old face. It is the old, old story of the use and abuse of a good thing.

The portraits in question were taken on an old sliding-box camera, guileless of swing back, in an ordinary bay-windowed room, with a six-inch R.R. at full aperture—about *f*-8. The chief difficulty was in getting short enough exposures to secure a natural, spontaneous expression, it being a very exceptional face that will stand a long exposure and give a natural, easy expression. Another difficulty is that when a characteristic pose is seen the lighting will perhaps not suit it, and to secure the best lighting and keep a happy pose is not easy where the light is so little under control. I sent the statement as to "no retouching" for insertion in the catalogue, but it failed to get an entry therein, to my great regret, it being a feature I wanted attention drawn to.—I am, yours, &c.,

FRED. H. EVANS.

158, Osbaldiston-road, Stamford-hill, N., November 12, 1889.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—In my last letter to you I stated that men fitted to enter business with any reasonable prospect of success would study well the *pros* and *cons* before they made the venture with their capital. Now I would like the writer who signs himself "An Amateur" to tell me on what ground he bases the right of claim to monopoly which he gives to the professional photographer.

Surely he knows little of the early history of photography; professionals have done little for it. They have done a great deal more for themselves.

I do not know whether Mr. Barnes was a professional photographer or a professional writer—perhaps he is both—but this I do know, that I agree with him that "I have yet to learn that it proves morality in a man to take the bread and butter out of the mouth of another *when he had no need for it himself*." And I may further add that I have yet to learn that it is wanting in morality for a man to take pay for honest labour to put bread and butter into the mouths of his family.

Professional photographers are not the needy, hungry creatures that "An Amateur" and Mr. Barnes would have us to believe they are; those with whom I am acquainted require no amateur's patronage or forbearance. They don't know the meaning of the cold word "charity," and I would say seriously to those who do, "Providence has not intended you for the vocation. Go, seek work of another kind, in which I hope you will be more fortunate."

"An Amateur" styles me "so-called amateur." On what ground does he do so? Certainly I am not a certified one by you, Mr. Editor.

In 1867 I bought my first outfit. I have been an ardent and diligent worker. I have received no pay for my work; the pleasure it gave me was enough. Of my work I have given freely away—an additional pleasure. Does an amateur give no copies away? I presume not.—I am, yours, &c.,

J. STONEY.

November 11, 1889.

To the Editor.

SIR,—Regarding the question as to "What is an amateur?" so far as being eligible for exhibiting purposes go, I should say that most cases must be decided on their own merits. In the first place, *all* the work, excepting coating the plates, and, perhaps, sensitising the paper, *must* be done by the exhibitor himself, and in the next place photography must be the hobby or recreation of the exhibitor, and not his business or profession. For instance, a man may be engaged in the City and does photography in his holidays, or out of business hours. That, I consider, is an amateur, whether he hands a print to a bazaar or even gets recouped his expenses for a copy.

A man of independent means, and who really goes in for work with the intention of getting paid for it, I should not rank as an amateur, whatever else he may be; but that is not my business. I fail to see—

selling a photograph, painting and selling a picture, and making a picture frame and getting paid for it, constitutes either a professional or a tradesman, and think, with you, that much of the difficulty arises from the lower grade of workers.—I am, yours, &c.,
H. R. W.

Exchange Column.

* * No charge is made for inserting *Exchanges of Apparatus in this column*; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange 12×10 bellows camera for a half-plate bellows camera with extra double dark slide.—Address, R. RAWLINSON, 1, Florence-street, Darwen.

Books on photography for amateurs, &c., in exchange for Wormald's *Key to Mechanics* or fireworks.—Address, J. R. RIGBY, Howick House, Burscough, Ormskirk.

I will exchange one interior and exterior flatted oil backgrounds, also balustrade and pedestal, for a 5×4 rapid rectilinear lens.—Address, H. MANISTRE, 26, Arlesford-road, Stockwell, S.W.

Will exchange Voigtlander's rapid portrait lens, two inches aperture and six and a half inches equivalent focus, specially constructed for taking children C.D.V. size, for Ross' portable symmetrical lens of six or eight-inch focus.—Address, TATE, Whitehouse, Belfast.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co., 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

Werner & Son, Dublin.—Four photographs of Right Hon. A. J. Balfour.

G. R.—The formula will be found among the "Answers" in this issue.

D. S. T.—Either lens will answer; we are best acquainted with the first on your list.

J. BARNES.—See answer to "E. C. Middleton." No alabastrine solution answers well with ferrotypes.

CHAS. GIBB.—By advertising in the *Photographic Times* and *Anthony's Bulletin*, both of them New York papers, your end will be served.

N. WELLS.—The only way to find out whether the photograph is copyright or not is to consult the register at Stationers' Hall. It is not necessary that a copyright picture be stamped as such.

C. RICHARD (St. Heliers).—The distance at which the universal sharpness would commence, with f-17 would be about forty feet. The portraits enclosed attest the suitability of the lens for such work.

C. B. says: "I recently intensified a number of negatives with bichloride of mercury and ammonia, and they have stained all over. What is the reason?"—Clearly the negatives were not thoroughly washed between the operations.

E. C. MIDDLETON.—A good formula for an alabastrine solution is the following: Saturate four drachms of hydrochloric acid with bichloride of mercury, then add four drachms of nitric acid, the same quantity of alcohol, and six ounces of water.

W. SALTER.—The transparent spots complained of arise from air bubbles sticking to the film during the development of the negative. The mottled appearance is due to the plate not being rocked sufficiently while the negative was being developed.

MORRISON LENCOSCOPE LENS.—Some reader has sent, doubtless at our own request, a defective lens for examination without any accompanying letter. Will he please communicate again, as we do not keep letters for reference when once answered.

R. BROWNING asks our opinion as to which is the best for treating the glass plate with prior to collodionising it in enamelling prints—wax or French chalk.—Either answers perfectly; some prefer one and some the other. The French chalk is the least trouble.

W. CROSS.—Lithographic rollers may be had from any printers' material dealer. The price of a twelve-inch roller is, we think, about 14s. There are two kinds, rough and smooth. The former is best suited for black ink, and the latter for the finer kinds of coloured ink.

B. JUN.—The marks on the prints forwarded are caused by the burnisher. The burnishing bar is evidently badly scratched. The remedy is obvious.

BORE.—1. Mount the pictures with starch paste made very thick, and using no more than is absolutely necessary. If you stick a piece of thin paper on the back of the mount, cockling will be avoided.—2. The Exhibition of the Photographic Society closed on Wednesday last.

A. C. wishes to know the best strength of bath for sensitising paper.—Very much depends upon the amount of chloride with which the paper is salted. Usually from forty-five to sixty grains of nitrate of silver to the ounce of water answers. Those from whom the paper was purchased will say the strength most suitable to employ.

REFLECTOR.—1, 2. Try a large-size reading glass of short focus.—3. Yes, if necessary. Perhaps you had better consult an oculist on the subject.—4. The reflector and arrangement you have is the same as that generally employed. Try the effect of a piece of white paper in place of the mirror. Possibly that may suit your requirements better.

F. BORLING asks us to give him instructions as to how to prepare sheet copper for engraving upon.—This is a long and tedious process for an amateur to undertake. It would take up too much space in this column to describe the method, and, moreover, it has no connexion with photography. Our correspondent will doubtless find it more profitable to purchase the plates ready for use.

INVENTOR.—The mere fact that the specification has been accepted at the Patent Office is no proof that the patent is a valid one. Scores of photographic patents are in existence which would not stand if they were contested in a court of law. Better consult one versed in Patent Law. It is always advisable to avoid litigation if possible. Litigating a patent is always a costly proceeding.

J. J. W. writes: "I have a diagram to copy, and the only lens I have that will take a picture the size required is an old single landscape lens, capable of covering a plate double the size. How can I avoid marginal distortion with it?"—If the lens is of sufficiently long focus to take a picture double the size of that to be produced, the distortion on the smaller plate will be so slight that it may be ignored in practice.

LEO says: "Four years ago I entrusted to the hands of a London artist a picture to enlarge on canvas and paint, for which I paid a good sum. The thing has now faded very much in the white parts. Can I claim back the money?"—Four years appears to be a short time for a picture to fade in, and we imagine that the producer would for his credit's sake do another if the matter is brought to his notice. The question can only be decided legally in a court of law.

A COUNTRY PHOTOGRAPHER complains that he recently sent a very valuable negative to a London firm for enlargement, and they say that it was found broken on its arrival. He asks who is responsible for the damage.—If the negative was properly packed and labelled "glass," the carriers are liable for the damage. Their attention should have been called to the injury at the time the package was delivered. They usually demur to recognising accidents after the lapse of two or three weeks.

NOVICE asks if the collodion sold for enamelling pictures will answer for negatives by the wet process if it were iodised, and, if so, how it should be iodised?—What is known as "enamel collodion" is not suitable for making negatives. As a rule, the solvents used are of too crude a character, and the pyroxyline not of the right character. Furthermore, this collodion often contains castor oil, a very undesirable substance in a negative collodion. If such a collodion were modified and iodised, it would quickly throw the silver bath out of order. Negative collodion must be made with the purest of solvents and with the proper kind of pyroxyline.

BIRMINGHAM.—A correspondent writing from this town who does not wish his name published, else would we give the letter in full, says, *apropos* of photographers keeping specimens of retouchers' and operators' work: "A few weeks ago I sent some beads to —, of Brighton, and I have sent to her several times asking her to return same, but can get no answer. One large bead is a very fine specimen, and I expect she is making use of same, as it has no name on mount. Being the only one I have of it, it is therefore of value to me."—It is really discreditable that any one should be guilty of such an act. We advise our correspondent to write to the Superintendent of Police, stating the circumstances and his suspicions, giving, of course, the full names and addresses. We ourselves have made a note of the name and shall be glad of the full address.

PHOTOGRAPHIC CLUB.—Subject for discussion on Wednesday—*Dark Room Appliances*, preceded by the adjourned annual meeting.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1542. VOL. XXXVI.—NOVEMBER 22, 1889.

PLATE-SHEATHS SUPERSEDED.

By a sheath we here mean a plate of blackened tin, or other thin metal, having its sides bent round so as to permit of a sensitive plate being inserted face out, the body of the tin plate forming such a backing as prevents light from passing through to any other sensitive plate which may be behind it, its lapped-over edges forming a protection to the face when a number are packed closely together. We have used these much during the past season in a hand camera, and have experienced considerable satisfaction in their employment. But since witnessing the extremely simple way which Messrs. Swinden & Earps have adopted of backing such plates with paper, and having subjected the same to a thorough practical trial, we have concluded that for small or hand camera plates the paper envelope possesses such advantages over the metallic sheaths that the latter may fairly be considered as superseded.

The backing of dry plates with opaque paper is so far from being a novelty, that special attention was directed to its employment for this purpose in connexion with an ingenious magazine camera, which was described in this JOURNAL many years ago, a camera in which a floor having a slot in it divided the space into two compartments, the plates stored in the upper compartment being passed, after exposure, through the slot into the lower division. This formed the subject of a patent which has long since expired. In this each plate was protected by a backing of opaque paper, although we then found that a backing of extremely thin zinc answered equally as well. Such zinc backing, with its edges turned on three sides to retain the plate into position, forms the sheath of the period.

What the gentlemen above-named have done is the giving us an exceedingly simple and effective way of applying the paper backing so as to retain all the advantages with none of the drawbacks which attend the employment of the metallic sheath, and we shall here describe it so plainly as to be very clearly understood.

What is wanted is to lay a plate, back down, upon a sheet of ruby or other opaque paper, a trifle larger than the plate in one direction, and then bend up the two opposite edges and cause them to overlap the sensitive surface to the extent, say, of an eighth of an inch, or even a little more. This, with a machine-like rapidity of action, forms the requirement, and we shall now explain how it has been met.

Procure a block of wood larger than the plate by an inch at each side, and of any thickness, as this is immaterial; one that we constructed is one and a half inches thick. Now cut into its upper surface a wide recess, capable of holding a plate in such a manner that when it is laid down flat in it the surface of such plate will be just a trifle lower than the level of the

two sides of the block. In the meantime, a packet of opaque paper must have been prepared for the backing. It is unnecessary that it be strongly sized or too thick, but it must be cut about half an inch larger in one direction of the plate, so as to allow of a quarter of an inch at each side for folding over the face of the plate. The operation of backing the plates is as follows:—Each of the two opposite edges of the paper having been slightly wetted to the extent of a quarter of an inch along the margin, the paper is laid down over the recess cut into the wooden block, and the plate is placed over the paper, sensitive side up. This, of course, leaves the superfluous marginal paper standing up above the level of the plate, and at the opposite sides, to the extent of about an eighth of an inch, and which, being wet, has merely to be bent down and pressed in contact with the gelatinous surface of the plate to ensure its adhesion. The means by which the paper edging is bent down and brought against the margin of the plate are simplicity itself. A flat strip of wood—or, more correctly, two, one at each side for simultaneous use—the length of the plate is provided, and this, in being slid over the face of the block and slightly on to the plate, bends down the paper border, and the slight pressure requisite ensures the contact of paper to glass. The edge of the wooden strip which performs this function has a small strip of rubber, which may be of the thickness of an eighth to a sixteenth of an inch; this ensures a more equal application of the pressure. By glue, pins, or otherwise, a slip is affixed along its outer edge below, to act as a check and prevent it from encroaching too far upon the plate when run in to bend down the paper.

Although it has taken some time to describe this apparatus, it is really very simple, and when everything is in readiness, plates can be backed at the rate of eight per minute; this, at any rate, is the record of the time we took when last using it. The special camera for which we have as yet utilised this system of backing is one of the hand class, originally made for use with sheaths, and in which the plates are dropped through a slit from a reservoir above to a compartment below. There being no patent restriction on its use, so far as we can learn, any one will be free to adopt this method of backing his plates with paper.

NEGLECTED PROCESSES.—METHODS OF PRODUCING NEGATIVES DIRECT FROM NEGATIVES.

From time to time various methods of making negatives direct from negatives at a single operation—that is, without the intervention of a transparency—have been published. The one which has, perhaps, received the most attention is the powder or dusting-on process, which was referred to a few

weeks back. But there are several others by which quite as good results may be obtained. Reproduced negatives, reversed or otherwise, are in constant requisition, and will be still further required as the different photo-mechanical processes become more general. It goes without saying, that in many respects, particularly that of sharpness, the reproduction—by whatever process—ought to be better when it is made from the original at a single operation, without the intervention of a transparency, leaving out of the question altogether the increased trouble involved in making the transparency.

One method of reproducing a negative direct is that by Major Russell's bromide process, or by the collodio-bromide process, for one is as good for the purpose as the other. The plate may be exposed either in the copying camera or by superposition. The image is then developed with an alkaline developer in the usual way, and washed, but not fixed. Of course, the image is a positive one—a transparency. The plate is then treated with nitric acid, which dissolves the positive image, and leaves a negative one behind in bromide of silver. After washing, to remove the acid, the plate is exposed to light, and then developed again as before. By this method exceedingly good reproductions can be made.

Excellent reproductions, either negatives from negatives, or transparencies from transparencies, may be obtained by taking advantage of what is known as the reversing action of light. This property was first discovered by Fox Talbot in the very early days of calotype. That the subject may be better understood, we shall here describe Talbot's discovery.

A sheet of paper was iodised, then sensitised with nitrate of silver, and dried. It was then exposed to light just long enough to cause the paper to blacken if the developer were applied at this stage. The paper was next treated with a solution of iodide of potassium and again dried. If the developer were applied now, the paper would still blacken; but if it were again exposed to light, the developer would have no action, so that the paper would remain white. Consequently, if the paper, after the second iodising, were exposed in the camera, a positive image, instead of a negative one, would result on development.

Many years after Talbot's discovery, Poitevin suggested utilising this principle for taking positives direct in the camera on wet collodion, and the late Mr. Window also suggested its employment in the production of enlargements.

In 1873, Mr. E. W. Foxlee read a paper before the South London Photographic Society on the subject, and showed some capital enlarged negatives made direct from the original ones. His method was as follows: A plate was coated with a lightly bromo-iodised collodion, and sensitised in the ordinary bath. It was then exposed to light, but only sufficiently long to produce fog if the developer were now applied. The plate was next washed and treated with a solution of iodide and bromide of potassium in water; it was then ready for exposure in the enlarging camera. After exposure, the iodiser was washed off and the plate again dipped in the silver bath. The image was then developed with the ordinary iron solution, when an excellent negative resulted, which was afterwards intensified, if required, and fixed in the ordinary manner.

In our volume for 1880, Mr. W. Brooks described a process for producing negatives direct from negatives which gave very good results. Mr. Brooks's method was this: A collodio-bromochloride emulsion plate is exposed behind a negative or in the copying camera. The picture is then developed with alkaline pyro, the result being, of course, a positive image. The plate

is then washed and immersed in an alcoholic solution of iodine until the image entirely disappears and the film looks the same as it did prior to development. After washing the plate, the developer is reapplied, when the original image again makes its appearance, but it quickly reverses and takes the negative form, the positive character quite disappearing as the development is continued.

About the time that Mr. Brooks published his method, Mr. Thomas Bolas described, before the Photographic Society of Great Britain, a very simple method of making reverse negatives, by the inverse action of light, with gelatine plate. The process is this: A gelatine-bromide plate is "sensitised" in a four per cent. solution of bichromate of potash, then rinsed with water, and dried. It is then exposed under a negative in a printing frame until a distinct image is apparent. The plate is now well washed to remove the bichromate, and it is then developed, either with the ferrous oxalate or the ordinary pyro developer, and fixed as usual. This method, beyond its simplicity, has the advantage of economy, inasmuch as almost any foggy plates, or those which may have been "light-struck" answer quite as well as good plates. It may here be mentioned that gelatine plates, without further treatment, will yield a negative image when exposed to a negative if they be very much over-exposed, but the reversing action is not so well under control as when the bichromate bath is employed.

It is somewhat difficult to say why some of the processes above referred to are not utilised in practice, particularly the last described, seeing that they are all capable of yielding good results. It may, perhaps, be that each of them entails a departure from the ordinary methods of working, and photographers do not care to leave their old paths.

AMATEUR DARK-ROOM APPLIANCES.

No. IV.

ANOTHER portable arrangement we have seen in use, and which has for a long time given every satisfaction to its owner and builder, consists of a framework put together precisely after the manner of a folding drawing-room screen, in three sections, and covered with opaque material. When folded so as to form three sides of a square, a top is fixed on by means of thumbscrews at the four corners; and this, assisted by the work table, attached in similar manner midway, braces the structure into a thoroughly rigid affair. The open side is provided with double curtains of suitable material, and the other arrangements are similar to those already described. For purely home use, this has the advantage over the previous arrangement of being more rapidly erected and taken down, and occupies even less space when stowed away; but it is not suited for travelling purposes.

We know many amateurs who, while enjoying the privilege of a special workroom, are compelled to devote it to a variety of purposes not altogether compatible with photography. How many amateur photographers are also amateur mechanics, and have to squeeze into, perhaps, one room, joiners' bench, lathe, circular saw, and what not, and use the room for developing as well? Matters are not so bad now, with gelatine plates; but in the old days of collodion, either wet or dry, such an arrangement would have been absolutely fatal to success, owing to the floating particles of dust of all kinds constantly pervading the atmosphere. Then, again, the nuisance of constantly having to shut out or let in daylight, according to the purpose in hand, condemns the practice on the score of convenience.

In such circumstances the most natural solution of the difficulty consists in partitioning off a portion of the room so as to form a permanent laboratory, borrowing its light from the outer apartment—an arrangement which is and has been in general use for very many years. But to most amateurs the idea of their constructing an inner room savours very much of getting in the builder's men for an indefinite period and enormous cost; but we have seen a perfectly comfortable and roomy dark room of this description which was built by its owner himself in a very few hours, and at the cost of as many shillings.

All that is required is the necessary quantity, according to size, of $2\frac{1}{2} \times 2$ inch "quartering," and a corresponding quantity of paperhangers' canvas. The framework of quartering is mortised together, and reaching right up to the ceiling, can be pushed into close contact by wedging from below, being finally fixed in position by fillets nailed to the floor. The uprights should be just so far apart as to suit the width of the canvas—usually about forty inches—which is next strained as tightly as possible and fixed with tacks an inch apart. Next, the canvas is thoroughly wetted, which causes it to shrink and become literally as "tight as a drum," and also prepares it for the next operation. This consists in pasting smoothly on to the canvas two or three layers of newspaper to form a "foundation" for any ornamental wall-paper, or for a coat of paint. This gives a wonderfully strong yet not bulky wall, and is, as already stated, both cheap and easily constructed. Of course, a door and frame have to be provided, but the door may be constructed in the same manner as the framework, and covered with canvas and paper.

For outdoor purposes, considering all things, it is perhaps better to employ wood or corrugated zinc, though at a pinch a similar construction to the above will answer the purpose. In this case, after attaching the canvas and newspaper to the framework, we should allow the whole to become thoroughly dry, after which we should cover it inside and out with "Willesden" paper, and finally with a coat of paint or tar. To our own knowledge, a house of this kind erected for another purpose some years ago is still perfectly weatherproof, having undergone no further repairs than an occasional "touch up" with paint.

From what we have now said, we think it may be fairly gathered that the amateur, no matter how confined his space, or how limited his means may be, need not condemn himself to a lifelong drudgery in the practice of his hobby, but by the exercise of a little judgment and ingenuity may provide himself with every necessary comfort at a very small cost.

We have many times pointed out the desirability of reproducing photographs of natural phenomena by some photographic process, instead of translating them into engravings, and so making pictures pretty but of questionable scientific value. But at the last meeting of the Royal Astronomical Society a failing in photographic technique in the representation of a variety of tint was unequivocally asserted; also a question arose as to the possibility of reproducing a very beautiful set of drawings of the milky way made by Dr. Boedlicker at the Earl of Rosse's observatory. Incidentally, we may refer to Captain Noble's suggestion that a negative of the drawings (which are dark on a white ground) should be reproduced rather than the drawings themselves, so as to present to the observer the actual appearance seen in the sky. This is a decidedly wise recommendation. Mr. Ranyard stated that with regard to the reproduction of such drawings by photography, Mr. Wesley and he had made several experiments in drawings of coronas and found that the photographic method was not suited for the reproduction of faint gradations of tint. The

Astronomer Royal said he had a few words with Lord Rosse on this subject, and he was inclined to think that nothing short of steel engravings would reproduce them satisfactorily.

Now here is a challenge to the profession. A set of beautiful drawings of astronomical objects have been produced by hand, and it is asserted that photography must be set aside in favour of hand work for the purpose of reproducing them. We should like to hear what some of our professional copyists would have to say on this subject, and our columns are open for any remarks they may have to offer.

APPROPOS of photography and astronomy, it may be noted that at the same meeting there was read a paper by Professor Pritchard on the *Determination of Stellar Parallax by means of Photography*. This paper represents a method of the highest ingenuity of design, originated entirely by Professor Pritchard, and has achieved results entirely photographic, which have been characterised by a well-known writer as being "certainly comparable with the most refined measures hitherto made, whether with the heliometer or micrometer, even if they do not, as is probable, surpass them in accuracy." This is high praise when it is so frequently stated that the drawback to photographs for star measurements is the difficulty in obtaining precise values. The method adopted is to take four plates per night at suitable intervals of time, the exposure having a maximum of five minutes. The negatives, which are made with the De la Rue reflector of thirteen inches aperture and ten feet focal length, are then measured with the De la Rue micrometer, the results having the value above described.

ALL photographers should have a knowledge of chemistry, though we are afraid it is not a common acquirement. It is a subject that cannot be "got up" by reading a book; experiment must accompany the study of the letterpress. For those who are just beginning to study, some help will be decidedly gained by the perusal and examination of a little work just published, in which the usual reactions are given in coloured table, instead of the customary tables of lists of elements and precipitates. These tables show, as nearly as possible, the precipitates in the colours they show, instead of in a series of words describing them; and in so far as the eye is educated rather than the memory, their employment should be a gain.

MOST of our readers have read accounts of the remarkable discovery in this country of a continuous lode of uranium ore, a discovery without a parallel, this metal having been hitherto most sparsely distributed wherever it was found. Its price in consequence was very high—about 20s. per pound. We allude to it here because of the continuous reference in the various newspaper paragraphs (originating, perhaps, in the endeavour to show the *raison d'être* for the inevitable "company") to its use in photography. Hitherto, it is stated, the metal has been used in the manufacture of a beautiful dichroic greenish glass, in producing a black upon porcelain, and in photography. We are not in a position to say what demand there may be for uranium in the two first-named directions, but we must observe that if it bears any analogy to that in photography, the profits from the sale per annum would not be likely to yield more than enough to buy a door-plate for the new company.

PHOTOGRAPHY, according to a foreign scientific journal, is about to be put to a new use in meteorological work. The determination of the temperature of the air at different heights is an important factor in meteorological investigations, and, as our readers may easily imagine, is a difficult problem to undertake, but the following outline of the new method suggests that something feasible has been designed. Herr Siegfels uses a thermometer which, by closure of an electric circuit when certain temperatures are reached, gives a light-signal. Small balloons, each containing such a thermometer, will be sent up at night, and the light will affect photographically a so-called photo-

theodolite, while the height then attained will be indicated in a mechanical way. It is hoped that this new method will enable more exact formulæ for decrease of temperature with height to be obtained.

LANTERN SLIDES ON GELATINE PLATES.

ASSUMING that the emulsion is to be employed at once—*i.e.*, within a day or two of washing—it may, after well draining to free it from as much water as possible, be at once melted up. If the directions previously given have been carefully followed, the bulk of emulsion will now be less than was originally intended, and the quantity must be made up with distilled water. Or it is sometimes an advantage to add a little alcohol in order to make it flow better on the glass, and also to help the rapid drying of the plates; but too large a proportion will cause a tendency to wavy markings in the film, from the mutually repellent nature of the gelatine and alcohol, as the former sets. Perhaps a maximum of six or seven per cent. of the total bulk will prove a safe proportion.

In this condition, especially when the addition of alcohol is made, the emulsion will keep at this time of year for several days without either decomposing or changing very materially in its photographic properties; but if it is impossible to use it up at once, or it is intended to keep it for some time, a little alcohol should be poured on to it after it has set in the bottle. This will protect it from atmospheric influence and preserve it for a considerable period; but when required for use, the alcohol must be poured off and the bottle well rinsed out with cold water before the emulsion is melted.

Considerable diversity of opinion has been expressed on the subject of the temperature the emulsion will bear at the time of coating, as well as the degree of heat that gives it the best flowing properties when coating. My own experience leads me to favour a tolerably high temperature, say about 120°, or even higher. This, so far as I have found, exercises no ill effect on the setting of the gelatine, even if it be melted up two or three times, and does away with the necessity for heating the plates before applying the emulsion, which is absolutely necessary when it is at a lower temperature, and, consequently, more readily brought down to its setting point on contact with the cold glass. At the temperature I have indicated, and the glass at the normal, not ice-cold, the emulsion will flow over the plate almost as easily as collodion, and after a little practice it will be possible to coat a large number of plates without losing a drop.

It will be necessary immediately before coating to filter the emulsion, however carefully that operation may have been performed previously, in order to remove any air bubbles or particles of foreign matter that may have been introduced during washing. The best material I have found for this purpose is fine cambric, made into the form of a bag, and provided with a support of some sort by which it may be suspended from the mouth of a beaker or jar. If two or three strands of fine thread be passed through the apex of the bag, so as to hang to the bottom of the receiving vessel, the emulsion will descend gently, and exhibit no tendency to form fresh bubbles, as is the case when it has to drop from a height.

Many contrivances were in vogue formerly for facilitating coating, in which that operation was carried on simultaneously with the filtration. The simplest of these, and probably the most easily attainable, consisted of the little Japanese teapots with inside strainer, obtainable for about a shilling. A small piece of cambric stretched over the outside of the strainer before placing it in position formed the filter, the emulsion was poured from the spout, and any excess returned to the strainer, so ensuring constant and perfect freedom from dust. The only objection to this arrangement lies in the shortness of the Japanese spout, which renders it difficult to coat large plates, but for lantern slides this trouble does not exist. Special coating pots, in which this defect was remedied, became articles of commerce, and such may, probably, still be picked up at some of the dealers.

The next point is the glass, and in this connexion the question arises of the advisability of coating the plates individually, or of preparing larger sizes and cutting them down to size after drying. I have no hesitation in deciding in favour of individual coating for many reasons. Cut plates are always more liable to frill where the tendency lurks than those in which the emulsion has got hold, as it

were, of the natural edge of the plate in setting. Besides, cutting in the dark room and through the layer of emulsion is never a satisfactory business, even when a good diamond is wielded by an experienced hand. The chances, too, of minute fragments of glass damaging the films is always present, and such defects are of more importance in a lantern plate than in larger sizes. But the amateur, even when he possesses a diamond, rarely has the necessary skill to use it to the best advantage, and rough edges are more than likely to be added to the other troubles. Nothing among the minor faults of lantern slides goes farther towards the production of an unsatisfactory result than rough edges and want of uniformity in size between the slide and cover-glass; the increased difficulty in mounting alone is sufficient to cause exasperation. Hence, I repeat, I strongly urge the use of plates cut to size before coating.

The only objections that can be urged against the practice are the longer time it takes and the chances of imperfect edges. With regard to the first, the little extra time occupied in coating is of no importance to the amateur, and is more than compensated by the superior result and the saving in the trouble of subsequent cutting; while after a little practice in coating there is no excuse whatever for badly covered plates.

Starting on the assumption that cut sizes, whether purchased or cut up at home, are to be used, the first operation is to clean the glass. I would, however, suggest as a preliminary, though not a necessary one, that the edges be slightly ground to take off the sharp edges, which will add greatly to the finish of the slide, and render the task of binding much easier. For this purpose a strip of rag-stone or slip for sharpening acythes answers well, or a small piece of smooth flagstone may be kept for the purpose. I procured such a piece at a stoneyard for a few pence, and used it for years for smoothing the edges of my glass for negatives; but latterly, for such small plates as lantern slides, I have adopted other means. If a grindstone be available, and an assistant to turn it, a number of plates may be treated in a very short time by holding each of the edges in succession at an acute angle with the side of the stone, pressing very lightly for a second or two. In my own practice, I apply the glass in the same manner to the side of an emery wheel revolving at a moderate speed in the lathe. Whatever the means adopted, the pressure must be very gentle, or pieces will be chipped out and the edges made worse than before. If the glass is cut accurately, no attempt need be made to smooth the *square* edge, but merely to slightly round off the corners, and a batch of plates so treated, if stacked together in a block, will present a wonderfully neat and uniform appearance.

After grinding the edges, the plates must be washed singly in warm water with a little washing soda, all dust and grease being carefully rubbed off with the fingers, or a piece of flannel or wash-leather, and, after rinsing under the tap, transferred to a vessel of hot water. When all are so treated, they are dried singly with a soft cotton cloth, the hot water greatly facilitating their rapid drying, and if the cloth be not allowed to get too damp no after polishing will be necessary. If upon breathing on the glass it should appear "smeary," a gentle polish with a perfectly dry linen or old silk handkerchief will complete the process. In all cases the polishing should be done some time before coating, in order to allow any electrical disturbance to subside, when adherent dust particles will be more readily removed. If a greater number of plates than are required at once be cleaned, the surplus ones should be dusted, packed together in contact, and stowed away in a dry place, wrapped in paper.

We now come to the coating, which to the inexperienced may, perhaps, at first present some little difficulty, and possibly some waste of emulsion, though this will soon disappear. What is chiefly required is a methodical system of working rather than any elaborate preparations. A cool room free from dust, a tolerably level table, and a sheet of plate glass, form the only requirements, beyond the coating vessel and another of hot water to keep the emulsion fluid. Place the light in front and at a suitable height to well illuminate the glass when coating, and on the table immediately in front of the operator should be a clean porcelain dish or similar receptacle to catch any emulsion that may escape over the edges of the glass in coating. This may be afterwards scraped up when set and returned to the stock.

Arrange the plate glass in a convenient position, and level it care-

fully and accurately by means of three small wedges applied at the points of a triangle, employing, of course, a spirit level as the guide. The levelling surface must be so placed that the direct light from the lamp or window does not fall on the films while setting, and it will be a further advantage if a light cover, a sheet of stout mill-board for instance, be placed a few inches above the slab for the double purpose of shutting off reflected light and preventing dust settling on the films.

The levelling slab need not be of large dimensions; an area of twelve inches square will comfortably hold half a dozen or even nine lantern plates, and by the time that number are coated, the first will be set and may be removed to the drying box. It is in every way desirable that the plates be placed in the drying box as soon as possible, as there is less risk of either light or dust getting to them there than when exposed in the open room; therefore, there is an advantage in using a small slab necessitating a frequent clearance.

Except with very perfect arrangements it is almost impossible to work sitting; it is much better to dispense with the chair, as it allows greater freedom in stepping from the coating place to the level, which can scarcely be within comfortable reach when sitting down, unless it be in front of the operator and underneath the lamp support. A shallow box with the end knocked out may be used to set the lamp on, and the levelling slab arranged beneath it. This forms, perhaps, the most comfortable arrangement that can be devised at a very little cost.

Before proceeding to coat, wipe the outside of the coating pot if it has been standing in hot water, otherwise some of the adherent water will find its way on to the plate with the emulsion, and cause inequality of film, if nothing worse. Having a stack of clean plates within easy reach, take up the first, pass a broad camel-hair brush once over the surface, and then with the glass balanced on the tips of the fingers of the left hand, pour a good supply of emulsion, sufficient to three-parts cover it, on to the centre. Incline it very gently in the direction of each corner to allow the emulsion to flow right up to the edge without running over, and return a portion to the coating vessel, without attempting to drain closely. Experience alone can educate as to precisely how much emulsion to leave on, but after a few trials the eye and hand will fall into the trick.

If from any reason, such as the emulsion having fallen too low in temperature, it should refuse to run freely, it may be led over the plate with the finger—I have never found any harm arise from using that handiest of instruments for the purpose—and the bulk of emulsion allowed to flow over the spot to equalise it before pouring off the surplus. If by any chance an air bubble should make its appearance, it may be led off to the edge in the same manner, but this is only likely to occur from careless pouring.

In placing the plate on the slab it should be tilted as little as possible—indeed, after pouring off the surplus emulsion, it must be restored to the horizontal position as quickly as possible, and a gentle rocking motion given to level the coating before placing it on the slab. This should be so arranged that the hand can get below its level so as to slide the plate on without any tilt. With but little practice the various manipulations at this stage will become perfectly easy. Proceed in the same manner with succeeding plates, placing each one on the level and pushing the previous one further on until the row is full, and when the slab is fully occupied transfer the lot to the drying box and start afresh, returning the coating pot to its hot water bath in the interval.

With regard to drying it is not my intention to describe any elaborate arrangements, as those who wish to go to the trouble and expense will find numerous such described in past ALMANACS. For amateur purposes all that is wanted is protection from light and dust, and as much air space as possible. An empty packing case, lined inside with paper and provided with a curtain to cover the front, will answer every purpose. If only a few plates have to be dried at once they may be reared on edge round the sides; larger numbers will require some simple form of rack, or, better still, narrow shelves may be nailed round the sides of the box to provide more space, and the surfaces of the plates will then be more freely exposed. In such a chamber, if not too closely packed, the plates will dry in less than twenty-four hours without further assistance.

I had intended to finish my series of articles this week, but have so far overrun my space that I must postpone development, &c., to another.

C. BECKETT LLOYD.

IMPRESSIONS BY A PROVINCIAL.

ONE of your contributors complained a little while ago of the scarcity of exhibitions in his part of the country. Some such reason, added to others of a business nature, caused a brother benedict and myself to find excuse for a short trip to the Metropolis, our object being to examine thoroughly the Exhibition at Pall Mall, with a view to future triumphs; to worship at the shrine of Saint Robinson in Bedford-street, not to mention other saints and shrines in other places; and to try and find out what these naturalistic cranks want to be at.

Our first impression (not altogether mitigated by a second and third view) was one of disappointment at the Pall Mall Show in negatives, printed in platinum or silver (the former mostly), without apparently any thought, in most cases, of their suitability for the one process or the other. Miserably poor, funereal, and gaudy frames stared at us from all sides, while many of the photographs themselves might well have been allowed to remain below "unseen, unhung, and unwept," their places being taken (if the object was to cover the screens) by some charming views from the Society's portfolios; these latter well repaid inspection.

One of the best pictures was undoubtedly Sawyer's *Dangerous Company*. I heard some one criticising unfavourably the "working up" on this; all of it, in my opinion, perfectly justifiable. This person was evidently a "naturalistic;" and here I may say that if the "faddists" above referred to have nothing better to show than, say, No 489, negative by P. H. Emerson, or various whole-plate platinotypes served up "hot," by G. Davison, the sooner they are rusticated the better. Most of them wanted a more liberal application of the trimming knife. But the remembrance of No. 489 is like a nightmare.

The ways and vagaries of Judges are most mostly beyond the comprehension of ordinary individuals. For instance, one could not understand why the beautiful productions of Van der Weyde were undecorated. From several points they were much superior to the "Cologne" artist's. The Autotype Company have obtained a medal, although I failed to discover anything extraordinary about their work other than the size. The man who supplies the negative is seldom thought of.

Mr. Ralph Robinson is a most prolific exhibitor, and shows some excellent landscapes, one of which we thought more deserving of a medal than the *Artists at Home*. We were glad to see McLeish's photograph, *Sympathy*, which we thought a distinct advance on some of his medal work. We wanted particularly to see the portraits, but apart from Mr. Baker's, No. 639, portrait in carbon pastel, those of children by Gunn and Stuart, No. 404, and two charming studies by Mrs. Edward Penton—charming in spite of their miserable frames—we saw nothing extraordinary. To see the best in portraiture, we had to perambulate Bond-street, Regent-street, and Piccadilly.

Strange ideas seem prevalent with regard to mounts. The rush for India-tint plate-impressed mounts is rather overdone, and the photograph is still trimmed to suit the mount, and not the picture. It would be far wiser to fall back on the plain cut-out mount.

The show at the Camera Club was another disappointment—picture speaking, of course; very interesting from the historical point of view. Almost any one of these pictures would be "immense" by itself, but a collection of them! I suppose these "one man shows" are a success, but how wearisome for many of us. Sutcliffe's studies are all worth seeing, a few at a time; but I am glad now that I did not see the collection lately on view. A one man show would be, I believe, more interesting if the work were more diverse in character—landscape, marine, architectural, &c.; and I could mention two or three who could provide such an exhibition, composed of good pictures throughout. I am afraid photographers, as a rule, are dreadful plagiarists, imitating and repeating themselves as often as, and oftener than, their neighbours.

The crush at the lantern demonstration, though very unpleasant, proved the popularity of these entertainments. While at the meeting on Tuesday we were pleased and interested to see, and meet, and rub shoulders, with men whose names are household words with all enthusiastic photographers. And we return to our little town, feeling that the Exhibition just closed, good as it may be, is hardly worthy of our Parent Society, and feeling, I am glad to say, not at all disheartened at the qualities of our own work at home.

D. D.

COLOURED PHOTOGRAPHS.

XIV.

IN our last paper we treated of the making of our sketch, and left it ready, or nearly so, for colouring. It is always an advantage, even when we have a photographic base to work upon, to be able to make a sketch from nature. Indeed, in cases where we are not obliged to

but have a photograph to work upon, this knowledge will be found more than useful. As I before suggested, it will be the artist's knowledge backed by skill that will give the intrinsic and artistic merit to a painted photograph. If three artists of three varied degrees of excellence were to paint three enlargements of the same subject, there would not be the least trouble in classifying them correctly from the results. No sound artist could be overpowered by the presence of a correct and elaborate sketch; then why should he be by a photograph, which I hold would be to him as nothing more or less than such? The trouble might be, and no doubt would, if the photograph were to be on an unfavourable texture, which would be antagonistic to an artistic result. If, for example, we had to paint in oils a portrait of a very forcible face on a very smooth surface, that would not take the colour kindly, we might fail in vigour; but there is no reason why we should be subjected to these disadvantages. With modern improvements, the requirements of an artist can be gratified in every way, whether for water-colour or oils.

Of course, there is a vast difference between painting in water-colours and in oils. Still, many of the principles as regards colour are the same, the difference being more in the treatment. In water-colours the lights in a face, for example, are transparent, while in oil-colours they are opaque. In oils, the transparency (a quality most desirable if not absolutely indispensable) of the shadows is preserved by placing one layer of colour over another, care having been taken to allow the first coat (so to speak) to become thoroughly dry before applying the second, and so on. By this treatment the colours first applied will show slightly through the second layer, and this not only produces transparency, but also secures depth and beauty. Nearly all the colours used in water-colour painting may be said to possess more or less transparency. Chinese white, of course (if I may class it as a colour), does not come under this condition, since it is unmistakably opaque. It is, however, little used in flesh work, so it matters not very much. In working water-colours you will find we must vary our methods of working, as we cannot possibly gain the same effects and results by the same treatment. Needless to say, whether on photographic base or otherwise, water-colours do not adhere to the surface upon which they are used with anything like the firmness of oils. As a consequence, we cannot gain either transparency or depth by washing one colour over another, even when the first washes have had ample time to become perfectly dry. The cause of all this is very simple, if we only reflect a little. The gum which is more or less used in all colours, and which bound, as it were, the first layer of colours, would on the second application become dissolved, and instead of two distinct layers we would have a mixture.

It may, perhaps, be worth while to give an example of this, as the fact is well worth bearing in mind. Now suppose, in oils, we place three coats of colour—blue, red, and yellow respectively (of course, having given number one time to thoroughly dry before passing number two over it, number three following under the same condition)—a compound tint will be the result, which will partake of all the three, the last applied naturally predominating. If we alter the rotation in which we placed the colours, leaving either blue or red to be the last or uppermost, we will still have a compound colour, but the tint will be quite different from that when yellow was the last applied. Now with water-colours the result is altogether different. Suppose we wash the same primaries in the same order; they will not remain, as it were, distinct, but, on the contrary, they will mix and unite, and darkness—I was almost going to say blackness—will be the result. This result, too, is but little altered by the rotation in which we apply the washes.

In order, therefore, to secure anything approaching to the transparency and depth of oil-colours, the water-colour artist is necessitated to use the somewhat tedious alternative of stippling or hatching the several colours separately, in their purity, and so produce the compound tint. It will be found that the primitive colours applied in this manner will always be more brilliant and effective than the same colours if previously mixed into tints and then applied.

Many of our greatest artists and best colourists preferred working these three colours in their purity rather than by compounding their tints. If I mistake not, Sir Joshua Reynolds and also Hogarth were in the habit of working in this manner. The great Rubens, too, advocates this principle. He is reported to have said, when instructing his pupils, "Paint your lights white; place next to that yellow, then red, using dark red as it passes into the shadow; then with a brush dipped in cool grey pass gently over the whole, till they are tempered and sweetened to the tone you wish." Of course, these remarks by the great master were made in application to oil-painting, but the principle is applicable to all colouring, and will be seen to apply to water-colouring as we go along.

To stipple is to apply the colour to the part to be painted by means

of a number of more or less fine dots, with the point of the brush. Hatching is to gain the same effects, but by a series of lines instead of points. Stippling may be said to be almost always the same, varying almost only in its degree of fineness. Hatching, on the contrary, is a much more varied style of work, probably nine out of every ten artists having their own particular and peculiar methods, and all good. I will try to describe what I think may be considered as a fair sample of this class of work.

First, we must start by working over the portion of the face to be covered with colour by means of a series of strokes, short, wide, regular, and somewhat horizontal. These should be worked in rows from the top downwards, and should be put on with a certain degree of firmness. Care should be taken to avoid having little blotches of colour at the end of each or any of the strokes, and they should (the strokes, not the blotches) run, as much as possible, in the same direction as the natural fibres of the skin. As a result of observation, we will find this to be, more or less, horizontal on the forehead, perpendicular on the nose, and round the eyes, mouth, and general contour of the face, circular. Naturally taste and judgment must considerably temper this treatment.

As I said, care must be taken to avoid the little blotches likely to form at the ends of the strokes, and which are sure to bother, as well as mar, the work of the beginner. In order to avoid these blemishes I would advise using the colour rather dry, and not carry too much in the brush at a time. It is wise, also, to press firmly on the brush at the beginning of the stroke, and becoming lighter as we get to the end, and not fall into the error of beginning lightly and developing courage and firmness as we get to the end. It may appear very foolish to do the latter, but I assure you it is much more easily done than appears at first sight. When we have successfully hatched the strokes firmly and evenly one way, we must now cross them with the same crisp, firm, and even touch, taking care never to cross them at right angles, or with strokes that are too oblique. This done successfully, a very light and mellow effect will be produced.

All hatching should be comparatively open, but not to a very remarkable extent. All shadows worked in this way will possess great depth and brilliancy, giving the spectator the idea that he can almost look into them as it were. Now, this is an effect that never can be gained by any number of so-called flat washes of colour.

There is one rule in water-colour painting which should be kept constantly before the student's eyes, and that is that the first colours to be used should be bright and pure; because, however much they may appear out of place, they can always be lowered to the desired tone afterwards. If, on the contrary, their brightness and purity be once sullied by thoughtless admixture with other colours, it will be found impossible to ever restore these most essential qualities. There are no qualities which impart such style and beauty to a picture as purity and brightness, nothing that can compensate for their absence.

To any one intending seriously to take up portrait painting, I would recommend a thorough study of light and shade. There are few, if any, things in nature which offer such endless studies of light and shade as the human face. Its varieties are exhaustless, and should claim our very best attention. If the human face were a flat surface, without either projections or depressions, one uniform flat tint or wash of flesh colour would prove all that was necessary in painting a more or less faithful representation of it. But it is not so; there are numerous little delicate undulations and markings which must all be secured and adequately treated, or else a meritorious portrait will never result. Indeed, the gradations of light and shade on some faces are almost innumerable. These are no end of trouble to the would-be artist, but to the really capable one they are sources of enjoyment, for he thoroughly appreciates their value and importance. For the study of light and shade, I would advise the student to have a white plaster cast, and keep it always handy when working as a kind of reference. I recommend a plain white bust for the study of light and shade, because it will be best understood when uninfluenced by the presence of colour. This study of light and shade is of such importance, that I do not think any student fit to proceed with the colouring until he has thoroughly mastered it.

Light and shade are the two great means used by nature to effectively relieve one object from another. If we observe closely the objects round about us, we will find everywhere that light is opposed to dark, and dark to light.

All objects in the open air will be found to throw shadows of considerably less force than those indoors; this is the result of the former being lighted more broadly. They have the reflection of the sky and also of the surrounding objects to aid them, while within doors the light is necessarily limited, and the reflections consequently less apparent.

It will be observed that the real colour of the majority of objects is most discernible in their middle tints. Strong colours are best adapted to the parts nearest to the eye; receding objects are proportionately fainter in colour than those nearer to the eye. Lights are very considerably less influenced by distance than are shadows, the latter growing paler as the distance increases. It will be remarked that the highest lights possess but very little colour; the deepest shadows absolutely none.

It must be remembered that all retiring parts partake somewhat of a greyish tone. Strong shadows should, in almost all cases, be *warm*: those of the flesh always inclining to *red*. All shadows of flesh must have *grey* edges, which naturally lends great richness, and at the same time does away with the hardness that would otherwise exist. All reflected lights of flesh will be found warmer than the neighbouring parts. The darkest parts of deep shadows will be found near their edges, the centre being relieved by the fact that it is lighted somewhat by reflected light.

The next stage is to prepare for active operations by placing the colours upon your palette. It is usual to set a palette when about to start *flesh* painting. For this purpose place the following colours in your palette, the lightest being near your thumb:—Indian yellow, Venetian red, vermilion, pink madder, brown madder, Indian red, Vandyke brown, cobalt blue, and sepia.

I only mention these as a most likely lot of colours, and ones by the use of which all flesh tints can be obtained. I do not at all wish to suggest that really good flesh tints cannot be made from the combinations of other reds, blues, and yellows. I may here say that almost every artist has his own special idea about colours, and makes up his palette accordingly. Many artists use colours of what we term a *low tone*, such, for example, as yellow ochre, indigo, light red, pink madder; while others fly to the other extreme and employ more brilliant and showy pigments, and never take into calculation the fact of their lack of durability. I need not say that this is not only a mistake, but a pity as well; for the work produced may be very good indeed, but in the lapse of time will not be fit to look at, and thus a work of art will become gradually useless.

Some artists use the colours *pure*, while others mix different *tints*, such as Indian yellow and Venetian red for the flesh colour; pink madder and vermilion for what we call the *carminations*; brown madder and pink madder for the strong markings of the lips and nostrils, and Indian red and blue for the shadow colour; blue and yellow for the green tints or greys, and all of which can be mixed when required for use. A small palette is best for this work, and it will be found an advantage to set apart one specially for this purpose. When using it, always keep a portion (say the centre of it) perfectly clean for mixing the various tints. Much of the success of a picture depends upon the fact of your keeping all your flesh colours bright and clean.

REDMOND BARRETT.

PERIPATETIC LANTERNISTS.

ADVERTISING transparencies are now to be seen on tops of houses, or inserted in the place of windows, in many of the principal thoroughfares of London, and the interest they create is evidenced by the number of people who stop to witness the succession of displayed and pictorial trade, theatrical, and other announcements. It has been left to the ingenuity of some one to further develop the idea by getting over the difficulty of finding suitable premises where people most do congregate by arranging a *travelling* exhibition.

From an advertising point of view the idea is good; and, although the instance I have in mind was only on a small scale, and without much "art" in it, there is no reason why a capital commercial speculation should not result from it, with care and attention given to details.

While strolling home one evening down a busy thoroughfare, full of fine shops (which are always an attraction to persons living in the suburbs of London), I came on a large crowd of people at the corner of a street running out of the main thoroughfare, and having previously seen the position occupied by a Punch and Judy show, thought it was a repetition of this ever-popular entertainment; to my surprise it was a magic-lantern display. I was naturally curious, and found, after waiting a little while, that a number of advertisements where projected on a transparent screen fitted into the back of a small hooded cart—the disc being about six feet in diameter. Judging by the light, the lantern employed was one with a three or four-wick paraffin lamp. Besides the advertisements, a series of comic slipping slides were shown for the amusement of the juveniles, and, possibly, the children of larger growth.

Here is a chance for the photographer who has not enough to employ his time, or sufficient business in the orthodox line "to fill his

coffers," to take up; but it should be done in a good style, and pictures, not daubs, shown in between the advertisements. While there are Pears', Beecham's, Cadbury's, and a hundred others only too anxious to outvie his competitor in his own particular line, there should be no difficulty in getting fees sufficient to pay all working expenses and show a profit, besides the opportunity it will afford the photographer (and manipulator of the apparatus) of making their whereabouts known to an extensive circle of possible customers. With compressed gas in cylinders, and a magic lantern having short-focus lenses, a capital result could be obtained in a hooded *van*, such as used in many trades (viz., millers, carmen, brewers, &c.), and which, no doubt, could be hired reasonably, by fixing a eight or nine-foot screen in the end in such a way that the hood afforded a little shade in case of any accidental side glare. The light of about 400 candle-power, thus produced by making the lime incandescent, would be equal, when passed through the condensers and projected on the disc, to over 2000 candle-power, and fully capable of withstanding a moderate amount of street illumination. To get the best effect and greatest transparency, the slides should be produced by the wet process; and preference should be given to bills having strong contrasts, or pictures of a bold character, having either transparent colours or photographs with high lights and deep shadows. The pictures should be produced as large as the condensing lens will cover, so that the objective has not so much to do to magnify them to the necessary size. For instance, if a four-inch condenser is used, the circular mat should be three and a half inches in diameter. In copying coloured posters care must be taken to neutralise those colours that photograph black, such as red, and otherwise, to get the glass positive as transparent as possible.

As it is generally admitted "that you must advertise if you want to be known," I think the idea here enlarged on should be a practical means to that end; and, if done in good style, need not be *infra dig*.

G. R. BAKER.

DETECTIVE CAMERAS.

THIS year has been marked by the rapidity with which the adoption and use of detective cameras has proceeded, and as it is probable that next year will see a still farther increase in the use of this most convenient form of camera, perhaps a little sketch to show what has been done in the manufacturing line to render the instrument as perfect as possible, and to point out in what direction we are to look for improvement, will prove of value.

I am referring not to those all but useless dodges which are hidden away under one's clothing with a lens poking out of a button hole, but to the really serviceable kind intended for producing pictures for enlargement or for lantern work.

The name "detective" has been given to this class of camera, I know not why, for I have never yet heard of a detective using one, or of any photographs taken with one being used as evidence in a police court, but it seems likely to remain, though for my own part I should be glad to see it replaced by the term *hand* camera.

A hand camera is primarily intended to take advantage of the rapidity of gelatine plates and the perfect state of rapid shutters, and to do away with the use of an awkward tripod and focussing cloth. This most important step taken, the remaining parts—for small sizes at least—can be enclosed in a box, thus no time is lost in racking out for focussing, and unscrewing this and screwing up that when an object presents itself. If very rapid work is attempted all is ready before the object comes within range, and it is only necessary to present and release the shutter.

The advantage of this arrangement is very obvious, and many results may be obtained which are quite out of the question with tripod and focussing cloth; for instance, I have a little picture which I entitle *A Warning to Young Ladies*—a stout young "cleric" seated on a camp stool, with ample coat tails falling behind, and reposing in folds on the deck—for the view was taken on a steamer—is chatting lightly with a damsel in a white well-fitting dress. The day being hot and sunny a sunshade casts an acceptable shadow over both, and their heads are close together; in fact, a mild flirtation is proceeding, and though I have obtained only a back view, it is most characteristic. Now imagine a gentleman on a well-filled steamer fixing up a tripod and camera and pointing it deliberately at the back of such a couple, it is highly probable that while his head was under the focussing cloth he might imagine that a thunderstorm had come on. But to become serious once more, I was staying this year at Southport which is some little distance from Liverpool, and in two visits to the latter place I managed to get a series of views of the docks, &c. which would have been—if not impracticable—very difficult to obtain with an ordinary camera; in fact, I believe an order would have been

necessary for photographing many of the docks. Again, in each of my two visits to Liverpool I was most fortunate in finding one of the two new Inman Line steamers of over 10,000 tons anchored in the Mersey—first, the *City of Paris*, and, second, the *City of New York*—of which I obtained good shots from the ferry boats.

Hand cameras are, I believe, made in many sizes larger than quarter-plate, but I am inclined to advocate this as the most convenient size; for most shots will bear enlargement up to 12 in. \times 10 in., and really sharp negatives to considerably more; and as many photographers (amateurs at least) go in for lantern work, reasonable-sized pictures are obtained for printing, and a convenient size for direct lantern-slide making. Now, starting on the basis of quarter-plate, let us consider what are the chief requirements for general work.

Lenses.—We will start with the subject of lenses, which is all important; without a good lens first-class results cannot be obtained. Mr. Traill Taylor has entered into the subject of the best class of lens for this purpose very fully in a paper read before the late Convention and published in this paper, so in view of this we will at once recommend the rapid rectilinear type to those who can afford it, and the single non-achromatic lens to those who require a cheap form, cautioning users of the latter to note that the focus as obtained on ground glass is not the chemical focus, and that it is necessary to shift the plate about one-thirtieth of the total focal distance nearer to the lens; this is of no consequence when the focussing is done by the use of a graduated scale marked with distances. The next point to be considered is what the focal length of the lens should be. Some recommend the use of a wide-angle or short-focus lens, and others the reverse, i.e., long-focus lenses; but it must be borne in mind that with a wide-angle the size of the object diminishes with great rapidity as the distance increases, and it is, therefore, necessary to be very close to the object if it is to be of moderate size on the plate and is not of large dimensions. The exaggerated perspective given by this class of lens is great, so that the idea of the distance of an object is very erroneous. But there is one point of advantage that it has over long-focus lenses; it is that the depth of focus is considerable, and therefore practically no focussing is required. The longer the focus of the lens the larger is an object at a given distance rendered on the plate, but the depth of focus diminishes with the length, and though the object be sharply focussed the distance is blurred, unless the lens is considerably stopped down; but I think that in some cases the blurring of the distance is of advantage, as it gives an idea of solidity to the main subject of the picture. As focussing by distance is not difficult in this kind of camera after a little practice, I am of opinion that, for general use, a lens of less than five inches focus should not be used on a quarter-plate, and no advantage is gained by employing one of more than seven inches focus.

Now, as we see that under certain conditions a wide-angle lens is of value, and under other conditions a long-focus lens is necessary, why not combine the two desirable qualities in one lens? It would be a very simple matter to make the front combination of a doublet lens moveable, and then by shifting this with a small lever the back combination will serve as a lens of double focus, so that if our doublet lens is of three inches focus the back combination alone is of six inches focus.

As to stops, more than three are unnecessary, beyond full aperture the ratios being as one is to four. With a rectilinear type the iris diaphragm should be used, as it adds but little to the first cost, and is of incalculable value when rapid adjustment is necessary, the movement of the end of a little lever along a scale attached to the outside of the box completing the adjustment. With the shifting combination lens described above, two scales for the iris diaphragm would be necessary.

Shutters.—The question of shutters most undoubtedly comes second in importance. First, the shutter should be adjustable for speed. I have lately seen a hand camera which has a shutter fitted which is not adjustable, and works at about one-fiftieth of a second; the full aperture of the lens is $f/16$, and three more stops are provided. Now, for an open landscape, in bright sunshine, at the best time of the year, with plates of fifty times—oh, how indefinite!—to get out detail thoroughly satisfactorily I do not find one-fiftieth of a second, with an aperture of $f/11.2$, too much. Now, how is my friend to get satisfactory results with his arrangement? I need hardly say that he does not. It is so easy to make a shutter adjustable within limits by a friction brake or an air brake, or by increasing or decreasing the tension of the motive spring while it is under course of construction, that I am surprised that every shutter has not the necessary means attached. With hand cameras it is not necessary to consider the portability of a shutter, as there is always ample room somewhere inside the box to dispose of it, and thus, as long as it is serviceable, it does not matter if it is clumsy.

The shutter must not kick with rapid exposures, for a double image will certainly result if this is the case; therefore, the opening and closing of the shutter should be completed before its motion is impeded. My shutter is a curved strip of thin sheet metal with a hole through the middle, equal in size to the full aperture of the lens. This passes between the two lenses through two slots in the mount a little in front of the iris diaphragm; it is worked with a small annular spring, and an air brake gives the means of adjusting the speed. The cap for regulating the admission of the air passes through the bottom of the box, where a small scale indicates the different speeds. I can work it at speeds varying from one-eightieth of a second to one second, and if time exposures are required it can be stopped half way. Now this shutter is all that can be desired, the only possible objection that can be found with it is its size; but this, as I have shown, is of no consequence in the class of camera under consideration.

The release button or pin should be placed in such a position that a finger of the hand holding the box naturally falls upon it, and it should not be stiff or awkward in use, for there is every chance of moving the camera if a sudden movement or jerk is necessary.

The plate-holding arrangements are very numerous, and frequently form subject-matter for patents. The most convenient is, of course, the roller holder and flexible film, as to change the surface it is merely necessary to turn a little key outside the box. But as we have not yet obtained a perfect flexible negative film, the greater number of hand-camera users are content—nay, prefer to use ordinary glass plates; and I think, notwithstanding that many ingenious dodges have been installed which are supposed to be preferable to the old double darks, that the double darks still hold their own. Of course, the double darks for holding celluloid films are much thinner than those for glass, and are very much lighter, so that a greater number of plates may be carried weight for weight and size for size; but it is sometimes of considerable disadvantage, in point of extravagance, to have a number of plates at hand, for the most experienced photographer will often become careless as to what he exposes his plates upon if he knows that he has a large number to fall back upon. If celluloid films are to be used, I would suggest that instead of cramming a large number of holders into the space which would hold six glass-plate double darks, that the space be reduced to accommodate only six holders, and the whole camera made more compact.

The methods of focussing are numerous: the lens is sometimes moved, more often the plate is moved, and in some cases the box is made telescopic, so that both lens and plate are moved. Of these I favour the telescopic device, for with both of the other plans it is necessary that the box be made sufficiently long to allow of a movement inside of the adjustable part of at least two inches when a five-inch lens is employed, and when closed the telescopic box is therefore two inches shorter than the others.

The gain in portability by the use of this arrangement, combined with the three-inch shifting combination lens, is apparent. The focussing should be done always by using a scale marked with the focus of an object at various distances; this may seem, perhaps, to a novice a very uncertain method, but one can with very little practice focus accurately by distance. This is due to the fact that an error of one or two feet, in judging a distance of eight or ten yards, would mean shifting the plate with a five-inch focus lens less than one-one-hundredth of an inch. It will be found of no gain to focus by sight if the scale is accurately divided, and it is very awkward looking through an opening at the back of the box, and having to remove the double darks which are usually stored at the back of the box; perhaps it might be advisable to have such an opening in case it is necessary to take an object two or three feet distant, for then a slight error in judgment will be of importance.

Finders.—Many users of hand cameras deery the value of these, but, after some practice, I will pose as their staunch supporter. It is all very well to say that one can tell how much is taken in on the plate when the camera is pointed at a certain object; yes, nothing is easier when one has only to consider the breadth of the picture, but height is an entirely different matter—the necessary inclination is always varying. For example, I am taking a noble elm with a group of cattle resting in its shade: it is first necessary to determine the distance I must be away to get the whole in; this is by no means easy, as the height of trees varies considerably. Then, while feeling a little uncertain whether the distance is right or no, I have to determine the inclination. What wonder, then, that on developing I find that the cows have no legs! Now a glance at the finder settles the whole matter, leaving no room for uncertainty. It is to the finder that we owe the certainty of our results turning out pictures. Have finders by all means, but let them be such that the picture is clear and sharp, and that it gives a correct idea of what is on the plate.

I have lately seen two finders—one for vertical and the other for

horizontal pictures—carefully fixed to a hand camera that have the reflecting mirrors inclined at 30° to the ground glass, and a most remarkably poor lens. Puzzle—find the picture! If our friends who are independent of finders have their experience of finders limited to such as these, I sympathise with them. Really good ones can be had for 2s. or 2s. 6d.

It is sometimes necessary to use a tripod for time exposures, and then one which folds up as a walking stick will be found very convenient, but for general work it is as well to be independent of it, for it is quite possible to hold the camera steady for half a second. I have one or two sharp negatives taken with this speed. One-fifth of a second makes work a little more comfortable, and with one-tenth of a second one may depend upon sharp results without much care being taken in steadying.

To obtain secrecy, many ingenious dodges have been adopted, and I think this is perhaps a point best left to the user; but I have found that a box merely painted dead black has been the object of remarkably little observation, far less than I expected. I would remind new hands that it is not merely the device adopted that gives security, but also that the manner of the operator must be above suspicion. If a man with a picnic basket tucked under his arm is found sneaking about in a suspicious manner in a crowd assembled to witness a Royal procession, dodging first this way and then that, and looking in a most unguarded manner every moment at his finder, it will not be surprising if he is quietly touched on the shoulder by an unobserved but observant policeman, and requested to "walk this way." W. P. ADAMS.

SOME MEMORIALS OF DAGUERRE.

[A Communication to the Glasgow Photographic Association.]

In bringing before you this evening a few photographic illustrations connected with the later years of Daguerre's life, I have first of all to acknowledge the extreme courtesy and kindness of M. Davanne, president of the French Photographic Society, in presenting me with these interesting reminiscences of the illustrious Frenchman.

Daguerre, as all the world knows, was by profession a scenic artist. For one theatre especially, *L'Ambigu Comique*, he painted several important scenes, but his fame was more permanently established by the painting of those pictures which have received the name of dioramic, where, by different arrangements of light and shade, and by viewing the picture first by reflected and afterwards by transmitted light, various effects are rendered. To enumerate all the pictures Daguerre produced in this way would be to exceed the limits of the present communication, but it may be sufficient for our purpose to refer to the delineation of the Goldau Valley in Switzerland, where, early in the present century, a severe landslide took place, the appearance of the valley, both before and after the catastrophe, being shown to the spectator. Another famous effect was that of Holyrood Chapel; this picture earned for Daguerre the cross of the *Légion d'honneur* in 1824. His last work was the *Temple of Solomon*, and this was produced in 1839. In connexion with these dioramic effects Daguerre had associated himself with another artist of the name of Bouton. The diorama was first opened to the public on July 11, 1822, and continued to be one of the sights of Paris down to the year 1839, when, on March 3 of that year, the whole of the series of paintings were destroyed by fire. Daguerre did not attempt to reproduce any more of these dioramic representations, having been engaged in the securing his light-drawn pictures; with what success we are all acquainted.

The photographic print which I now pass round shows, perhaps, the only remains of Daguerre's handiwork to be found in France. If you were asked, What does that picture represent? the answer would be, The interior of some large cathedral. But it is nothing more or less than a painting. The circumstances under which it was painted are something like the following:—Daguerre, after he had received the annual pension of 6000 francs decreed to him by the French Government for his discovery of Daguerreotype, removed from Paris and settled down in the retired village of Bry-sur-Marne. Here he built a villa, where he spent the remainder of his days with his wife and niece. He married an English lady, Louisa Arrowsmith. The house itself was pulled down in 1870, having been acquired by a religious body. The only thing remaining as in existence in Daguerre's time is the handsome gateway erected by himself. This you will see a picture of by-and-by. Returning to the church picture: it seems the parish church at Bry terminated very abruptly almost immediately behind the high altar. By the expedient of painting on canvas an interior such as you see depicted, Daguerre increased the apparent size of the building; indeed, it may be said he more than doubled it. In making the connexion between the real building and the artificial one, Daguerre first drew in very high relief, on either side of the wall

behind the altar, a stone column. On one was painted a gilt picture frame with no picture in it; on the other a frame was shown with a representation of the Virgin. On each pillar a bouquet of roses was delineated, and from the arch above a crucifix was made to appear as if it had been duly suspended. All this formed, as it were, a starting-point—a sort of framework for the illusory nave, which filled up the centre of the canvas. M. Balagny, who photographed the picture, describes the illusion as most complete, and if the altar were not there to bar further progress, visitors would wish to penetrate to the nave beyond. It is to be noted that the effect described is to be seen from any part of the church. Daguerre, in painting, was careful enough to see that it should be so. His invariable habit, after almost every stroke of the brush, was to retire to the various parts of the church to see the effect produced.

The next picture which I wish to bring under your notice is, as you will see, a representation of a kind of grotto. This was an arrangement erected on the grounds of Daguerre's friend, Baron Louis de Bigny. In 1848, during one of those revolutionary periods to which France seems to be periodically subject, the inhabitants of Bry-sur-Marne were in somewhat sore straits: many of the villagers were employed in the park of Bigny, under Daguerre's superintendence, in making a sort of miniature Switzerland. The photograph gives a very good idea of what the nature of the work would be. It is somewhat theatrical in effect, this grotto, but I have no doubt it will form a cool retreat on a hot summer's day.

We have already referred to the fact that Daguerre's house is no longer in existence, but, as also noted, the gateway to the house remains. In the print now sent round you have this gateway shown, while on the right of the picture is seen the small parish church of Bry-sur-Marne.

The remaining photograph connected with Daguerre and Bry-sur-Marne represents Daguerre's tombstone. It is a plain, square stone (presumably of granite), having a medallion of Daguerre carved on the side—represented in the picture. This was the work of M. Hussion, and is said to be a faithful likeness. The inscription underneath the head reads as follows:—

"À.

DAGUERRE,

ARTISTE, PEINTRE, CHIMISTE.

L'INVENTEUR DE LA PHOTOGRAPHIE.

LA SOCIÉTÉ LIBRE DES BEAUX-ARTS.

1852."

From which it will be seen that this commemorative stone has been erected by the Society of Fine Arts, of which Daguerre was a member. The other sides of the stone have also inscriptions: one, "Sciences, Beaux-Arts;" another, "Diorama-Daguerreotype;" and the remaining, "Le Consul Municipal de Bry à Louis Jacques Mandé Daguerre, né à Cormeilles en Paris le 18 Nov., 1787; décédé à Bry le 10 Juillet, 1851."

We now leave Bry-sur-Marne to turn to Cormeilles, a town which has the honour of being the birthplace of Daguerre. A very handsome monument was erected to the memory of Daguerre in the year 1853, on a small square opposite the house where he was born. The funds were provided by those interested in photography in the various countries of the civilised world. It is a pedestal some six or seven feet in height, and is surmounted by a bust in bronze, the work of the sculptor Capellaro. The print I now pass round shows this handsome memorial. The inscription is much the same as on the tombstone at Bry-sur-Marne, giving the facts of Daguerre's birth and death; while at the foot of the pedestal we find the inscription, "Souscription Internationale, 1853." It only remains to be added that the inauguration took place on Sunday, August 26, 1853, and the two prints shown are from negatives taken on that day, an interesting record of an interesting ceremony. "They manage these things better in France," is a saying we often have quoted, and I think in the matter of erecting memorials to their illustrious men we could borrow a leaf from the book of our Gallie friends. When are we to see monuments erected in this country to men such as Talbot, Ponton, and others, who have done as much towards the solution of the problems involved in photography as either a Daguerre or a Niepce?

Speaking of the latter brings me now to the end of my communication, and in connexion therewith I have only to place before you two very interesting prints, viz., the scene that took place at the inauguration of Niepce's statue at Chalon-sur-Saône. This event was celebrated on the 22nd of June, 1855. The artist who designed the statue was M. Guillaume, and the casting in bronze was from the famous workshop of Barbadienne, in Paris. For these interesting memorials I also am indebted to M. Davanne, and I

think I cannot do better, by way of conclusion, than ask you to record a vote of hearty thanks to that gentleman for the favours conferred.

I have reproduced all the various prints as lantern slides, so we will have the lights turned down, and we will be able to see at one and the same time each particular subject.

WILLIAM LANG, JUN., F.C.S.

AN EPISODE.

TIME—AFTERNOON TEA.

By an Amateur.

Florence Ayebecce.—Oh, mamma, that nice Mr. Chocum has taken four lovely views of the church for our bazaar next month!

Mrs. A.—I forget, Florrie, what your next bazaar is for.

Florence.—The stray pigeons' home, mamma.

Georgie.—Pa says its humbug! He says pigeons are 'ticed there, and shut up till they forget where they belong, and then they stay there.

Mrs. A.—Rude boy!

Florence.—And, ma, he says he will give as many copies as can be sold, and a set to each of the stall keepers. They are two insides and two outsides—and so large!

A parrot.—He's a fool! Polly wants a cake!

Florence.—And, ma, he asked me when I had my last portrait taken; and said he would take me and Georgie also; and he would be glad to see you with us whenever you would call. He said he had a beautiful place in his drawing-room, with the light as good as a photographer's studio.

Mrs. A.—It is very good of him; but, Florrie, portraits by amateur gentlemen are seldom so smooth and bright as the regular people's.

Florence.—I asked him about this, and he said he should send the glasses to a person who got a living by making them smooth. He called it retouching.

Parrot.—He's a fool! Polly wants a cake!

Georgie.—I shall be smoking a cigarette. I shall.

Mrs. A.—Be quiet, sir! You will do nothing of the kind. You will sit still, and wear your new necktie.

Florence.—I told him, mamma, I was ashamed to have all these, as they must cost him so much; but he said I was mistaken—photography scarcely cost anything. He said less than a doctor's lotions and mixtures.

Mrs. A.—Then what a shame; that man Reeton charged me 15s a dozen for the last cabinets I had, and seemed to think it hard to take me a third time for a decent expression!

Florence.—But they are very nice, mamma.

Mrs. A.—Perhaps so; but no more Mr. Reeton for me!

Florence.—Mr. Chocum offered to take the curate to sell at the bazaar, but the vicar heard of it, and said he hoped Brightman was not such a simpleton as to let him.

Mrs. A.—By the way, Florrie, keep all mention of this from your pa. Some one has told him that amateurs ruin professional photographers' and he disapproves of it.

Parrot.—Polly says ditto! Polly wants a cake!

Georgie.—Pa says Mr. Chocum's a jackanapes!

Mrs. A.—You rude boy!

Georgie.—He says six hundred a year made a fool of him! If he had to work for a living he would do less harm to other people!

Enter Mr. A.—Eh? What?

FINALE.

Foreign Notes and News.

The Photographic Society of Amsterdam very praiseworthy appears to consider it part of its functions not only to stimulate and diffuse interest in photography by means of meetings and discussions, but from time to time institutes competitions and distributes prizes. Last spring it offered four silver medals as prizes for the best Dutch landscape, the best foreign landscape, the best instantaneous view, and the best detective camera photograph respectively. The competitors were to send in their specimens by October 15. This was duly accomplished, and Messrs. Bakhuis, Lentz, Beduin, and Bloemendaal, emerged from the criticism of the jury as prize-winners.

Luz, the very appropriate name of the official organ of the above-named Society, further informs us, with some show of satisfaction, that Loman's

reflex camera is gradually making more and more way in Germany. As it is one of the most perfect models of a hand camera in the market, this is not much to be wondered at, and we shall very probably before long become pretty familiar with it in this country as well.

It will be of interest to readers of the JOURNAL to learn that at the last meeting of the Society for the Promotion of Photography in Berlin, a special resolution was put and carried, on the motion of Herr Jahr, that THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1888-1889 should be added to the library of the Society, and that it should be taken regularly every year in future.

THE dark chamber glass difficulty has been making itself felt in Potsdam as elsewhere, Dr. Miethe declaring that he has been unable to discover any fit for use throughout the length and breadth of that town. After a spectroscopic examination of the different kinds he was obliged to throw them all away. For his dark chamber, which he also uses for preparing and drying emulsions, he employs a light placed behind a sheet of white paper over which is stretched cherry-coloured and canary-coloured chagrin paper. "This," says Dr. Miethe, "gives a perfectly safe light—so safe that dry plates may be exposed to it for an hour without clouding!"

PICKERING'S caricatures, obtained by means of crossed slits, appear to owe their origin to a French discoverer, Ducos du Hauron, who first described the phenomenon and showed that as the front slit was horizontal or vertical, a broadened or lengthened-out image was obtained.

FROM Herr Vogel's recent researches it would appear that Gädick's monochromatic soda flash light acts very well with ordinary plates, but does not give good results with orthochromatic plates.

CAPTAIN MENSINO, who is a member of the committee of the Society of Friends of Photography, has been invited to attend the International Navigation Congress at Washington.

THE well-known firm of dry-plate manufacturers, E. Kaders, in Dresden made October 26 last an occasion of merriment and rejoicing, which was probably not unaccompanied by the internal administration of alcohol not in the form of an emulsion. On that day namely they despatched their fifty-thousandth case of plates since their establishment in 1867. Our readers will doubtless join in the wish that their future may be as prosperous as their past has been.

W. CRONENBERG gives the following recipe for a gold bath for Aristo paper, which the Editor of the *Wochenblatt* says he has found to give very fine deep tones:—

A.	
Distilled water	600
Ammonium rhodanate	27.5
Phosphate of soda	30

B.	
Chloride of gold (doubly crystallised)	1
Distilled water	100

Both solutions must be allowed to stand for a day and a half. Before using, add fifteen parts of B to one hundred of A. Let it stand for an hour and then use.

Our Editorial Table.

DIE PHOTOGRAPHIE MIT BROMSILBER-GELATINE.

By LUDWIG DAVID and CHARLES SCOTIK. (Halle: WILHELM KNAPP.)

WE have received the first volume of the second edition of this excellent publication, which has appeared almost contemporaneously with the fourth edition of Dr. Eder's great work, dealing with the same subject, namely, photography with bromide of silver gelatine. The whole is divided into six parts:—1. Manufacture of bromide of silver emulsions. 2. The employment of gelatine plates. 3. Orthochromatic photography. 4. Failures and methods of preventing them. 5. Collection of receipts, &c. 6. Instantaneous photography—of which the volume before us embraces the first two. The present treatise being, as it is, the combined work of an eminent professional and an eminent amateur, is mainly distinguished by its high degree of practicability, being based almost entirely on the personal experience of the authors.

Both those commencing the manufacture of dry plates, as well as those who have a varied experience in the same direction, will hail its appearance with satisfaction, and it will in all probability form a standard work of reference for those engaged in this branch of industry. The first part comprises an exhaustive account of the various processes of manufacturing gelatine plates according to the three principal methods in use, namely, Monckhoven's, Henderson's, and Eder's boiling method, together with descriptions and illustrations of the plant and apparatus in use in large dry-plate factories. The second part forms an excellent treatise on development, well illustrated, and thoroughly up to date, and includes retouching, varnishing, and complete treatment of the negative. The extremely practical tendency of the work, and the capital way in which it is illustrated, would probably secure for it an extensive sale should it appear in an English dress.

DIE PHOTOGRAPHMETRIE.

By Dr. C. KOPPE. (Published by the Deutsche Photographen Zeitung, Weimar.)

A SCIENTIFIC treatise on the application of photography to scientific measurement, more especially in connexion with surveying. Indeed, the work before us more properly belongs to that department of technology. It is, however, interesting to the photographer from the considerations involved in the selection of means required to confer upon apparatus that degree of accuracy necessary for exact estimation of distance. Such, for instance, is the excellent chapter on the choice of objectives and the description of the photo-theodolite. This is an instrument, as its name implies, in which a small photographic camera is substituted for the usual telescope, and enables not only greater accuracy in measurement to be attained, but also obviates a great deal of the tiresome sighting and reversing which the employment of the ordinary theodolite involves. The book is an excellent example of that careful and thoughtful application of scientific principles to the solution of practical questions which has enabled Germany to make such rapid progress in all things technical. To such surveyors as have a tincture of photography it may be thoroughly recommended.

DIE AMATEUR PHOTOGRAPHIE.

By ROBERT TALBOT. (Published by ROMAIN TALBOT, 10 Bräuerstrasse, Berlin.)

A SMALL but most exhaustive pamphlet of some fifty closely printed pages, in which almost everything that one requires to know on the subject of photography is lucidly and attractively treated. The object with which it is written is, as we are informed by the unassuming preface, threefold. Firstly, to impart to those unacquainted with the art sufficient instruction to enable them, after a short time, to be able to use the camera; secondly, to give those already acquainted with the art an accurate description of the various forms of apparatus and processes at present in use; thirdly, to show architects, engineers, machine designers, &c., what assistance they may obtain from photography in copying drawings, plans, &c. A very cursory examination of the little work will show any one acquainted with the subject how thoroughly the two second objects are attained; and if success in regard to the first is less certain, it is not necessarily the fault of the author. One considerable advantage is that the theoretic and historical aspects of the subject are omitted altogether, so that wherever one opens the little work the eye lights upon something of practical value; and it is, besides being excellently and copiously illustrated, thoroughly up to date. It is offered at the modest price of one mark. An equally cheap and equally exhaustive practical treatise in English is still something of a desideratum.

PHOTOGRAPHISCHER ALMANACH UND KALENDER FÜR DAS JAHR 1890.

THIS almanac, published by Ed. Liesegang, Düsseldorf, Germany, contains several contributed articles, a compendium of the bibliography of the year, together with a list of the patents taken out in that country. It is printed in fine large type, and contains 140 pages, price one mark.

THE LONDON STEREOSCOPIC COMPANY'S FLEXIBLE NEGATIVE FILMS.

SINCE acknowledging the receipt of these films we have had an opportunity of fully trying them. They are coated on celluloid films, and as regards their flexibility they entirely bear out the accuracy of the descriptive title, seeing they can be bent into a curve and spring out again into their original flat condition. The sensitometer number of the films sent to us being twenty-seven, their value in obtaining fully exposed negatives during these dark November

days with a rapid exposure is something not to be lightly esteemed. In developing our negatives we first followed to the letter the instructions of Mr. John Carbutt, the maker, using the hydroquinone judiciously, according to the following formula recommended:—

A.	
Warm distilled water	20 ounces.
Sulphite soda crystals	4 "
Sulphuric acid	1 drachm.
Hydroquinone	360 grains.
Potassium bromide	30 "
Water to make up to	30 ounces.

B.	
Caustic soda in stick	1 ounce.
Water to make	30 ounces.

C.—Accelerator.	
Caustic soda	1 ounce.
Water to make	10 ounces.

D.—Restrainer.	
Bromide potassium	$\frac{1}{2}$ ounce.
Water	5 ounces.

Take of A 1 oz., B 1 oz., water 2 to 4 oz.—the first for instantaneous and short exposures, and the latter for time exposures, portraits, and views. For lantern transparencies, 1 oz. A, 1 oz. B, water 4 oz., D $\frac{1}{2}$ drachm. After using, filter into bottle for future use, and for starting development on time-exposed plates and films. With this we obtained negatives of singular excellence. We then tried a pyro developer taken from the formulae given in the last two or three ALMANACS, and having succeeded equally well with that, we conclude that as regards methods of development, the plates possess considerable elasticity in this respect.

BARNETT'S UNIVERSAL FILM CARRIER.

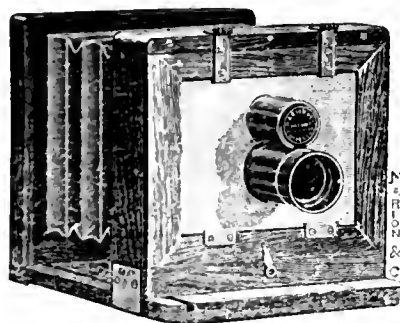
(The London Stereoscopic Company.)

ACCOMPANYING the above films we have received samples of Barnett's Film Carrier. They are light, and each is about the thickness of a glass plate. Formed of card, they have a light brass edging which ensures their being rigid. This edging also serves as a groove into which to slide the films, one of the ends sliding out to permit of this being done, afterwards closing tight over the end.

These film carriers greatly conduce to comfort in using negative films.

MARION'S FOCUSING EYEPiece.

MESSRS. MARION & Co. have sent us one of their new eyepieces for focussing. It consists of a magnifying glass set in a short tube, and this glass is capable of adjustment so as to suit any strength of vision. Its novelty consists in the way by which it can be attached to the focussing screen. This is done by a little pneumatic sucker projecting



slightly from the mouth of a shorter tube than the eyepiece, and to which it is affixed. Mere pressure against the focussing screen ensures the attachment of the eyepiece. Its nature may be further ascertained from the above cut. It must necessarily prove very useful and convenient.

NEW TRADE CATALOGUES.

THE catalogue of Messrs. McHie & Co., Glasgow, is remarkably elegant—our copy of it, at any rate, being done up in stiff boards, gilt lettered, and edged. It contains 116 pages descriptive of the lenses, cameras, general apparatus, backgrounds, and chemicals supplied by

this firm, and, being closely printed, this represents a large and complete stock.

Fallowfield's *Photographic Remembrancer and Traveller* for the quarter ending December marks a new departure, and is the first of a new series, which it is intended shall embrace a wider scope than hitherto. In addition to the various novelties of the past season, Mr. Fallowfield has impressed the muse into his service, there being two poetical contributions, respectively, *The Instantaneous Photographer* and *The Retoucher's Point*. This number includes the 114th page of this series of publications, and is quite equal to its predecessors.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,998.—"An Improved Plate Holder or Dark Slide for Photographic Cameras, together with a Swing Frame coupled with an Indicator, to be Used therewith in Cameras specially Made therefor or Adapted thereto." Complete specification. T. COLLEY.—*Dated November 12, 1889.*

No. 18,139.—"Improvements in Apparatus for Facilitating the Microscopical Examination of Photographic Pictures, Maps, and other Objects." H. DUNCAN.—*Dated November 13, 1889.*

No. 18,166.—"Improvements in Photographic Cameras." W. J. LANCASTER.—*Dated November 14, 1889.*

No. 18,167.—"Improvements in Photographic Camera Shutters." W. J. LANCASTER.—*Dated November 14, 1889.*

No. 18,224.—"Improvement in Photographic Shutters." H. G. M. CONYBEARE.—*Dated November 14, 1889.*

No. 18,330.—"Improvements in Stands for Photographic Cameras." W. R. BAKER.—*Dated November 16, 1889.*

SPECIFICATION PUBLISHED.

1889.

No. 8274.—"Focussing Cameras." ELLISON.—Price 6d.

PATENT COMPLETED.

IMPROVING THE MEANS OF FOCUSSEING PHOTOGRAPHIC CAMERAS.

No. 8274. CHRISTOPHER OBER ELLISON, 62, Dale-street, Liverpool.—*October 26, 1889.*

THE use or attachment of a mirror or reflector to the outside of any kind or make of cameras having a focussing plate or screen at the back, so as to show the intended view as clearly as seen thereon, but the right way up—as in nature—instead of "upside down," as on the focussing screen itself, enabling the operator to artistically arrange and focus the subject in any easy graceful position, instead of the fatiguing and cramped attitude now so well known, and that without any change in or enlargement of the cameras, or the use of screws, levers, or other appliances liable to get out of order, and doing away entirely with the covering of the head, shoulders, and camera with the black sheet so annoying to lady and gentleman amateurs.

The mirror or reflector to be held or attached with rubber bands, or other means, to the back of the camera, so as to allow of the correct angle being obtained, and give play during focussing, and also allow of the mirror or reflector being swung out of the way when not in use, or laid flat against the camera for travelling, the light being kept therefrom by silk or other light material—or even a pocket handkerchief, so arranged as to be used with or without eyepiece or focussing glass, single or double, as preferred.

The mirror or reflector may also be hinged or otherwise attached to the frame of the focussing screen, so that both will swing out of the way together after focussing and remain ready for instant reuse, or lay against the camera as above, leaving no loose or unattached parts.

The claims are:—1. The focussing of any camera by means of a mirror or reflector on the outside thereof, showing the subject to be photographed exactly as upon the focussing plate—only the right side up, as in nature—and seen from the top instead of the back of the instrument, without any alteration or enlargement of the camera, the necessity for the use of any special camera, the use of screws, levers, or other appliances likely to get out of order, and without covering the head and shoulders with the black sheet so annoying to lady and gentleman amateurs. 2. The attachment of a mirror or reflector to the frame of the focussing plate, so that after focussing as above, both reflector and focussing plate can be easily swung out of the way together ready for instant reuse (leaving no loose parts to get mislaid), or laid flat against the camera for travelling. 3. The reduction of the weight of apparatus to be carried, and greater freedom from vibration of camera, by the use of shorter legs, owing to focussing from the top, instead of the back of the instrument.

[We are always very sorry to say anything that would have a tendency to damp the enthusiasm of an inventor, but we feel compelled to say that in an article entitled *How to Invert the Image on the Ground Glass of the Camera*, published in THE BRITISH JOURNAL OF PHOTOGRAPHY so long ago as August 30, 1867, and illustrated by a drawing, Mr. Ellison has been completely anticipated in his invention, our drawing showing the mirror hinged at the bottom the same as his. See vol. xiv., page 410.—ED.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 25 ...	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 26 ...	Great Britain (Technical)	5A, Pall Mall East.
" 26 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
" 27 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.O.
" 27 ...	Burnley	Bank Chambers, Hargreaves-street.
" 28 ...	Burton-on-Trent	The Institute, Union-street.
" 28 ...	Halifax Photographic Club	Mechanics' Hall.
" 28 ...	Liverpool Amateur	St. George's-crescent North.
" 28 ...	Oldham	The Lyceum, Union-st., Oldham.
" 28 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 14.—Mr. A. L. Henderson in the chair.

THE CHAIRMAN showed a large collection of photographs which he had gathered during a recent journey to the Antipodes. They were principally views taken in New Zealand, but included some other specimens, notably from Malta and Ceylon, and a large panorama of Sydney Harbour. Amongst the New Zealand photographs were a considerable number, both of portraits and views, by Morria, of Dunedin, of whose work in both departments the Chairman spoke very highly—and the work shown supported that good opinion. Amongst other photographers in New Zealand Mr. Frost was mentioned, a photographer formerly well known in this country in connexion particularly with photo-mechanical work. A very fine portrait of the Chairman, by Frost, was passed round with others. The photograph referred to last week as amongst the objects of interest from New Zealand, having some colour on the cheeks said to have been produced naturally, was shown. It was from the studio of Mr. Paul, of Dunedin, and was a *carte* print on bromide paper, with no trace of colour except a red tint on the cheeks, about the same amount of colour that was commonly put upon glass positives of the cheaper class in the early collodion days.

The opinion was generally expressed that the colouring had been done by hand, and it was proposed to submit the print to examination and test, and report upon it at another meeting. Other photographs of interest were some portrait groups taken by Frost by electric light, and some landscapes by Wheeler; one particularly noticeable amongst these was a view of Mount Cook.

THE CHAIRMAN then showed a negative with a large insensitive strip, which was attributed to some action proceeding from a new piece of wood that had been placed as a stop on the inside of the shutter. A further experience of the ill-effect of leaving plates in some shutters was mentioned. The shutters last referred to were some which had previously had an injurious effect on plates left in them, and therefore they had been allowed to dry for some months and then were treated with paraffin. Plates left in them since this treatment had been found to become insensitive.

Mr. J. B. B. WELLINGTON suggested that a clear space in one of the photographs might be due to the intervention of some part of the vessel on the deck of which the camera had been placed.

Mr. A. HADDON thought the Chairman's experience pointed to some emanation from the paraffin as having acted injuriously upon the plates.

THE CHAIRMAN showed a carbon print upon opal glass that had been made some years since. On washing it under a tap recently, the lighter half tones had come away from the support.

Mr. A. COWAN suggested that the separation might be due to gum used with the retouching colour, which, when dry, contracted and partly loosened the thin film underneath.

The thanks of the meeting having been tendered to Mr. Henderson for bringing the collection of pictures, the usual winter monthly lantern slide display took place. Slides were shown by Messrs. Teape, Wellington, Hastings, Kellow, Park, Freshwater, Hindley, and Cowan. Those by the last-named member were in illustration of the difference of results obtained by variations of the developer with a given make of plate, the same transparencies being used that had been shown at the previous meeting. The general opinion of the members on seeing the slides in the lantern was the same as that previously expressed on seeing the transparencies,—that on the whole none were better than those which had been developed with pyro bromide and ammonia, without sulphite, although the addition of bisulphite to the fixing solution had a slight clearing action which, for lantern slides, was thought beneficial. Another very successful series was that developed with eikonogen, the influence of increasing quantities of bromide in giving density was very evident.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

On the 15th instant the Committee were again engaged in considering the alteration of the rules of the Association, and made fair progress.

Mr. J. D. O'Connor was elected a member of the Committee.

CAMERA CLUB.

On Thursday, November 14, Major J. F. NOTT gave an address on *Films*, accompanied by a demonstration. Mr. F. Machell Smith occupied the chair.

Major Nott described the ordinary processes in the working of stripping films, and, in addition to his practical demonstration of these manipulations, he showed before the meeting some effectual methods for correcting and remedying faults which might be committed in some parts of the process.

Some surprise was experienced by those at the meeting at finding that Major Nott used neither rubber solution nor collodion, but simply squeezed the washed negative straight upon plain glass plates. An opinion was expressed that as this could be done successfully the greatest objection to the use of

stripping films was removed, and it was thought that the fact ought to be intimated in the working instructions sent out with the films.

Mr. DAVISON then showed examples of negatives upon stripped films, Vergara (Froelmann) films, and upon Allen & Rowell's cut celluloid films. He also exhibited the results of a few test exposures on some of the new rollable celluloid films about to be introduced by the Eastman Company, and described their behaviour in the roller slide, and in development, and the after processes. He found that the pieces when cut off the thin celluloid lay flat in development, and that by treatment with glycerine and water (or without any special treatment if pinned up at the four corners to dry) the pieces remained flat on drying.

Prints from some of the negatives were handed round.

A lively discussion took place.

Thursday, November 28, will be devoted to the lantern.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

NOVEMBER 11.—Mr. J. Humphries (President) in the chair.

Mr. D. P. RODGERS introduced the subject of *Hand Cameras*.

The following firms responded by sending representatives with specimens as manufactured by themselves:—Messrs. Mawson & Swan, Marion, Watson, Platinotype Company, Robinson, Photographic Stores, Shew, and Fallowfield exhibited their respective cameras of this class.

Next meeting, November 25, Mr. F. W. Hart will demonstrate his flash light.

UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

THE first meeting of the Session 1889-90 was held in the Chemical Library on Tuesday, November 12. This was an informal reunion of members and their friends.

Messrs. Watson exhibited their detective camera and some recent models of half and whole-plate apparatus.

Mr. H. Park showed a whole-plate Victoria camera and Ashford's patent stand.

The next meeting will be held in the Chemical Library on Tuesday, November 26, at five p.m. Discussion on *Detective Cameras*.

HACKNEY PHOTOGRAPHIC SOCIETY.

NOVEMBER 14.—Mr. J. Hubert in the chair.

Five new members were elected.

Dr. KIBLER communicated to the Society the results of one of his investigations relating to a method of toning with the ordinary gold bath, not completing the process, but, instead, transferring the prints when still brown into the fixing bath, to which was added acetate of lead, causing a beautiful grey tone to the avoidance of rusty prints.

Discussion on this was postponed.

Mr. BERT ACRES read a paper upon *Colour-sensitive Plates*. After a few introductory remarks on the failure of ordinary plates to render incorrect values, the colours as seen in nature, and the consequent great loss of beauty in photographs from this cause, he went on to enumerate a few of the attempts of several scientists to discover some process which would correct this the greatest drawback to artistic photography. He then gave a brief outline of the discovery made by Waterhouse, that an ordinary collodion wet plate treated with eosine became strongly sensitive to yellow and orange, and the further development of this discovery by Taillor, of Paris, who applied it to the modern gelatine dry-plate process, by which he was able to prepare plates by the now well-known emulsified bromide of silver emulsion process, thus doing away with the necessity for dyeing plates, as plates treated with dyes soon became spoiled, whereas when the plates were prepared by this emulsion process they would keep as well as ordinary plates. One of the most important features of the paper was a very spirited attack on the use of the yellow screen. It was pointed out that, with the exception of copying paintings and in taking outdoor views in misty weather, the yellow screen was seldom or never required, the use of a yellow screen in landscape work under ordinary conditions spoiling the atmospheric effect in the resulting photograph, as it made the distant objects appear too near, thus destroying one of the principal charms of English landscapes. He then showed some silver prints and negatives of views in North Wales, taken a couple of weeks ago, on ordinary and on isochromatic plates, without a yellow screen, from the same point of view, at the same time, and under exactly the same conditions—the difference between the two processes being very strongly marked, for while the ordinary plate rendered the yellows, browns, and greens, of one uniform tint, the colour-sensitive plate rendered each in their proper values as seen by the human eye. He attributed the false impression that every colour-sensitive plate required the use of a yellow screen to the writings of Dr. Vogel, whose azaline plates were so slightly sensitive to yellow that unless a yellow screen was used no appreciable difference was obtained, whereas with a truly isochromatic plate the screen was a positive drawback. Continuing, he gave a few hints on manipulation, severely condemning the ridiculously small lamps that are frequently used for development, as, provided that the quality of the light was safe, a greater quantity was not likely to do any damage. He preferred pyro-ammonia for development, and recommended that in cases of under-exposure the developer should be further diluted, instead of the usual plan of adding ammonia.

Lantern slides from the ordinary and isochromatic plates were then shown on the screen, and whilst those from the ordinary plates were considered to be excellent, those from the colour-sensitive plates were pronounced to be better.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 14.—Mr. B. KARLSESE (Vice-President) in the chair.

Messrs. F. A. Compton, T. Walter Jones, and A. Roberts were elected as members.

The CHAIRMAN gave notice that all nominations of members to act on the Council for the ensuing year must be handed in that evening.

Mr. E. C. MIDDLETON read his paper on *Hints*, which proved instructive and valuable alike both for beginners and those farther advanced in photography. On October 25 the Lantern Committee gave a display of the American slides, per favour of the Camera Club.

The annual meeting of the Society will be held on the 28th instant.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

NOVEMBER 13.—The President (Mr. George Bankart) in the chair.

One member was elected.

Mr. THOMAS SCOTTON (Derby) then delivered a lecture on *Photographic Processes for Copying Line Drawings*. After having described the processes in detail, Mr. Scotton gave practical examples, by developing before the meeting a specimen print of each, accompanying each demonstration with a running fire of useful commentary.

IPSWICH PHOTOGRAPHIC SOCIETY.

NOVEMBER 14.—There was an exhibition of the *Illustrated Boston* slides. The lecture was read by Mr. FRANK WOOLNUGH. At the close Mr. Woolnough warmly commended the idea of the Boston Society, and suggested that their own members should undertake a similar enterprise in regard to the old town of Ipswich and its surroundings.

This matter will be brought before the Committee for consideration.

During the evening the prizes offered by Mr. J. C. Wiggin for the best six negatives taken during the summer excursions were awarded to Messrs. E. R. Pringle and R. Cash.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 7.—Mr. Wm. Lang, jun., F.C.S. (President), in the chair.

The following gentlemen were elected members of the Association:—Messrs. Edmund J. Nulls, D.Sc., F.R.S., R. C. Platt (Airdrie), Alex. Scott, John Morison, jun., James More, William Murdoch.

The office bearers for Session 1889-90 were afterwards appointed as follows:—President: Mr. William Lang, jun., F.C.S.—Vice-Presidents: Messrs. William Brown and William McLennan.—Council: Messrs. John Annan, William Jenkiss, W. J. McIlwrick, A. Maclear, George Mason, A. Watson.—Treasurer: Mr. George Bell.—Secretary: Mr. J. Craig Annan.

The PRESIDENT then read a paper entitled *Some Memorials of Daguerre* [see page 755], which was illustrated by lantern transparencies specially prepared.

Two volumes of cyanotype impressions, produced in 1859 by an unknown lady amateur, and which had belonged to the late Robert Hunt, F.R.S., were afterwards shown to the members.

Mr. Frieae Greene's opal cards next occupied the attention of the Society, and the meeting ended with a lantern exhibition of slides, the work of some of the members.

Correspondence.

Correspondents should never write on both sides of the paper.

PRICES OF DRY PLATES.

To the Editor.

SIR,—There are many inequalities and curious discrepancies in the prices charged by manufacturers of dry plates for the different sizes and various rapidities and thicknesses of films. The following tables give a few instances, to which, I should imagine, it is only necessary to call the attention of the manufacturers to secure a prompt rectification.

Plates.	Area.	Prices on same ratio as 1 plates.	Makers' prices.	Increase.
	Square Inches.	s. d.	s. d.	
4½ × 3½	13½	—	1 0	
8½ × 6½	55½ = 13½ × 4	4 0	4 3	6½ per cent.
15 × 12	180 = 13½ × 13½	13 0	18 0	38½ "
30 × 21	720 = 13½ × 58½	52 0	90 0	73 "

The makers endeavour, I believe, to justify these increased prices for large plates by asserting that the greater proportional charge is to cover (1) greater loss on broken and spoiled plates, and (2) increased cost of large glass. These points seem to me, however, to be more than balanced by (1) smaller cost of labour, as it obviously occupies less time to handle twelve plates 30 × 24, or 15 × 12, than 625 or 156 quarter-plates (this applies to all the operations, such as cutting and cleaning glass, coating, drying, and packing plates), and (2) diminished cost of cardboard boxes and packing papers.

Plates.	Prices: Pall Mall Extra Rapid, & Ilford Slow.	Ilford Extra Rapid.	Increase.	Pall Mall Thickly Coated.	Increase.
	s. d.	s. d.		s. d.	
4½ × 3½	1 0	1 6	50 per cent.	1 6	50 per cent.
7½ × 5	3 5	5 3	51 "	4 6	28½ "
8½ × 6½	4 3	6 6	50 "	6 6	50 "
15 × 12	18 0	28 0	56 "	23 0	28 "

It is curious that whilst the enhanced cost, in consequence of the

increased quantity of silver bromide, is estimated alike by both manufacturers in the quarter and half-plate sizes, in the 15 x 12 size they vary as one to two. I am convinced that a reduction in the cost of the larger plates would tend, by increasing their use, to greatly benefit the receipts and profits of the manufacturers.—I am, yours, &c.,
Penzance, November 18, 1889. W. HERBERT PERCY.

PROOFS AND RESITTINGS.

To the Editor.

SIR,—The inquiry of your provincial correspondent as to the recognised practice of first-class London houses, with regard to the number of proofs submitted and resittings, cannot, I fear, receive a very satisfactory answer, for, as you remark, the growing tendency is to submit a number of proofs out of proportion to the order given; and very probably a resitting for some trifling objection or caprice, so well known to photographers, follows upon his extra endeavours to obtain success. It is a subject so important to the profession throughout, that I have often thought that, if possible, it should be discussed and formulated into some definite rules, to be used with discretion by each individual firm; but it is evident that unless there is unity of action throughout the profession, it is quite hopeless to alter the existing state of things. If that could be brought about, I, for one, should be devoutly thankful.—I am, yours, &c.,
63A, Baker-street, Portman-square, W. WILLIAM GROVE.

To the Editor.

SIR,—Concerning the number of proofs to be submitted for approval, my experience is that two are enough, for this simple reason: If the dress, as to fit, style, or other objections, does not please the party, if you were to take fifty, they would all be condemned. I have found this out years since. I found, in practice, this answers perfectly: If they are found fault with, it is easy to take two others as a re-sit.

I have an idea it is possible to make oneself too cheap.—I am, yours, &c.,
Cardiff, November 20, 1889. AN ARTIST.

THE FUNCTION OF THE PHOTOGRAPHIC SOCIETY'S COUNCIL.

To the Editor.

SIR,—Early in the present year the Photographic Club appointed a Committee to consider the desirability of adopting a uniform system of weights and measures for writing photographic formulae, and in due course this Committee issued a Report recommending that a certain course be adopted. This Report was sent to each of the recognised photographic societies with a letter to the Secretary, distinctly stating that it was for communication to his Society, and asking for its support in obtaining the adoption of its principles. The letter and report were duly received by the Hon. Secretary of the Photographic Society of Great Britain; but, with a want of courtesy to the Photographic Club, which it is to be hoped was not intentional, the matter has not been brought before the Society, except that in the next number of the journal of the Society the letter and Report were printed, together with an intimation that the Council had discussed the matter, and had replied that the Society would co-operate in getting the proposed system adopted.

As a member of the Society, and one much interested in the question involved, I felt that such an important subject deserved serious consideration before the Society should be pledged to any definite course, and I considered that the decision should not be left to that small number of the members who are chosen, presumably for their business abilities, and not for their scientific knowledge, to conduct its affairs. The following letter was, therefore, addressed by me to the Hon. Secretary:—

DEAR SIR,—In the June number of the journal there is published a letter addressed to you by the Hon. Secretary of the Photographic Club enclosing a Report of a Sub-Committee of that Club for communication to your Society. Up to the present the Society has had no opportunity of expressing an opinion upon the question raised, but I find it stated at the foot of the Report that the Council have considered the question and have replied in the name of the Society.

I regret it should be necessary to point out that the Council, in discussing and adjudicating upon a purely scientific question, such as that referred to the Society in this case, is not only exceeding its function, which is to manage the business of the Society, but is robbing the ordinary members of what is most distinctly their right of expressing an opinion upon any photographic matter brought to the Society for discussion. At the same time, there is no doubt that it would be quite competent for the Society, as a body, to repudiate the dictum of the Council upon such a question.—I am, yours, &c., A. MACKIE.

To this I have received a reply that "the Council do not see their way to taking any further steps with regard to the question."

Having thus failed in bringing the matter before my fellow-members by an appeal to the Council through the proper channel, I am reluctantly compelled to state my case in the present manner.

It is much to be regretted that the reform in the laws of the Society has not resulted in a corresponding improvement in the spirit of its government, and that the present Council should have chosen to follow the worst traditions of its predecessors. Under past misrule the representative character of the Society long since ceased to be acknowledged;

but a time has come when, under vigorous and conscientious administration, there is hope that its prestige might be restored. It would be a thousand pities if the opportunity were neglected.—I am, yours, &c.,
10, Queen's-road, N.W., November 18, 1889. A. MACKIE.

[Having a vivid recollection of the revolution, jeopardising the very existence of the Society, that arose from cognate causes several years ago, we feel concerned at any member of the Society thinking that the Council oversteps its functions in deciding upon matters which rightly ought to be brought before the members generally.—ED.]

EXHIBITION MATTERS.

To the Editor.

SIR,—I have, like "An Old Medallist," and "Wyrall," for a considerable number of years past looked forward to the annual trip to town to visit the big Society's Show, to see the work of exhibitors who are recognised as masters in our art. Alas! what has become of them? There are certainly a few left whom the bronze bait appears to attract, but where are the majority? Have they received sufficient honours from the Society, or are they lamenting over damaged frames, or does their work get better shown and their frames get better treated at the provincial exhibitions? Echo seems to favour the latter.

This, doubtless, accounts for the grand shows of photography made at many of the provincial exhibitions within these last three or four years, and the magnificent collection now annually brought together at the Crystal Palace, where platinotype, carbon, and silver can be seen to advantage, which cannot be done when work from all three of these processes is huddled and mixed together indiscriminately in one small room, with the result that it is painful to look upon, and reminds one of a cheap draper's shop where contrasts are great—reds and blues being mixed together with startling effect. If platinotype, carbon, and silver are to be shown together in one small room, let them be shown fairly and advantageously to each, and not be mixed together like a mosaic or fancy tile pavement. And why should the names and addresses of some exhibitors be allowed to appear upon their works year after year, and yet the rules sent out by the Society forbid such practices? I myself have gone to the trouble of remounting pictures which have had my name and address upon them, fearing they might be rejected, and I have been somewhat surprised to find that by putting a stroke of the pen through the address, or pasting a piece of transparent paper over same, I might have saved myself trouble and expense, and have got an advertisement for my wall-space money.

I have exhibited annually for about fourteen years until this year, and have been skied, floored, and on the line, and still I am discontented, and, like "An Old Medallist," and "Wyrall," think that the time has come for a new organization and a new Exhibition, when I think that our old friends who are now so conspicuous by their absence would again put on their war paint and come to the front. Trusting that some of them more able with the pen than myself will take it up, and let us know wherefore their absence—I am, yours, &c., OLD MEDALLIST No. 2.

To the Editor.

SIR,—During the past few days I have had an opportunity of talking to several of the foremost men in the profession, both London and provincial. A few of the replies to my query, as to why they had ceased to exhibit, may be interesting.

A. "No, thank you; no more for me. The game was not worth the candle. *Pall Mall* packing has cost me dear."

B. "Yes, I sent about half a dozen important pictures this year, but they were distributed all over the place, and instead of being a good show they were no use to me at all. I shall not trouble to send again."

C. "Last time I sent I had to hunt up my pictures from Middlesex Hospital way. What they were supposed to be suffering from I was never told; but that year — was competing, so I suppose mine were carefully not shown."

D. "Yes, I was offended, and had, I think, cause. I had to listen last time to one of my very best works being pulled to pieces by one of the officials at the very top of his by no means musical voice, to a full room. Of course, I could not reply, however absurd his strictures. I should have liked to have had him outside for a few minutes!"

E. "See no use to showing my style and methods, to be copied by the fellow 'over the way.'"

If the above, which are genuine expressions of opinion, are of any use, why "there they are."—I am, yours, &c., AN OLD MEDALLIST.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—My attention having been arrested by a letter in the columns of your JOURNAL, by Mr. Bart. Rous, condemning in the most emphatic manner all the works of Mr. Robinson exhibited at the Camera Club, I am tempted to make a few remarks upon the subject.

In the first place, the letter is assuredly a most uncalled-for attack upon the work of a professional photographer, who, as the pioneer of combination printing and picture making in photography, was one of the first to raise it from a mere mechanism to the realms of art, and who for

thirty years has laboured earnestly and conscientiously in the same direction both with camera and pen. That his labours have met with the success they deserved is testified by the number of gold medals awarded him in all the capitals of Europe, and by the fact that there is scarcely a place in the world in which photography is practised that his name is not known.

Mr. Rous condemns *in toto* the combinations as unnatural and impossible, and the figures as dressed-up models; but this is an assertion so evidently unjustified by facts, that it may be passed over without comment.

Considering the great number of works Mr. Robinson has produced, he would be more than human had he never erred, but there are many examples which are in every way as much entitled to be called works of art, as any to be found on the walls of our art exhibitions.

Mr. Rous tells us, what indeed we know, that a photograph must be also a picture or it can never be worthy to be called a work of art. But what does he consider constitutes a picture? If there are none among Mr. Robinson's collection, where is he going to find them? This is a slap at professional productions *en masse*.

But who is this Daniel come to judgment? . . . As professional men we have not the slightest objection to Mr. Rous' attacks, but in sheer justice we hope he will show us some of his own work at the Society's Exhibition next year, when we shall be able to judge for ourselves whether his criticisms are worth consideration or not.—I am, yours, &c.,

Torquay, November 18, 1889.

W. DURRANT.

To the Editor.

SIR,—“A Member of the Camera Club,” who uses my name so freely, while withholding his own, is quite welcome to his opinion of my photography. He probably admires it, as much as I do myself, as photography. Let me remind him that “Mr. Rous's work” was not the subject of my letter, but Mr. H. P. Robinson's work. My work, being worthless, would not lessen the worthlessness of any one else's.—I am, yours, &c.,

The Arts Club.

BART. ROUS.

EXHIBITION OF REJLANDER'S PHOTOGRAPHS.

To the Editor.

SIR,—Would you kindly allow me to state that the Committee of the Camera Club proposes that the next Exhibition in the Club Rooms, after Mr. H. P. Robinson's is closed, should consist of a collection of pictures by Mr. O. G. Rejlander? To ensure a full and representative number of his pictures being brought together, I should be much obliged to any of your readers who possess prints by Rejlander, and would be willing to lend them for exhibition, would kindly communicate with me at the Club.—I am, yours, &c.,

GEORGE DAVISON, Hon. Sec.

Camera Club, 21, Bedford-street, W.C., November 18, 1889.

AMATEURISM.

To the Editor.

SIR,—This subject reminds me of Sir J. D. Lenton's picture, *The Banquet*, in which a monkey is nicely posed on the garden wall while the guests dance to their hearts' content. Now may I suggest a way out of the difficulty?—that the following chemicals be heavily taxed: pyrogallol, neutral oxalate of potash, quinol, and eikonogen. This will raise the price of photographs and place photography in the good old position it occupied when the wet process was to the front.—I am, yours, &c.,

23, Cattell-road, Birmingham.

H. VICTOR PAGE.

To the Editor.

SIR,—I, too, wish to place a stone on the cairn of this discussion, “Professional Amateur,” and claim the privilege of your columns in that I have been engaged in the art, more or less, from the early silver-plate days—now, alas! some forty years ago—and as a subscriber (in the stereotyped phrase) all through from the birth of your parent journal the *Liverpool*; thus long before your boasting professionals existed, or, at least, put forth such pretentious claims as they now do. Why, your professional is little more than a mere machine, willing and eager, I grant you, at all times to gather a wrinkle or receive a lesson from the so-called amateur. In fact, the greater number of your successful “professionals” have only had the discernment and wisdom to gather round them men who have mastered detail; and these professionals could not, individually, for their very life, do what many an amateur could. How could they? They have to live. Where would your *JOURNAL* be, and other similar publications, and, indeed, the whole art itself and its various ingenious and clever craftsmen who now so lavishly and honestly minister to its wants, if it were left to professionals? LET THESE MEN THEN BE SILENT. They prosper on the patient labour of amateurs, who, in many cases, take to the art as a relaxation from other and, possibly, less remunerative pursuits.—I am, yours, &c.,

Partick, November 16, 1889.

WM. CALDWELL.

To the Editor.

SIR,—Why so many words about the name “Amateur?” All workers in photography are supposed to be lovers of it. In it there are evidently

three classes of workers. To each class give a distinct name, and be done with it.

I suggest that we call the first class “Gentlemen Amateurs,” gentlemen who work at it for pleasure and enjoyment solely, and from whom we have received much, and from whom we expect to receive much more. Next, we have—for want of a better name I shall call the “Professional Amateurs,” or “Amateur Professionals,”—men who work at it for pleasure, but also with an eye open for profit.

And, lastly, we have the “Professionals proper,” men who make it their daily business, or, as Mr. Barnes names it, “their bread and butter.”

All these three classes are equally honest and legitimate; and, to use the language of another of your correspondents, “it is presumption and impudence in any man to find fault with his neighbour.” Every worker, as a sane man, has entered the class best suited to his own interests, and at any time he has perfect liberty, should he repent of his choice, to leave it and to enter the one he likes better. There is, therefore, no cause for ill-feeling to exist in any class against its neighbour; and the man who entertains any, is not only an enemy to his class, but an enemy to mankind generally, and the sooner he is stamped out the better for society.—I am, yours, &c.,

November 18.

F.

EIKONOGEN.

To the Editor.

SIR,—This new agent is having anything but a fair and common-sense trial. I would urge those who try it to stick to the inventor's formulae for some time, and leave their experiments till afterwards.

A great many of our clever men complain about their solutions going black; if they will take care that the sulphite and carbonate of sodas are thoroughly dissolved before adding the eikonogen, they will find this discolouration disappear.

For myself, I dissolve the sodas, leave them for twelve hours or more, and then add the “kono,” using distilled water only. I have a one solution developer made up according to Dr. Andresen's formula, which is now three months old, and it is still as clear as crystal.—I am, yours, &c.,

HENRY L. BENWELL.

Folly Bridge, Oxford, November 16, 1889.

TONING DIFFICULTIES.

To the Editor.

SIR,—In some of your late numbers you have referred to the numerous appeals made to you by amateurs concerning their difficulties in toning. One, in particular, of your correspondents much excited my sympathy by his inability to escape from the dirty, reddish-brown tone. Having myself “been there,” I feel tempted—with your kind permission, and, of course, thoroughly endorsing your remarks as to the necessity for strong negatives, and so forth—to offer a suggestion, which, I venture to believe, may benefit. Judging by my own experience, I should say that the average amateur, with his comparatively few prints and small toning bath, errs if he acts upon the rule of one grain of gold for each sheet of paper to be toned. Given good negatives, good prints, and proper care, should the tone still be a failure, I would suggest *more gold*. I enclose two or three half-plate prints of flowers to testify as to my own results in tone. I claim nothing remarkable, but that by using “more gold” I have certainly escaped from “the dirty reddish-brown.” I use soda—no sulphite—for developing, and for printing purposes prefer a “greenery-gallery” negative.

I use preferably the lime bath as given by Captain Abney—the No. 1 in his “Instructions;” I somewhat lessen the quantity of lime. I use Messrs. Watson's single albumenised sensitive paper.—I am, yours, &c.,

Bournemouth, November 18, 1889.

J. G. R.

[The tone of the prints is very rich.—Ed.]

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as “anything useful” will therefore understand the reason of their non-appearance.

Safety bicycle, balls all over, will be exchanged for cabinet or larger lens.—Address: C. BANYARD, Leaton, Suffolk.

Will exchange four well-painted 12×10's (in oil) for an old whole-plate or 10×8 camera, complete.—Address, GRIFF, 38, East-street, Leicester.

Silver English lever, with centre second, in exchange for half-plate portrait lens, camera, and stand.—Address, J. KEVAN, 11, Rodney-street, Liverpool.

I will exchange violin and case for half-plate rectilinear lens by good maker, or for good half and whole-size plates.—Address, B. WOODROW, Park-street, Toweester, Northamptonshire.

I will exchange stereoscopic mahogany camera, with lenses, five slides, and tripod, for half-plate bellows camera.—Address, W. CHURCHILL, jun., Photographer, East-street, Wareham, Dorset.

I will exchange a pair of Newton's mahogany lanterns (four-inch condensers), in case, for a cabinet portrait lens or rapid symmetrical.—Address, W. T. WHETTER, Photographer, Villiers-road, Bristol.

Will exchange enlarging lantern, five-inch condenser, and blow-through jet, for Humber or Salvo tricycle. Each article to be sent carriage paid.—Address, G. H. DENMOSE, Chemist, Downton, Wilts.

Universal studio camera, 8½x6½, two slides, and Grubb's 2n lens; portable bellows camera, 10x8, with two double and one single slides and doublet lens; and large box of oil colours; to exchange. Wanted, 12x10 portable bellows camera (Dallmeyer's 3n or 3a lens).—Address, HEWITT, 80, St. Thomas's-street, Weymouth.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

W. H. D.—There is no relationship between the two.

X. X.—It is not correct that every one at the French Exhibition got a medal, as we know several that did not.

INQUIRER.—There will be more than one article on the subject in the forthcoming ALMANAC. Better wait for that.

A. S.—An ordinary portrait lens works quicker than the others named, and, hence, would be more suitable for children's portraits.

W. Wm's.—Read the articles now appearing in the JOURNAL by Mr. Redmond Barrett. These will give you the required information.

A CORRECTION.—Mr. Alfred Green directs our attention to an arithmetical error in an article on lunar photography, in which 156 is printed instead of 216.

DEVELOPER.—If the solution is only discoloured to the extent described, its working properties will, practically, not be interfered with. Why not have tried the solution before writing?

H. E. M. (Sea View).—Get some one to give you a few lessons in retouching, or study the series of articles on the subject by Mr. Redmond Barrett which appeared in our volume for 1886.

ALEX. STEVENSON.—The recent presentation prints of the Art Union are all copyright, therefore to pirate them subjects the pirate to the penalties. His being a subscriber to the Union makes no difference.

A. H. C.—The only way to arrive at a correct exposure is to make a trial—using different portions of the plate different exposures. "Ordinary gas burners about four feet away" is no data upon which to give an opinion.

BEGINNER.—Your neighbour cannot prevent the building; but it is possible that plans will have to be submitted to the local authorities. Better consult the surveyor of the district. As all the houses are newly erected, there can be no ancient lights to be interfered with.

J. W.—In copying a painting with orthochromatic plates, when the light is somewhat yellow a paler screen should be used than when the light is very clear and white. In copying, when the light is very yellow the colour screen may sometimes advantageously be dispensed with.

NEMO.—Send an example of the trouble. From the details to hand, we strongly suspect that the evil arises from light in the enlarging room. See that no white light gains admittance when the light is temporarily stopped out. A crack in the shutter would fully account for the difficulty.

A. WESTON.—Why not coat the back of the negative with matt varnish and then scrape it away in the highest lights? If the effect obtained by this treatment is not sufficient, stomp a little plumbago on the deepest shadows. By this means harmonious prints may often be obtained from harsh negatives.

W. PERL.—The fact of the lens bearing no name does not indicate that it is necessarily a bad one. There are many excellent lenses in use which have no maker's name upon them. The name of a maker of reputation is a guarantee of quality. In purchasing a second-hand lens without a name, a trial should be allowed.

EGYPTIAN asks:—"If I enlarge a quarter-plate negative to whole-plate, how many diameters enlargement would that be called?"—Two diameters, of course. A foot rule shows that a whole-plate measures eight and a half inches, and a quarter-plate four and a quarter inches in their longest dimensions. The enlargement would be four times linear.

ARCHER says the plates he is now using, though exceedingly good in other respects, all have a "metallic or iridescent appearance," extending for half an inch or more round the margins, with no detail at all there. He asks if there is any means of avoiding the evil.—The fault is with the plates; they have evidently been made for a long time. There is no remedy but fresh plates.

B. GEDGE.—The half-plate "rapid" will certainly answer better for enlarging with than the quarter-plate portrait lens; but your camera will not be long enough to enable you to enlarge from five by four inches up to ten by eight with that lens. The best plan will be to have a cone made to fit the front of the camera so as to lengthen it about twelve inches. Make the enlargements direct on bromide paper. If you make an enlarged negative, a transparency must first be produced.

GEORGE B. ANDREWS.—There is no restriction whatever in photographing the buildings in Ghent, Bruges, or any of the other Belgian cities. Also, there is no difficulty in taking dry plates with you, the Custom House officials knowing all about photographic requirements, and being civil and obliging. We recommend you to take both wide-angle lenses for the buildings, some of which are very tall, and quick-acting lenses for street scenes, which will amply repay any trouble or expense.

G. WILMOT.—So far as we are aware, there are no dry plates prepared for stripping the films from made in this country, though they are articles of commerce both on the Continent and in America. Plener's method of stripping with hydrochloric acid is, as you say, a disagreeable one; still, it is the best in practice. If celluloid films are too thick, why not try the Eastman stripping films? They are well adapted for reversed negatives. Messrs. Horne & Thornthwaite, Strand, supply reversing mirrors.

B. B. B. writes, complaining that he recently purchased three dozen dry plates, 7½x5 size, and each packet contained one or more broken ones, and several others scratched by the fragments of glass. He wishes to know if he has any means of recompense, as both the seller and the maker deny their liability. Our correspondent says it is exceedingly annoying when away from home to find, on opening a dozen packet, two or three broken plates, and as many more useless through scratches.—We are quite in accord with him.

J. W. M. requires the following information:—"Can you oblige me by suggesting how I can overcome the following difficulty?—I have to prepare a large number of sheets of tracing cloth for the iron process, positive from positive, but cannot prevent the liquid from going through, so that when printed and developed, it always leaves a black back. I have tried resin in turps and alcohol, rubbed in, also liquid indiarubber, arrowroot, and such like—two coatings—but cannot get over it. There must be some method, although I am ignorant of it; perhaps in the place of tracing cloth there is some other finely woven cotton used?"—Perhaps some of our readers can enlighten our correspondent.

TOP LIGHT writes:—"Your advice as to the following will oblige. I have taken a house in which is a large room with a good side, but no top light; now, I wish to convert this into a studio to do portraiture and copying; what can be done to the top and reverse side so as to get an all-round light? Can you advise any kind of reflectors for this purpose? Is a top light really necessary? The room is about fifteen feet by ten feet, with side light two feet from each end and about two feet from the floor. I think by contriving a bit I can make this room to turn out decent work."—Very good portraits can be taken in a room such as that described. If the side light be high it becomes practically a top light. Our correspondent does not say the height, or we could better advise. However, all that can be done is to employ reflectors—either white or pale blue—to soften the shadows. Under such conditions as these it will be found better to use large reflectors placed at a distance than small ones closer to the subject.

PHOTOGRAPHIC CLUB.—Wednesday, November 27.—The monthly lantern meeting.

PHOTOGRAPHIC SCRAPS.—This monthly (November issue) issued by the Britannia Works Company, is full of variety as usual. It makes nice desultory reading.

EXHIBITION OF ANIMAL PAINTINGS.—The committee of the Animals' Institute will open their Winter Exhibition of Animal Paintings on December 7, when the Institute medals will be presented for the encouragement of animal artists. All exhibits must be sent before or on December 1, to 9, Kinnerton-street, Belgrave-square.

TRANSPARENCY FRAMES.—Messrs. Mawson & Swan have submitted specimens of a simple transparency frame they are introducing. It consists of a half-round metallic band, which is bent so as to surround the transparency, with corner pieces to prevent its falling out. It is suspended by a chain affixed to the two upper corners.

CRYSTALLISED EIKONOGEX.—We have received from Messrs. Marion & Co. a sample of a new make of Dr. M. Andresen's Eikonogen, which presents a different appearance from any we have previously seen, being in the form of large crystals, having a slightly yellowish tinge. Approved formulae for its use as a developer accompany each bottle. Great things may be anticipated by the introduction of such a fine preparation of this useful developing agent.

ROYTON.—A Photographic Exhibition, in aid of the Church restoration fund, Royton (near Oldham), will be held in the Town Hall, Royton, on February 5 to 20, 1890. Several medals are offered. Applications for space must be made not later than December 31, 1889. A small entrance-fee will be charged for pictures, a charge of five shillings being made to each exhibitor of apparatus. Address, Rev. Geo. Gibson, Royton (near Oldham), enclosing stamped envelope for reply.

MUYBRIDGE AT BATH.—On Monday, December 2, Mr. Muybridge is to give his celebrated lecture on *Animal Locomotion* in the Assembly Rooms, Bath, which, it is scarcely necessary to say, will be illustrated by his zoopraxiscope and a large series of instantaneous photographs. This lecture is to be under the auspices of the Mayor of Bath and the Presidents and Officers of all the local scientific and art societies, including the Bath Photographic Society. Every one interested in the possibilities and capabilities of photography ought to be present.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1543. VOL. XXXVI.—NOVEMBER 29, 1889.

POSITIVES ON CELLULOID.

It is not by any means an easy matter nowadays to hit upon any striking novelty in connexion with photography capable of taking and holding the popular fancy, and we are, therefore, surprised that no practical use has yet apparently been made of celluloid for positive purposes. The public at large is apt to tire of one particular style of picture; *toujours perdrix* is, metaphorically speaking, no more pleasant when applied to photographs than in the literal sense, and though silver prints have for so long a period held the premier position, there are not wanting signs that at last they are losing their firm hold on public favour. The rival claims of gelatino-bromide and platinum prints have begun to assert themselves, even outside the circle of those whose artistic instincts from the first led them to approve the chaste delicacy of the platinum proof; indeed, it only required the change of fashion, the necessary education to the cool tones and matt surface, to cause the public taste to extend in the new direction.

But, though platinotype and bromide prints have now become regularly recognised products of the professional studio, it is difficult in a practically business way to rouse any great amount of enthusiasm in their favour over and above the ordinary and normal. The vast well-to-do classes look upon it as a matter of duty to be photographed from time to time, but as to most people the ordeal is not a pleasant one—it is postponed as frequently and as far as possible, and nothing short of a decided novelty will electrify sitters into anything like enthusiasm.

Since the introduction of celluloid in extremely thin sheets in this country, a considerable demand has arisen for the films for negative work, and we have seen several very fine effects for decorative purposes in the form of transparencies both for framing and for ornamental glazing. The slightly roughed surface of the celluloid renders it eminently suitable for this class of work, the grain being finer and more delicate than the smoothest ground glass, while the details of the picture are as well thrown up as with a backing of greater density.

But it is not in the direction of transparencies that we consider celluloid has been neglected, but rather of positives to be viewed by reflected light, whether for framing or for album purposes. Opal pictures which, when artistically executed, far excel the best paper prints, both in delicacy of detail and richness of gradation, have long held a deservedly high position, and have commanded high prices when something out of the common or above the average of "an ordinary portrait" is required. But opal in every form is, at present, suffering from the effects of over-cheap production; the shop windows have been full for some time past of indifferently executed opals of any and every kind of subject, and for almost every possible

purpose, until the ordinary mortal has got sick of them, while the former patrons of the better class of opal have lost faith in it.

As a substitute for opal, we can imagine nothing better than the imitation ivory, several different kinds of which have been from time to time introduced, though none, we think, approaches celluloid in general good qualities. The colour, for one thing, is to the artistic eye far more pleasing than the cool tint of most opal glass; it is better suited to warm tones, though not one whit inferior to opal for cool greys or black. It is lighter, less bulky, less fragile than glass, and may be so used as to require no mounting either for framing or any other purpose.

The material we now refer to differs from the celluloid employed for negatives, both in thickness and translucency; an opaque white or cream-coloured pigment is combined with the celluloid, which gives it a certain degree of opacity, increasing, of course, with the thickness of the material, and this can be varied at will. We employed nearly ten years ago a sample made, we believe, by the British Xylonite Company, of Hoxton, which was upwards of one-sixteenth of an inch in thickness, though that now supplied by the English agents of the American manufacturers is only about a fourth of that thickness. One side is finished with an extremely fine polish, fully equal to ivory, and its resemblance to the latter is still further enhanced by a most natural and skilful imitation of the ivory grain. It is perfectly impervious to moisture, not liable to stain, and, in fact, in every way as convenient as glass; and why the makers of plates and films should have so far neglected so promising a novelty is a matter of surprise. Such films in the sensitive condition have been placed on the market, but apparently did not "take," so, perhaps, it may be the fault of the public after all.

Failing the possibility of obtaining the sensitised celluloid, it is not a difficult matter for the photographer himself to coat it with emulsion. The material is obtainable from the agents, whose address will be found in our columns, in sheets measuring 50 x 20 inches, costing 7s. or 8s., and as each sheet will cut up into about thirty cabinets it will be seen that the celluloid is cheaper than good opal glass.

Any good, slow emulsion will answer well for positives, but it is better that it should for the purpose contain a larger proportion of gelatine and less silver than is usual when a negative image is required. This gives a more transparent deposit, and adds to the depth and richness of gradation.

It will not be found convenient, working on a small scale, to coat the full-sized sheets, nor, indeed, anything much exceeding one-sixth of the dimensions, owing to the difficulty of getting the flexible material to be perfectly flat. We have tried a

variety of ways of securing this end, but find nothing more convenient than to squeegee the celluloid on to a sheet of plate glass previously coated with an adhesive material, such as india-rubber solution or one of the adhesive plasters obtainable at any chemists. A very thick mixture of gelatine and glycerine, similar to the well-known "graph" composition, answers well if the emulsion is not too hot when poured on, and we have even succeeded by simply wetting the glass before laying down the celluloid. What is required is simply to retain the sheet in contact with the glass until the emulsion has set, after which it may be stripped off and hung up to dry.

The size of the sheets coated will depend upon the sizes to which they are subsequently to be cut; it should not be too great, owing to the difficulty we have mentioned, nor too small, or extra time and labour will be wasted in coating. The cabinet size cuts rather awkwardly into 50×20 so as to use the material to best advantage, though for general purposes the dimensions are very convenient. Whatever size be selected, care should be taken to allow for cutting off bad edges, which are more liable to occur with celluloid than with glass.

The next point is the cleaning or preparing the surface to receive the emulsion, and this is a rather difficult task, owing to the apparent greasiness of the celluloid. The trouble is vastly lessened by slightly abrading the surface; but then, for some purposes, the beauty of the imitation ivory picture, especially in small sizes, lies in its fine, though unobtrusive polish. If a matt surface will answer, then the polish may be removed by friction with prepared chalk, made into a thin paste with alcohol; or, perhaps, a better plan is to pour plain methylated alcohol on and off a few times, when, upon setting it aside to dry, the surface will be found to have lost its fine finish. A little ether may be added to the alcohol to increase the matt effect.

When it is requisite to preserve the high polish, some other means must be adopted of causing the emulsion to take to the repellent surface. Similar precautions are frequently taken in conjunction with glass, such as applying a preliminary coating of such solutions as silicate of potash or sugar, and these might answer with celluloid, though we are not in favour of such applications. Polishing with powdered talc we have practised with success, though it occasionally fails; but to make assurance doubly sure it is better to follow up the latter treatment by giving a coating of plain gelatine solution containing 10 grains of gelatine, $\frac{1}{4}$ grain chrome alum, and $\frac{1}{2}$ drachm methylated alcohol to each ounce of water. This may be poured on to the levelled celluloid, or the latter may be floated on the gelatine, and the surplus in either case drained off without waiting for it to set. Before placing the coated sheet away to dry, examine it carefully to see that the gelatine has not run away from any portions; if it has, the bare portions must be rubbed with a piece of sponge dipped in the gelatine solution and the coating or floating repeated.

When the celluloid so prepared is dry, it is ready for coating with emulsion, which will then take readily to the surface and adhere perfectly. For coating, let the celluloid be laid down upon glass in the manner described, and then covered with emulsion just as if it were a glass plate only, the film and support being laid upon a levelled slab to set in the ordinary manner. When set quite hard, insert the point of a penknife between celluloid and glass, and the two will part readily, and the sensitive film may be hung up in the drying cupboard to dry.

In cutting up to size, a glass shape and a pair of long-bladed

scissors will prove more satisfactory than any form of cutting or trimming knife, owing to the thickness and toughness of the material; but undoubtedly the best way of reducing the sheets to standard and uniform size, where it is available, is the card or mount-cutting machine that now is to be found in many studios. This is at once expeditious and accurate, and nothing is so essential to neatness of finish or accuracy in cutting.

Collodion emulsion may be substituted for gelatine if preferred, but if applied to the bare celluloid will slightly lower the gloss, and at times tend to produce a slightly sunken appearance in the shadows. The preliminary coating of gelatine obviates this, thus retaining the full polish and giving brilliance and transparency to the image.

Pictures, whether portrait or landscape, should be printed under a mask, in order to provide a clear, white margin, except in the case of those of large size, which are better framed or mounted without margin. If protected by means of a suitable varnish, such pictures may be placed in albums or framed without glass, and exhibit little tendency to succumb to the ordinary wear and tear to which such things are subjected.

We repeat, in conclusion, our surprise that so little has been done in this kind of picture; but perhaps some of the plate-makers will, ere long, remedy the neglect by placing the coated celluloid for positives on the market.

PHOTOGRAPHING INTERIORS.

No. II.

LENSES and camera selected, the tripod claims an important share of attention, and, seeing that an exposure may range over many hours, sometimes even days, rigidity and steadiness are naturally, essential, conditions of construction. We know many old hands who have a very decided preference in this kind of work for the old-fashioned triangular top and ash tripod, made still in the same form in which it was known a quarter of a century ago. Where it can be used nothing can excel it; but it so often happens that the best standpoint for a particular view may be from some inconvenient corner, against an immoveable piece of furniture, off a flight of stairs, through a narrow aperture, or in one of the many awkward spots that those skilled in interiors are only too familiar with, that to use such a tripod is almost impossible. On these occasions, one capable of adjustment as regards the length of its legs is a *sine quâ non*. It is true that extemporised makeshifts can be employed, and with advantage; thus we have used a pair of library steps, and have not disdained the loan of a portable stand for a butler's tray, two of which, superposed, stood us in good stead on one particular occasion. A tripod selected, the first difficulty that is likely to present itself will be the slipping of its points upon the stone floor of church or public building, or the polished wood of a well-built mansion. To avoid this, either the legs must be tied, or, what is better, india-rubber or cork or other shoes provided to fit the metal points, and prevent the sliding away that will happen, though the utmost care be exercised in inserting them in the interstices between the tiles or other portions of the floor. But, again to extemporise an expedient, we must confess to a feeling really of partiality for one or two door-mats to subserve the purpose of slip-preventing. They are to be had in every house and every public building, and one for the front limb and another for those at the back form a foothold which cannot be excelled. Provided, let us add, that the points of the tripod are well

pressed down into the mats, for during an exposure of several hours we have known of blurring being produced by a slight sinking of the whole into the body of the semi-elastic surface of a good cocoa-fibre mat.

Slightly departing from the natural sequence of work in the actual process of taking an interior negative, we may here, so as to keep the more purely mechanical aspects of the case together, refer to the "focussing;" we mean the examination of the image and getting it into focus—a very slight matter to the inexperienced it may appear, but by no means so in reality. It is, in fact, so difficult at times, that we have placed a camera and plate ready focussed *in situ*, and used our judgment only as to its being in focus. The common difficulty is the necessity of working in a corner or some excessively cramped position, and finding, upon examining the ground glass, that there is apparently nothing to be seen owing to the absence of any strong light in the apartment to be photographed. Here it is that the absence of a tail-board or other projection under the chin will be appreciated. However, if the head is kept well covered with the cloth, the eyes will, in a few minutes, begin to perceive sufficient to enable a judgment to be formed as to how the subject generally falls upon the screen, though it will usually happen that some portions can only be calculated as occupying a certain position. It may be that the chief interest of the picture centres in some particularly dark piece of carving, be it wood or stone, and that this in particular must be in focus at all hazards. A white pocket-handkerchief waved about, close to its surface, by an assistant will aid in fixing its position, though occasions will arise when there is not light enough for even this expedient to succeed. The plan then is simply to light a wax match or taper, and let it be held at the salient points necessary to be examined; this will fix the position of the object, and permit a proper focus to be obtained. In our own practice, at sundry times, we have met instances where no other method was available.

The difficulty may arise, perhaps, that an essential portion of the view, although using the shortest focus lens possible, just extends beyond the edge of the plate, even when the body is compressed in the smallest possible space; when, in fact, that little extra space for retiring the camera is just what is needed to enable the whole of the subject to be embraced in the field of view. Here a pair of steps as a tripod will come in with excellent effect. Let the steps be planted rigidly parallel to the wall, the camera placed on the top, and the view focussed in the ordinary way; if a small step cannot be used, the focus must be so arranged as to allow for a little extra distance. Then all that is necessary is to push the steps, camera, and all, right against the wall, and everything will be in the right place on the ground glass.

Very probably it will be found, when all this is done, that the focussing screen cannot be removed to make way for the dark slide, or that the shutter of the latter has no space for being withdrawn. There need again be no difficulty. All that is necessary is to ascertain the relative position of the camera to its support, either by pencilling or scratching lines corresponding with its sides on to the top of the support, or, failing that, placing a couple of heavy books one on each side, so that the camera can just be withdrawn without moving them. This allows it to be removed and replaced without any shifting of the position of the image. The slide may now be inserted, the shutter withdrawn, and the whole replaced ready for exposing. There is not the slightest difficulty in succeeding if this be carefully done; and, indeed, occasions may arise

when this removal from the camera stand, charging with slide, and replacing, may occur when the actual focussing is done in the usual way. When the camera is on the stand, a simple plan of marking its position is to stick a few pieces of postage-stamp paper on its underside and just against the edges of the triangle.

We will conclude this aspect of the subject by referring to levelling the camera. In some otherwise excellent cameras there is not complete parallelism between the front and the ground glass, and as it is so easy in a building to run the eye along the front of the camera, and any door, window frame, or pillar, to ascertain that it is truly vertical, the spirit level itself is apt to be discarded and evil may then result. For it is ever to be remembered that to ensure parallelism of the vertical lines in a picture the uprightness of the front must be entirely ignored: it is the ground glass that must be perfectly upright; no matter how rigidly perpendicular to the floor the front may be, if the back deviate in the slightest sloping lines will result. Therefore, before leaving the focussing let the back be ascertained, either by level, by plumb-line, or by eye comparison with surroundings, to be truly and exactly vertical.

EXHIBITORS, photographic or otherwise, at the late French Exhibition have no occasion to complain of the number of medals awarded by the Jurors in the different sections. But it appears on this occasion awarding and giving are totally different things. It is true that the exhibitor to whom a gold or a silver medal has been awarded can have it by paying for it, and on no other terms. He will be presented with a certificate of the award, but the medal itself, if he has it, must be paid for. The system of charging for medals which have been awarded is not altogether unique at Continental exhibitions. However, it is the award that is most valued, and few English exhibitors who have gained gold medals will, we imagine, care to expend the necessarily heavy sum for their acquisition, whatever may be the case with regard to silver medals. We have been given to understand that medals, *facsimiles* of the real ones, but of base metal—plated or gilded, as the case may be—are, or will be, supplied commercially.

ALTHOUGH the late Paris Exhibition was such a grand success, both as regards the show itself and the number of its visitors, it appears to have been far from a success financially. It is rumoured that there is a considerable deficit. Perhaps this fact may have something to do with the medals not being presented. We have known, in England, of medals being awarded but not given by reason of the financial failure of the undertaking, but not in an exhibition of an international character.

RECENT legislation on the subject has given an immense impetus to electric lighting. Within a very short period there will scarcely be a district of London—or indeed any town of moderate size—where the electricity will not be procurable by photographers without having to go to a heavy expense for plant. This will be a very great advantage to many; for there is no question that the arc light in the studio, when daylight fails, is a great acquisition, as those who have it can carry on their business while others are remaining idle. It is not alone in portraiture that artificial light is useful, but in copying and enlarging. Indeed, most of the work in connexion with the production of type blocks is done by the aid of the electric light. Often a subject has to be photographed and the block produced ready for the press within a few hours; but for the electric light this business could not be carried on as it is now. The time, we imagine, is not far distant when the majority of well-to-do studios will be provided with the arc light as an auxiliary.

A FEW weeks back we alluded to the rapid spread of photography as proved by the number of new societies springing into existence and

the interest taken in their meetings. It is gratifying to note that some of the old ones also show increasing prosperity. The balance-sheet of the Photographic Club, recently issued, shows that it possesses a greater number of members and a larger cash balance than it has had at any time during the ten years of its existence. All this speaks well for photography.

Do some of our dry-plate manufacturers sufficiently consider the importance of packing the plates? That the plates are carefully protected, so far as light is concerned, cannot be denied; but is the material used in many cases really suitable for the purpose? It is not unknown in the experience of makers that a batch of plates, which were pronounced perfect when they were first issued, unaccountably become deteriorated after a few months' keeping. May this not, in many instances, be attributed to the paper or the boxes used in the packing?

It is a recognised fact that plates kept in dark slides are sometimes injured by exhalation from the material used for the hinges of the shutter, and sometimes from the colour used for blacking the slide. It is well known that paper in contact with the film, generally, has a marked influence upon it, as witness the effect of the strips of paper used to separate the plates if they have been long kept. Seeing the action the dark slides may have on plates kept in them, one may readily imagine that some papers may, with variations of the temperature, emit fumes which are equally as deleterious to the plates as those given off by the slides, and, with the present system of packing, there is an air space between each of the films for their circulation. It is a noteworthy circumstance in connexion with this subject, that it is the margins of the plates that first become deteriorated by long keeping, and it is these which would be first influenced by any baneful emanations from the packing paper.

Now that transparencies for the stereoscope and other purposes are becoming more general, many complaints are made that the ground glass supplied for backing them is far too coarse. There is no question that much of the ground glass sold for photographic purposes generally is of such a character that it materially detracts from the delicate beauty of the picture, particularly if it be a small one—a stereoscopic slide, for example; especially is this the case with the glass with embossed borders supplied with the metal frames. Much of this glass is not ground at all, but greyed by the sand-blast process. By this method, it is said, any degree of fineness is obtainable, yet we must confess that we have never seen any sand-blasted glass that was, to our taste, fine enough for stereoscopic transparencies. The finest and best glass for this purpose we have ever met with was that used for the transparencies of Ferrier and Soulier, some thirty years ago. This extremely fine surface was said to have been obtained by hydrofluoric acid.

It is easy enough to grind glass with an exceedingly delicate grain by using emery in a sufficiently fine state of division. The finest flour emery, as met with commercially, is much too coarse for the purpose if used as purchased. However, from it the finest particles—and these answer well—are easily separated from the coarser in the following way:—Take two or three pounds of flour emery and stir it up in a large vessel of water; the coarser particles will quickly settle to the bottom, leaving the finer ones in suspension. After a time the water is poured off into another vessel and the suspended emery allowed to subside. It is then collected and dried, or it may be used wet. The longer the coarse particles are allowed to subside the finer will be the decanted emery; three or four minutes will usually yield a sample which will give an exceedingly fine grain. The way to grind the glass is simply to apply a little of the emery with water and grind the surface, with a circular motion, with a small piece of plate glass used as a muller. Much labour will be saved by starting with patent plate glass, as its surface is quite even and only requires greying. Those who have a difficulty in obtaining fine glass for their focussing screens should grind their own.

MANY of the old French stereoscopic transparencies were backed with a varnished surface. One of the varnishes used, if we remember rightly, was composed chiefly of a solution of white wax in chloroform. Matt varnish is an admirable substitute for ground glass for transparencies, and the fineness or coarseness of the grain is perfectly under control, though, it may be mentioned, if it be made to give a very fine grain it is sometimes difficult to obtain a perfectly even surface on large plates.

THE NEGATIVE IMAGE.

IV.

THE treatment of prepared silver bromide plates, in order that visible positive pictures might be taken upon them, is an idea of comparatively old standing. "An ordinary gelatino-bromide plate," wrote the author of *Modern Dry Plates* in 1881, "darkens in a few seconds under the action of light, and if exposed beneath a negative for some hours a picture full of detail is obtained, which, however, disappears in the fixing bath. By fuming the plate with carbonate of ammonia the darkening proceeds much more rapidly."

Were this information revised up to date, it would doubtless be considered desirable to amend the statement that exposure under a negative for "some hours" was necessary, even with the very slowest of the commercial plates now retailed, except, perhaps, in a highly unfavourable light. Parenthetically, it may be noted that the slow plates, which are invariably coated with a compound haloid, have, relatively to their common sensitiveness, a higher amenability to the visible action of light than plates of pure bromide.

The "disappearance of the picture in the fixing bath" complained of, is a partial confirmation of the writer's experience of the remarkable solvent action of hyposulphite over images obtained upon debromised films, the difference being that in the latter instances the disappearance was incomplete, and was not observed until after many hours' immersion.

Of any experiments having for object the production of visible negatives by submitting the prepared film to the action of reagents no details have been met with. Closely allied to the subject, however, was the frequent recommendation, as a means of increasing sensitiveness immediately before exposure, to exhibit the plate to the fumes of strong ammonia. Such a proceeding was at best open to one serious objection, namely, the difficulty of ensuring uniform activity, and, of course, was impracticable for outdoor photography.

From time to time numerous other bodies have been suggested as capable of influencing the sensitiveness of the prepared film; of assisting or promoting the action of the usual developing solution upon the invisible impression, and so forth, with the particulars of which many are, doubtless, acquainted. Whether any real benefit is derivable from such devices is matter for legitimate debate. The field of experiment, however, still possesses an open aspect, when we observe how ardent and indefatigable are the modern endeavours to abbreviate the exposure by augmenting the efficacy of the older developing compounds and introducing new agents, that should command a more general admiration than they receive, if but a few of the properties that are attributed to them are not imaginary. It is to be remembered that the introducer of hydroquinone claimed that by its use exposure could be reduced one-half; experience has signally failed to confirm the claim. In reference to the history of this developer, it will possibly edify Captain Abney, Mr. W. T. F. M. Ingall, and other workers, to be blandly informed by the conductor of a one-year-old contemporary that "the introduction" (my italics) "of hydroquinone as a developer was largely facilitated by our advocacy" (also my italics). The substance in question was introduced as a developing agent as nearly as possible ten years ago; its properties were most exhaustively examined and discussed between the years 1884 and 1888, and neither our general nor our particular knowledge of those properties has received any addition of novelty or importance from the commercial exploitation of which hydroquinone is at present the victim.

In the previous article we were occupied in tracing the effects of light upon silver bromide, from which, granting the correctness of the chemical change wrought by sodium sulphite in dilute solution, as expressed in the equation, a portion of the halogen had been abstracted, leaving a compound the precise constitution of which must remain unknown, but which, from the marked dissimilarity of its behaviour to that of normal haloid, and the unvarying constancy of its reactions, must nevertheless be considered a true and distinct chemical substance. Furthermore, it was sought to be shown that the products of light and developing agents upon debromised films had an identity in common. Conceding the provisional accuracy of the deductions arrived at, and the experiments upon which they are founded as capable of repetition

and endorsement, we are encouraged to inquire of what practical use, if any, such properties may be made?

Is it, in fine, possible to produce in the laboratory a stable body analogous in composition to the material of the debromised film? Given an affirmative answer and the substance successfully isolated, is it practicable to form an emulsion with it? More: Would such an emulsion take so high a degree of sensitiveness as to give visible images with short exposures; in alternative terms, would light itself and alone reduce this hypothetical lower combination of silver and bromine with total separation of halogen? If so, and allowing fixation to interpose no difficulty, would the resulting negatives be of a kind to obviate intensification or other after-treatment?

Such questions are, of course, not to be answered without a prolonged invasion of the domain of research; but it is not unprofitable at this stage to revert to Mr. Carey Lea's papers upon a kindred subject, and to note that he was able to prepare in the laboratory photo-salts identical with the material of the latent image, and this, not by one method, but by very many; and that he produced by chemical means a sensitive body resembling in every respect the substance formed by acting upon normal haloid with a reagent. It can consequently be understood why it is to be reasoned that an effect corresponding to that produced by sodium sulphite and similar bodies in dilute solution upon a film of normal bromide, is to be duplicated in the pure haloid at or before emulsification. It is worthy of remark that, notwithstanding his observation of the great superiority in visible sensitiveness of photo-bromide to the normal salt, it did not occur to Mr. Lea, practically, to test that property.

One word as to the conflicting theories anent the latent image. If we bear in mind that light subjects silver combinations almost entirely and invariably to a reducing action, and it is discovered that an exact analogue of the product of the decomposition is to be prepared by chemical substances, it is logical to seek an answer to the problem within those lines. We have but to study the chemical action of the spectrum upon other metallic compounds to recognise the force of this principle of the interchangeability of light and chemical bodies. Almost always where light induces partial or complete reduction, we may find that a parallel is to be maintained by chemical agency. Hence the persuasion of the writer for leaning to the inclusion of the silver salts under the same law, and that whether we call the products of light upon them sub-salts or photo-salts, the production of analogous substances in the laboratory with the same facilities that attend the preparation of other bodies having a similarity to those formed by light of their higher compounds, is a clue to the problem not lightly to be rejected.

For light, whether it acts by oxidation or by reduction, has, over numerous compounds, an influence perfectly comparable to most chemical oxidising and reducing bodies. It is, in brief, a re-agent in the truest meaning of the term, with a range of power as wide as that illustrated by a chemical substance in its most concentrated and diluted states. If such a view became universal, our faith in remedies for under-exposure, our confidence in the plethora of developing formulæ of modern practice, would be frail indeed.

While deferring further pursuit of the attempt to establish the practicability of producing visible negative images in the camera, it would be affectation on the part of the writer to omit the admission that the tendency of much of the foregoing is wholly heterodox. The crude theory that silver, in combination with lower proportions of bromine than either chemical or photographic philosophy at present countenances, possesses properties of probable value may not be borne out in experiment; but the extent to which endeavour so far has gone is not opposed to the conviction that therein lurk the germs of an important departure.

THOMAS BEDDING.

ON THE DENSITY OF INTENSIFIED NEGATIVES.

[A Communication to the Photographic Society of Great Britain.]

NATURALLY, intensification of a negative has frequently to be touched upon by writers on photographic matters, but there seems to be only what I may term a qualitative knowledge of its nature. Indeed, the statements about density of deposit have always been more or less random. It was to see whether the density given by intensification had any exact relationship to the density given by mere development of a negative that my time has to a certain extent been employed. In a paper which I read at the Camera Club Conference, and which has appeared in its Proceedings, and in the pages of the photographic papers, I showed that the transparency of the different squares of a negative taken in a Spurge's sensitometer obeyed the law of error when the transparency of the square areas was represented by the ordinates to the curve, and the holes which admitted the light were taken as the abscissæ. I explained that the particles of silver reduced by the developer must be looked upon as being scattered at

random over the different areas, and that the transparency of the negatives was caused by the light penetrating through the interstices left by these particles. In a paper read subsequently at the British Association, and which was afterwards printed in an amplified form, it was shown that there was more than a probability that the number of particles deposited during development varied directly as the intensity of the light which previously had acted, and that the reason why the transparency of the different small areas did not also vary directly was due to the overlapping of particles owing to the random scattering. When the particles are once distributed, and intensification is carried out, it remained a question, hitherto unsolved, as to whether the diminished transparency obeyed any law. The sole answer possible to this question, it appeared to me, could only be arrived at by direct experiment. It must be borne in mind that the positions of all the particles of silver which have been reduced by development are fixed; and it was a question if the intensified negative might not obey the same law as the unintensified negative. It must not be forgotten that intensification by the ordinary mercury and silver method implies that each particle of silver is increased in size, and that therefore in all probability the same formula would apply to the intensified negative as it did for the unintensified one. The experiment was carried out in the following manner:—A plate was exposed in a Spurge's sensitometer for a time sufficient to give nearly opacity on the area to which the greatest intensity of light was admitted, i.e., with the light coming through the largest hole. The usual alkaline developer was employed. After development the plate was fixed, and the different opacities measured in the manner I have described on previous occasions. The curve was then plotted, taking for abscissæ the number of the holes of the sensitometer, and for the ordinates the transparency of each part. The theoretical curve was then calculated as is ordinarily done, and the observed and calculated values, when compared, show their agreement. The negative was next intensified by the mercury and silver process. It may perhaps be of value, and make this paper more complete, if the formula for the intensification be given, more especially as I wish to call attention to the fact that negatives I have treated with it remained unchanged, which unfortunately is not the case with the old mercury method. I have called this in one of my works "the best intensifier," and I certainly think it is so:—

1.	
Bichloride of mercury	100 grains.
Bromide of potassium	100 "
Water	10 ounces.
2.	
Silver nitrate	100 grains.
Water	10 ounces.

To this last is added a 100-grain (to the ounce of water) solution of potassium cyanide till the precipitate first formed is just not entirely dissolved. The plate is immersed in No. 1 till it bleaches thoroughly. It is then washed copiously and immersed in No. 2 till it is blackened right through the film, and again thoroughly washed. The sensitometer negative thus treated, after drying, was measured for a transparency. On applying the formula $T' = T e - \mu x^2$, x in terms of light, intensity being 25, where μ is the intensity of the light, where T is the total transparency, and T' that passing through a hole No. x , x being reckoned in this case, and in the proceeding from the hole in which no deposit was to be seen. It was found that the formula applied in this case as it did in that of the unintensified negative. The zero of the abscissæ was found to be the same in both cases, as might be expected from the nature of things.

In the ordinarily developed negative μ was found to be .00303, while for the same negative when intensified $\mu = .01015$. Total transparency T having measured 80° on the rotating sectors. The formulæ became in the two instances $T' = 80e - .00303x^2$ and $T' = 80e - .01015x^2$ when T and T' are the transparency of the deposits in the ordinary and in the intensified negatives respectively.

We thus find that $\frac{T'}{T} = e^{-.0112x^2}$, which shows that the density obtained by intensification is not directly proportional to that existing in the simply developed negative, as many have imagined, but increases more rapidly, in fact, as the logarithm. The gradation is much more rapid in the intensified negative than in its original state. It is not hard to calculate what the difference in gradation is, for we shall find it when the intensities of the light come in through any particular square of the sensitometer. This being so, we have $1e - .00303x^2 = 1e - .01015x^2$. Taking logarithms on both sides of the equation we get $\frac{x}{T} = 1.207$. That is, the range of gradation of the one is about 1.3 times that of the first one, the range being reckoned as derived from the sensitometer. If a little thought be given to

negative that requires intensification, it will be seen that the highest light falls short of anything like good opacity. Suppose that the greatest opacity was such that $\frac{1}{16}$ of the light passed through it, then by intensification the density would be so increased that only $\frac{1}{256}$ of the light would pass. For printing purposes the $\frac{1}{16}$ transparency is nearly equal to total opacity. But the fact must not be lost sight of that intensification is absolutely hurtful if the opacity in the high lights is what it should be without it. The details in the high lights, which may be very delicate shades of light, will be represented very nearly as opaque as the highest lights themselves, and they will appear as blanks when the negative comes to be printed.

I trust that the results I have given will be of some scientific value, for the more we know about quantitative photography the more useful we make the art generally. I dare say to a large majority of those attending the meeting this paper will be voted as too mathematical; but I think even a dull mathematical paper, if it contains anything novel, should be read before the Society, whose *raison d'être* is to foster not only the art side, but also the scientific side of photography. I can conceive of no greater proof of this than to look at these walls on which are so many splendid examples of art, and then on the black board, where we only see formulæ and apparently shapeless curves. The connexion between the two may seem remote, but I believe that it is by fostering the latter that the former will make any real progress. W. DE W. ABNEY, R.E., C.B., D.C.L., F.R.S.

SPIRIT PHOTOGRAPHY.

[THE writer of the following article, Mr. Henry J. Newton, is entitled to speak on the subject of Spirit Photography with a certain degree of authority because, as a photographer, he is and has for many years been the President of the Photographic Section of the American Institute, while he is further, and has long been, the President of the First Society of Spiritualists, New York.—Ed.]

WHETHER spirits have been or can be photographed is in the minds of many still a mooted question. When the subject was first brought to public notice, the law of optics applicable to such cases which science has promulgated and adapted required that a subject to be photographed must be to a certain extent opaque; in other words, a perfectly transparent body could not be photographed, it must be dense enough to reflect sufficient rays of light to project a visible image on the ground glass of the camera. At that time I believed these views to be correct, therefore, when questioned as to my belief in the truth of statements made, that through certain mediums spirits had been photographed, I pointed out the obstacles in the way and stated that to my mind, as I understand the laws governing such cases, they would be insurmountable.

At that time Spiritualism had developed but a limited variety of phenomena, and occupied a very different position in the world from what it does to-day, and the scientific theories which prevailed thirty years ago have in many instances been modified, and entirely changed in others. Whether or not we know anything more about light than we did then, we merely know more about some of its properties. The drift of scientific investigation, with reference to the constituent properties of light, point prophetically to the probability that in the no distant future science will adopt the theory that electricity and light are identical. Should this be so, it will not follow that we shall know practically anything more about light than we do now.

When photography was first introduced, and for many years after, science claimed that the action of light on the haloid salts of silver was a chemical action. This claim went undisputed and unchallenged until about the year 1865, when one of our most noted American chemists published the result of a series of experiments bearing upon this question. In his published statement he says that he became thoroughly convinced that the action of light on the sensitive film was purely mechanical and not chemical. The theory was that light travelling with the velocity which has been demonstrated, must, in coming in contact with any substance, exert a degree of physical force corresponding to its density and rapidity of motion, therefore, when the light impinged on the delicately prepared film, sufficient mechanical action resulted to produce the photographic image.

He states that one of the experiments which he made, and which to his mind was conclusive, was in submitting the prepared sensitive film to the delicate pressure of a medallion or uneven surface (I think he used a fifty cent piece) in his dark room, and then applied the developing solution, and an image was developed the same as if the plate had been exposed to light in the usual way.

This fact demonstrated the possibility of producing an image equivalent

in all essential respects to a photographed one in a dark room without the interposition of actinic light in any form. This was exceedingly interesting to me, and furnished stimulus to further experiments in occult photography.

The fact would seem to have been established that a photograph could be formed on the prepared plate by physical manipulation in the dark room, and I had many times witnessed the exercise of spiritual force infinitely greater than that required to affect a sensitive plate by an invisible, individual intelligence, and the question arose in my mind why images could not be formed by some invisible expert without the use of light, and with much less effort than is required to write between two closed slates. Additional evidence of the physical force of light was furnished by experiments conducted by Professor William Crookes, one of the most distinguished scientists of England, and Editor of the *Chemical News* of London.

He constructed an instrument which he called a radiometer, which was made by placing in a glass globe, or bulb, a wheel with four delicate fan-shaped arms, so arranged as to revolve something on the principle of a windmill. After exhausting the air from the glass bulb, it was hermetically sealed; the wheel was then in a vacuum, and it was found that this wheel would revolve when a ray of light was permitted to fall upon it, and, furthermore, the rapidity of the revolutions was in the ratio of the intensity of the ray of light. I have used this instrument to accurately measure the comparative quantity of light necessary to affect the sensitive surfaces prepared by different manufactures of photographic plates.

In the early part of my experiments, the idea of full form materializations had hardly been broached, and therefore did not form an essential element in my methods as it did afterwards. It is not my purpose in this article to detail any of my experience with the many mediums who have kindly volunteered their services, as that alone would make a long article; suffice it to say, that I obtained two or three pictures which were produced by spirit power, and about which fact there can be no reasonable question. My purpose mainly is to point out a way by which any medium who believes him or herself an instrument for producing spirit photographs can know beyond a peradventure that whatever results are obtained of an abnormal character on the sensitive plate through their mediumship can be relied upon as genuine.

First, however, I wish to say something more about light, so that the reader can more readily understand the whole subject. A photograph can be made in light from which the visual ray has been abstracted. It must be borne in mind that the visual ray in the solar spectrum is the ray which excites the optic nerve and produces the phenomena we call seeing; therefore, it follows that light from which this ray has been abstracted will be, as far as our vision is concerned, darkness.

In analysing the solar ray for the purpose of experimenting, the prism used should be made of transparent rock salt, as this does not absorb the heat ray, which glass will more or less. By passing a delicate thermometer along the spectrum it will become manifest that the heat rays reside between the visible rays, and increase in intensity as we approach the least refrangible end of the spectrum, and we find the greatest heat some distance beyond the red ray. This ray is not, however, the one which produces chemical action.

It will be found that the chemical ray is also invisible, but increases in power as we proceed towards the most refrangible end of the spectrum, and the greatest energy is manifested some way beyond the visible violet ray, these two invisible rays acting with increased energy as we approach opposite ends of the spectrum.

It is evident that neither of these rays excite the optic nerve or produce the phenomena we call vision, and neither of them are coincident with the visual ray, and therefore do not focus at the same point when transmitted through a single meniscus lens upon the ground glass of the camera.

You will now more readily understand the following experiments, for which purpose use any ordinary camera and achromatic lens. Set up the object you wish to photograph—a good steel-plate engraving answers an excellent purpose—and focus it on the ground glass. Have prepared a glass cell large enough to cover the front of the lens, and about three-eighths of an inch thick. Fill this cell with bisulphide of carbon, which is a perfectly white, transparent liquid. Into this liquid put a small quantity of iodine sufficient to change it to a deep violet colour. This liquid so prepared has the power to absorb all the visual rays from the solar spectrum which pass through it. Place the cell so prepared directly in front of the lens, and in contact with it, in such a position as effectually to exclude all white light from the camera; there can be, therefore, no white light or visual ray enter the camera through the lens, and by placing the focussing cloth over your head and examining the interior of the camera, it will be found to be perfectly dark, yet the actinic ray is not excluded; and, if

under these conditions you expose the sensitive plate on which you have focussed, you will be surprised to find that the photographic image has been produced on the sensitive plate nearly as quick as if the cell of violet-coloured liquid had not been there. As wonderful as these results are, they are but a small part of the wonders revealed in experimenting with light, but only a few of them are pertinent to this subject.

The absorption of light by certain substances, and its retention for a limited period, may properly be noticed briefly here, from the fact that it has been alleged that some mediums for spirit manifestations have made use of this fact to deceive their patrons. Whether this be true or false, I have formed no definite opinion, for the reason that, so far as I know, there has been no reliable evidence produced to prove such statements to the satisfaction of a conservative and careful searcher after facts. In the hands of a crafty and designing person, having knowledge of this peculiar property of light, I admit it would be possible to impose upon the ignorant and inexperienced, but any one at all familiar with experimental exhibitions of light held by absorption would not be likely to confound it with any of the most ordinary spirit lights. The major part of what I have read in spiritualistic papers touching upon this subject have been exhibitions of ignorance regarding the whole matter.

Any medium for spirit photography should have for a photographic outfit a stereoscopic camera. With such an apparatus there is necessarily made simultaneously two pictures of the same object, as the camera is arranged with two perfectly matched lenses. If on a sensitive plate exposed in a camera so arranged there should appear an image on one part of the plate from one of the lenses, there must of necessity appear an exact duplicate on the other part of the plate from the other lens. Now, as all so-called spirit pictures which are fraudulently obtained are made by manipulating the plate either before or after exposing, when there is no visible image to guide the operator, it is with him either the work of measurement or of guessing where the figure which he improvises shall be placed; therefore, it will readily be seen how impossible it would be to produce two fraudulent pictures exactly alike, such as the stereoscopic instrument would produce.

If, however, it were possible by an ingenious person using careful measurements to produce two pictures apparently simultaneously so near alike as to deceive an inexperienced person, its genuineness can readily be determined by having prints made from this negative and mounted in the usual stereoscopic manner, which is to cut the print in two pieces through the centre, and place the right-hand picture on the left of the card mount, and the left picture on the right end, then look at it through a stereoscope, and if it is a genuine stereoscopic picture the figures will stand out in relief, if fraudulent they will be flat. Any medium for spirit photography who will adopt this method will avoid all danger of ever being called a fraud if they obtain a genuine stereoscopic picture of a spirit.

I have in my possession a stereoscopic spirit picture made in Central America by a friend of mine, and I have also seen the negative. The story of its production and the recognition of the spirit picture by relatives in London give additional interest and value to the picture.

—The Better Way.

HENRY J. NEWTON.

EIKONOGEN.

HERZ EUGEN VON GOTHARD, Principal Astronomer of the Herenz Observatory, whose recent stellar photographs obtained with orthochromatic plates and a reflector have become famous as a new departure, supplies the following notes from his experience of eikonogen.

"I employ," he says, "two solutions of the following composition:—

SOLUTION 1.

Sodium sulphite	200 grammes.
Water	3 litres.
Eikonogen	50 grammes.

SOLUTION 2.

Soda	150 grammes.
Water	1 litre.

"For use, three parts of Solution 1 are mixed with one part of Solution 2.

"Solution 1 keeps in good condition for at least three months. Dissolved in pure distilled water eikonogen decomposes very rapidly, and in an open glass turns yellow in a few minutes, then brown, and finally the colour of coffee. The undissolved powder also becomes brown if not kept in an air-tight vessel. Eikonogen acts very energetically, bringing out the image quickly, and finishing rapidly. When the development is carried too far, yellow or green fogging frequently takes place, even when the solution is diluted with water. One disadvantage of eikonogen is that it easily produces too hard negatives on account of its energetic

action. If the solution is diluted with half its volume of water the negatives are much softer and more harmonious, but the action is considerably slower and green fog easily appears. The same solution can be employed three times in succession, even for instantaneous exposures, but after that it loses power. The plates must be very carefully washed after developing if one intends employing an alum bath, otherwise considerable precipitation takes place in the film destroying the negative. The alum bath may, however, be omitted, and an acid sodium solution alone employed. Bromide of potash acts as a powerful restrainer. As regards price, the cost of eikonogen is about the same as that of the soda, pyro, or hydroquinone developers, but as it can be employed several times in succession, it comes considerably cheaper."

A NEW PLATINUM TONING PROCESS.

[A Communication to the Camera Club.]

THE very great stability of the metal platinum, superior even to that of gold, has from the very commencement of photography naturally excited many workers to experiments, with the view of making it a basis for a positive printing process that was to defy the ravages of time. As far back as 1832 we find recorded experiments of Sir John Herschel on the action of light on salts of this metal; he was soon followed by Robert Hunt, amongst others, who has left a very detailed account of his numerous experiments in the pages of his well-known works on *Light* and *Photography*. In more recent times Willis entered the field, and his experiments resulted in the well-known hot and cold-bath platinum processes, which will hand his name down to posterity as the father of all platinum printing. Of the numerous array of smaller workers I will not weary you; their efforts are to be found here and there in the earlier numbers of our own and foreign photographic journals.

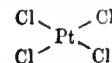
But I cannot continue without devoting a few words to the experiments of Mr. Burnett, of Edinburgh. This gentleman appears to have tried every salt of platinum as toning agents, and, moreover, appears to have specially advised the use of the platinum in preference to the platonic salts, and also advises their use as developers of images formed on uranic and ferric papers, thus closely foreshadowing the present platinum processes.

A careful study of all these experimenters' works shows, however, that the platinum salts are not practically reducible by the action of light, even when in the presence of organic substances, but if it be wished to obtain an image in platinum black, it is first necessary to form a provisional image, visible or not, and then, by means of a toning or substitution process, convert this provisional image into one formed of platinum.

Every kind of platinum printing at present known is subject to this law, which distinctly separates it from the ordinary types of positive printing in silver, whether direct or by development. In these processes the image is formed of silver which has been blackened by exposure to light, or rendered prone to reduction by suitable agents, and this blackening forms the image. In platinotype the image is formed of another metal, to be replaced later on by platinum, and by a substitution process analogous to that in which the silver image is sometimes partly replaced by the gold of the toning bath. Gold toning is sometimes described as a *gilding* process, and it is assumed that the silver image is coated, or *gilt*, with a thin layer of gold, but I think that there can be no doubt but that it is a pure chemical substitution process, three atoms of the silver image being replaced by two of gold, the silver chloride, or oxy-chloride, that is so formed being subsequently dissolved out in the hypo.

The well-known modern platinotype processes of Willis and Pizzighelli come under the above rule as toning processes, the only difference being that the metal of the provisional image is iron instead of silver, and at present all known platinotype processes may be classed together under the head, *toning processes*.

The first gentleman who appears to have practically used platinum as a toning agent was a Frenchman named M. Carranza, who described his process in *La Lumière*, February, 1856, and *Photographic News*, vol. i., p. 251. He used a dilute solution of platinum chloride acidulated. Now the commercial chloride of platinum is, according to Pizzighelli, chloro-platinic acid; the real platonic chloride is PtCl_4 , but is insoluble in water, and therefore hydrochloric acid is added, making the formula $\text{PtCl}_4 \cdot 2\text{HCl}$; it further contains $6\text{H}_2\text{O}$. Now in this salt, which is the common platonic chloride of commerce, sometimes called bichloride, a relict of the older chemistry, the platinum is tetravalent, that is to say, its molecule is formed of an atom of platinum united to four atoms of chlorine, and



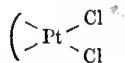
therefore, when a substitution is effected, four molecules of a univalent salt (that is a salt which is satisfied by a single atom) must be brought

up to the platinum salt, and each take one atom of chlorine before the platinum can be reduced to the metallic state. Silver is such a metal, and if the atomic weights of this salt and platinum were the same, it would mean that four parts of metallic silver must be converted into the chloride before one part of platinum metal could be formed, and therefore the deposit would only be one-fourth as thick. Or again, if their colouring properties were equal, after the substitution the intensity of the platinum image would only be one-fourth that of the provisional silver image. However, platinum has, weight for weight, like gold, a greater colouring property than silver; and, furthermore, the substitution process is never very thoroughly carried out, but still there is a very decided loss of intensity in a print which has been thoroughly toned by platonic chloride. It is extremely probable that the free hydrochloric acid has also a deleterious effect on the image; for in the best toning formulae, which contain platonic chloride, it is recommended to first neutralise the hydrochloric acid and then re-acidify the solution, preferably with nitric acid. But even after this precaution it cannot be said that there is any satisfactory process of toning by platonic chloride at present described.

In comparing toning processes by means of platinum with those where gold is used, it must also be remembered that the platinum is much less easily reducible than gold, and Mr. Willis found, in his early experiments, that the salt was by no means to be precipitated like the chlorides of gold or silver. However, the fact that oxalic acid greatly aided the reduction of gold from its salts had long been a known fact in chemistry, and its similar action on the platonic salts had also been noticed by Döbereiner (Schwergger's *Year-book*, vol. xvii., p. 122), who found that chloride of platinum in solution of sodium tartrate, or oxalic acid, separated out under the action of light in the form of a thin film. This fact appears to have also been known to Willis, who in his early experiments found that a hot solution of oxalate of potash instantly precipitated the platinum from the chloride when in the presence of a protosalt of the heavy metals, in his case ferrous oxalate being the one used.

But, as we have already seen, the platonic chloride demands that four molecules of ferrous oxalate shall be converted in order to liberate one molecule of platinum, and since the ferrous oxalate has to be formed by the agency of light, it follows that the proof must be very much overprinted in order to get enough of the ferrous salt to make the image of sufficient intensity.

It was at this point that Willis introduced his great improvement which made platinotype a practical process. He found that platinum was capable of forming a second series of chlorides, in which the metal acted as if it were divalent. Such a chloride is known as platinumous chloride, PtCl_2 , in which we may suppose that where two of the bonds of the platinum atom are satisfied, each with a chlorine atom, the other two mutually satisfy each other.



It is evident, at first sight, that with this salt it will only require that two molecules of any univalent metal be presented to the platinum salt, when they will take up all of the only two chlorine atoms in it and liberate the metal, and therefore with this salt we only require half as much reduction to produce an equal effect as it would were the platonic chloride used. We may further assume that the two bonds that are satisfied by each other are in an unstable equilibrium, and can easily be dissociated, and thus accelerate the rupture of the complete molecule and render the ultimate precipitation of the metal more speedy. I think that there can be no doubt that experiment and practice has proved the correctness of the above theories, and I hold that platinum toning only became a practical possibility from the day that Willis employed the platinumous instead of the platonic salt.

Platinumous chloride itself is an insoluble salt, but it forms with the halogens double chlorides which are freely soluble in water, the salt that has proved the most suitable being the double chloride of potassium and platinum, known as the chloro-platinite of potassium, 2KClPtCl_2 , or K_2PtCl_4 .

In the most recent of the platinotype processes, known commonly as the cold-bath process, or Willistype, this salt is practically used, the provisional image being formed of ferrous oxalate, in which, however, the organic matter in the sizing of the paper certainly has some action; this provisional image is converted into platinum by the addition of the chloroplatinite of potassium, oxalate and potassium, and monopotassic orthophosphate, the quantities being as follows:—

D.

Oxalate of potash	5 ounces.
Monopotassic orthophosphate	3 "
Water	50 "

P.

Platinum, chloroplatinite	60 grains.
Water	2 ounces.

Normal developer, D 3 parts + P 1 part + water 2 parts.

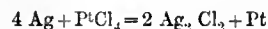
This developer is brushed over the print, or the print is floated on the developer; the faint lilac image very rapidly changes to a deep rich black, the print being completed in from one-half to one minute. The unaltered iron salt has then simply to be dissolved by suitable acids, and the proof is complete.

When we come to the other sort of platinum toning, where silver is used as the basis, we see that very much the same chemical changes obtain. The colouring matter of which the image is formed is more complex in its nature, being probably a mixture of metallic silver, purple subchloride, and a deoxidised organate of silver, which Messrs. Davanne and Girard very appropriately term a *lake*.

It is, therefore, difficult to say precisely whether any particular one, or all, of these compounds have an action. I am inclined to believe that the violet subchloride practically plays no part in the transformation; for if the print be treated with common salt, all the violet subchloride is destroyed, and the reddish organate of silver alone remains, but yet the toning goes on as well (perhaps a little more slowly) as usual. But, at the same time, if a print be fixed in hypo before toning, as far as my present experience goes, I find that the print refuses to tone; with plain paper prints, however, there is a slight tendency to tone.

There is a certain contradiction in this which I cannot as yet solve or explain.

But whatever may be the precise composition of the salt that forms the provisional image, the action is precisely the same as in the case of iron. Assuming it to be metallic silver, we should get the following equation, parodying that of Berkeley:—



—this is, of course, far from being correct, for we know that the silver is not wholly in the metallic state. However, the equation shows clearly enough that four molecules of the silver are converted into chloride before one of platinum is reduced, and these four molecules of silver had to be produced by the action of light.

With plain paper prints, that is, paper simply salted and excited, it is an easy matter to obtain some sort of toning with any platinum salt, but not so with albumenised prints; this fact was noticed from the very first by Haackmann (*Photographic News*, vol. i., p. 251). It would appear, therefore, that the reduced albumenate of silver that is formed by light has a mechanical action that tends to prevent a ready interchange between the two metals, and that we should therefore endeavour to soften the albumen by some agent, such as tartaric, acetic, or tribasiphosphoric acid added to the toning bath. I have, however, such a dislike to the surface gloss of all albumenised prints, that I do not take enough interest in them to experiment in this direction.

I have, however, for some time past, been trying to bring about a thorough toning of matt-surface silver prints by means of platinum. The goal I have aimed at is to have a print that can be examined in the printing frame as it progresses; the advantage of this for combination or cloud-printing is obvious. Secondly, the greater part, preferably the whole of the silver, should be replaced by platinum black—that is, that the print should not change colour when treated with mercuric, cupric, or other chlorides or oxidising agents. Minor points are that the print should not lose in intensity in the toning, that the colour should be variable, that some power of altering the gradation or scale of tones should be possible by slightly varying the toning ingredients; in short, that the process should be as perfect and as well under control as the cold-bath platinotype process, with the advantage that the paper requires no special precaution in keeping, and the image is plainly visible. So much for Utopia; now for practice.

My first experiments were naturally made with the ordinary commercial platonic chloride, and I found that it certainly was capable of toning, although slowly, and as the formula shows there should be, I got a great reduction of half tone, and general loss of intensity over the whole print. Following the lines of Willis, I tried the addition of oxalate of potassium; this certainly improved the toning of the platinum, and it was possible to completely convert the image into an agreeable tone, but the loss of intensity was very great, and the prints, to have any vigour at all, had to be printed very deeply. The effect of this was to cause granulation in the darkest shadows, that is, where the print was solarised and had the well-known metallic lustre due to this cause. In this the silver prints show a striking analogy to the iron ones; it is a well-known fact, both in the hot and cold-bath platinotype processes, that after a certain exposure the image solarises, and becomes lighter in colour than the surrounding

parts. I have repeatedly noticed that these solarised parts, on development, also gave granularity. I cannot chemically account for this; I can only presume that in these solarised parts the metal has been completely reduced from the organate, and that it has a tendency to form into nuclei around which the deposit of platinum is more violent.

Finding, then, that the ordinary platonic chloride was unsuitable for toning, it was only natural at this stage to further follow Willis's example and use the platinous salt. This I did, and my first experiments were made with the ordinary developer as recommended by Willis in his cold-bath platinotype process. My very first trial gave me a very remarkable success, so much so that this developer is a very good toning formula in itself without any alteration. In my first experiments I proceeded exactly according to Willis's instructions. I, of course, washed the plain paper print to free it from the free nitrate, and then simply floated it over a little of the developing solution spread out over a piece of glass; the toning took place with the greatest of rapidity—in fact, quite as quickly as the ferric oxalate paper, the red-brick colour of the silver organate rapidly giving way to the black of the platinum. When this colour, viewed by transmitted light, had entirely disappeared, the print was fixed and washed in the ordinary way, and an image was left resembling very closely an ordinary platinotype hot-bath print in colour. I described this process, and showed some specimens at the meeting of the Camera Club, November 29, 1881, when Mr. Willis gave his demonstration of his then new cold-bath process.

During the winter I allowed my experiments to lapse, but in the spring, incited thereto by the appearance of Mr. Valentine Blanchard's toning process, which possessed considerable analogies, I continued my experiments.

With the ordinary platinotype paper the chloroplatinite of potassium is not reduced when applied to the paper in an aqueous solution, but requires the addition of a soluble phosphate or oxalate; but with the silver provisional image such is not the case, the platinum being rapidly reduced from the chloropotassic salt without any further addition. It is difficult to say precisely whether any advantage accrues from the addition of the oxalate; when present in large quantities it is injurious, giving a brown or yellowish colour to the delicate half tones, and when present in small quantities it appears to have no very appreciable effect, so that in my subsequent experiments I have entirely discarded all other chemicals but the chloroplatinite of potassium. At the same time, I am inclined to think that the oxalate may cause a more complete reduction of metallic platinum and so tend to permanency. Further experiments are wanted in this direction.

The next series of experiments were made to determine the solubility of, or the best amount of water to use with, the chloroplatinite of potassium. It must be confessed that but very little difference is to be found in the resulting prints from any variation in the strength of the developing solution. By difference is meant, of course, a variation in the scale of gradations, or intensity curve of the print. The sole difference between using a concentrated solution 1 in 15 (platinotype formula) and 2 grains to the ounce (1 in 218), is that the former completes its work much more rapidly—in fact, the change is almost instantaneous, and the print may be held in the hand and watched during the operation. In such a case it is, of course, preferable to either brush the solution over the print or else float the print on it. When more dilute solutions are used, the toning proceeds more slowly, and the print should be immersed in a bath as in ordinary gold toning. The results, however, will be sensibly the same, with the advantage in favour of the stronger solution, which has a tendency to give slightly more brilliant results. The strength that I practically use now is about 1 in 218, that is, a drachm of the platinotype solution is made up to two ounces, with which the toning proceeds quite rapidly enough to enable the developer to be brushed on. I will refer later on to the practical details of the process.

The alkalinity or acidity of the bath demanded also a series of experiments. I do not find any appreciable difference with results when the solution is acidified. The prints have perhaps a slightly blacker appearance, but that is all; but when rendered alkaline, the solution refuses to tone at all, even when a concentrated solution (1 in 15) is employed. This fact was very noticeable—so powerful was the toning solution, that when the wet print was immersed in an acid solution to neutralise the alkali, there was enough platinum left in the pores of the paper to instantly tone the print. Even when only a little alkali is present, I find the toning action is much slowed. In this respect my results differ from those of Gwenthan (*Photographic News*, vol. ii., p. 263), who says alkaline solution gives brown and acid ones blue tones.

With regard to the formation of the provisional image, all my early experiments were made on ordinary commercial matt-surface sensitised paper. I have used several brands, some obtained from the Civil Service

Stores, some from Marion's, Watson's, and Valentine Blanchard. The last two papers gave decidedly superior results, owing, probably, to their being more richly silvered. It is necessary in this process, if an ordinary negative is to be used, that the paper be somewhat rich in silver, as a good deal of this metal must be reduced in order to obtain a very dense deposit of platinum; in fact, with the same negative, it is not possible to obtain as deep a black on any brand of ready-prepared paper as can be obtained with the ferric oxalate paper of the Platinotype Company. A sufficient intensity for all ordinary purposes can be obtained, however, from any fairly plucky negative. The prints I show, together with the negatives, will give you an idea of the results that can be obtained from the ordinary material to be obtained from the chemist.

But I think it is one of the great advantages of this process that it is an extremely easy matter to sensitise one's own paper. It will at once be evident the artistic power this gives one; not alone are we confined to rough or hot-pressed parchment or plate paper, but we can produce our pictures on silk or cotton, leather or satin jean, or whatever material the texture of which we think may enhance the effect we have in view. The few examples I hand round, hurriedly and imperfectly executed, will, I hope, give you an idea of the power it puts in your hands.

Although foreign to my paper, I will here give you the salting and sensitising mixtures that I have found most suitable for the formation of the provisional image:—

SALTING SOLUTION.

Gelatine	90 grains.
Chloride of ammonium	60 "
Carbonate of soda (re-crystallised)	120 "
Citric acid (in crystals)	30 "
Water (rain or distilled)	10 fluid ounces.

Any gelatine will do. The ordinary gelatine of the housekeeper, sold by Nelson in one ounce packets, answers very well. The above quantity will be sufficient to make the above solution set into a weak jelly when cold. More or less can be added, according to the taste of the operator, or the amount of size the paper already contains. In the place of gelatine, starch or arrowroot may be used (for English animal-sized papers I prefer arrowroot), the resulting tone of the print varying slightly thereby. The quantity of the sizing must, of course, vary with the quality of the paper used. The object of the sizing is to keep the image on the surface; therefore, with a porous paper much, whilst with a glazed paper little, should be used. The above amount will be found sufficient for most papers, without causing any objectionable gloss after finishing.

I prefer the ammonium to the other chlorides myself, but sodium or barium can equally well be used, the proportions then being, for the above formula, sodium chloride, 72, or barium chloride, 138 grains. The paper should be floated on this mixture, or it should be brushed over it, care being taken not to wet the back. It should then be hung up and allowed to dry. In this state it may be freely exposed to light.

With regard to the sensitising solution, I much prefer the variation in the ammonio-nitrate of silver as introduced by Hardwich, the strength I use being sixty grains to the ounce. The following is the method of preparation:—Dissolve the sixty grains of silver nitrate in half an ounce of water; then add strong ammonia till the brown precipitate first formed is redissolved; then divide this mixture into two parts, and add nitric acid till it gives a distinctly acid reaction; then mix the two parts together, and make up to one ounce. This solution is ready for use at once, and only keeps in the dark.

This solution of silver oxide, dissolved in nitrate of ammonia, is undoubtedly the most rapid process; but, like other processes, when speed is desired, its manipulation is more difficult, and it does not keep. In this respect it is vastly superior, however, to the ordinary ammonio-nitrate process, which hardly keeps a few hours. Paper prepared with the above formula will, I find, keep a day, or even two, with care. A disadvantage is that it is impossible to float the paper on this mixture, but it has to be brushed over the surface of the paper, or applied with a glass rod in the usual manner.

Therefore I largely use the ordinary nitrate of silver process, using a bath of the same strength—sixty grains to the ounce. This bath can be used over and over again, and sheet after sheet floated till it is all but exhausted. With this bath, however, I prefer to slightly increase the amount of salt, making it, say, ninety grains. I find a paper so prepared to be fairly rapid, giving untuned prints of a rich colour. I find also that it is advisable to add citric acid to the above solution till all effervescence ceases, and the reaction is slightly acid. This is unnecessary if the paper be fumed, a process which, in very dry or very dull weather, I can most confidently recommend. For further details as to plain paper

silver printing I would refer you to the pages of Hardwich's *Photographic Chemistry*, and THE BRITISH JOURNAL OF PHOTOGRAPHY, leading article, 1878, page 78 and *ante*, where full practical details are given.

(To be concluded.)

LYONEL CLARK.

Foreign Notes and News.

THE Germans appear to have been excessively pleased with the Berlin Photographic Exhibition. We, last week, chronicled the fact that the greater number of the objects there exhibited had been removed to Königsberg, where they form a continuation of the great exhibition. Dr. Vogel has now made arrangements for their further removal, at the beginning of next year, to Breslau, where, for some three weeks, their presence will gladden the "friends of photography" of that town. Both Leipzig and Heidelberg had subsequently written to request that they might be made participants in the honour, but their petitions arrived too late. It would be difficult to find a better proof of the wide interest all classes in Germany take at present in things connected with photography.

HITHERTO, pliable films have had but a very limited employment in that country. Now, however, thanks mainly to the exertions of Dr. Arnold, they are gradually coming into use. In Berlin, Messrs. Heselkiel & Justi have established an agency for Anthony's sensitive films, and Herr Richter for Balagny's. Herr O. Perutz, of Munich, has also extended his business by adding a branch for film manufacture.

THE recently opened Polytechnic Institute of Zürich, besides being provided with chemical and pharmaceutical laboratories and workshops, also rejoices in the possession of a photographic department. This consists of a large room ten metres by 6.45 metres, communicating with which is the studio, three metres by six and a half. The dark chambers are situated in the basement, which is entered by a spiral stair. The large room contains the work tables and retouching tables, and is provided with a small, miserable, dark chamber. The basement is divided into four parts. One of these contains thirty-two small cupboards for the pupils to store their reagents in: the other three form laboratories, furnished with water-pipes, tables, &c. Here is placed an apparatus for drying plates, and an apparatus for enlargements. As only nine students can work at once, it has been found necessary, in consequence of the large number desirous of doing so, to organize work in "gangs." The glass roof of the studio has been provided with a number of water-pipes, which will enable snow or dust to be got rid of, and in summer help to keep it cool—a practical arrangement, which might perhaps be followed with advantage elsewhere. Switzerland, it thus will be seen, is following the lead of Austria and Germany in providing first-class instruction in photography. Will England ever feel disposed to follow suit?

THE 28th of last month was a date to be marked with a red letter in the annals of the "German Society of Friends of Photography." On that occasion they held their first meeting in the rooms of the Royal Kriegs-academie, which have been placed at their disposal by Field-Marshal von Moltke.

PROFESSOR DR. RIETSCHEL on that occasion spoke at some length on the subject of some very interesting experiments he had carried out with a mixture of hydroquinone and eikonogen solutions. It appears from the results he obtained that this developer acts more slowly than pure eikonogen, thus enabling the progress of the development to be more easily controlled. The mixed solution, he points out, keeps remarkably well—a quality which pure eikonogen does not always display.

DR. J. SCHNATTS has been carefully comparing hydroquinone and eikonogen. He has come to the following conclusions:—"When the solutions are of similar strength, and contain similar amounts of alkalis, the rapidity of development is about the same with both. With hydroquinone the blacks come out stronger, while eikonogen gives better half tones. All plates developed with eikonogen, however, require subsequent intensification, which one avoids by using hydroquinone."

THE *Mouiteur de la Photographie* gives a receipt for magnesium light which gives, when burning, a light of 20,000 candle power. The mixture recommended is as follows:—

Magnesium powder	20 parts.
Barium nitrate	30 "
Flower of sulphur	4 "
Beef suet	7 "

The suet is melted and kneaded up with the mixture, which is filled into zinc cases, 10 × 7 cm. Each such case holds about a pound, and will burn

for twenty seconds, giving a light that may be seen at a distance of sixty miles. This appears to be perfectly possible, for Dr. Miethe, who, some time ago, experimented with signal rockets containing a mixture of magnesium powder and chlorate of potash, found that the light emitted was visible from Potsdam to Oderberg.

RECENT researches by Signor Vittorio Aducco (published in the *Atti della R. Accademia dei Lincei*) seems completely to confirm the earlier results arrived at by Molescholt, that change of tissue in the animal organism is promoted by the action of light. Change of tissue, on the other hand, in the case of animals confined in the dark, takes place so slowly, and to such a small extent, that the nutriment ordinarily in reserve in the body is quite sufficient to keep life from becoming extinct for a very long time. We shall not be surprised to find the vegetarians making capital out of this piece of information, and recommending those desirous of living cheaply to supplement a vegetarian diet by existence in a darkened room!

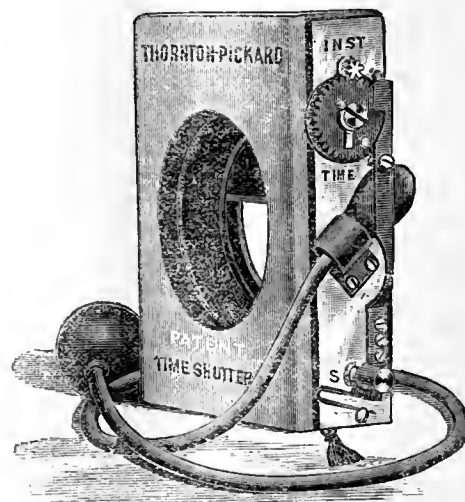
MONS. JOLY, in a communication to the Société Française de la Photographie at their last meeting, points out that solutions of hydroquinone, when sufficiently concentrated, are no longer colourless, but possess a yellow tinge, varying in intensity with the degree of concentration. The spectroscope enabled him to prove that complete absorption of the blue and violet could easily be brought about, and by increasing the degree of concentration of the solution, one could succeed apparently in cutting off even the green rays. If this be so, the hydroquinone will, ere long, be figuring not only as a developer, but as the best light filter hitherto discovered, for any light it lets through, when sufficiently concentrated, will probably be quite unactinic.

APPROPOS of hydroquinone, it is certainly calculated to bring a smile upon the face of the most care-encumbered of our readers to learn that two Italian doctors have recently been recommending this reagent as a febrifuge. Surely the *mot* of the learned judge in a recent criminal trial, that a doctor was one who puts a drug of which he knows little into a body of which he knows less, could hardly have received a happier illustration!

Our Editorial Table.

THE THORNTON-PICKARD TIME SHUTTER.

THE aims of the firm by whom this shutter has been brought into existence have been high, and these aims have been carried into practical effect in such a way as to enable them to make high claims for it. In configuration it forms a nearly square mahogany frame, as shown in the cut, about an inch thick, and having a padded hole in



the centre, in which the hood of the lens is inserted. At the bottom is a small tassel, which, when pulled, draws up a spring roller shutter, which has in it an opening the full size of the lens. Pressure on the pneumatic ball causes its release. Worked as an "instantaneous" shutter, various degrees of rapidity can be obtained by the bracing-up of a spring; for protracted exposures it can remain open an hour or a day, while for brief time exposures, such as from a quarter of a second up to as many seconds as one may wish, its action is really

admirable, the mechanism for effecting this being both ingenious and simple. It is well made, and the various actions are effected without any jar.

MAGNESIUMLICHTES IN DER PHOTOGRAPHIE.

Von Dr. MAX MÜLLER. (Weimar: K. SCHWIER.)

THIS work, as its name indicates, is devoted to the application of the magnesium light to photography. It is illustrated by a well-executed portrait and the interior of a cave, the former by photogravure and the latter on albumenised paper, both being taken by magnesium. The author opens by giving an historical account of magnesium, and gradually leads on to the construction and uses of various flash lamps, several of them being known to English readers, although some are conspicuous by their absence. Several pages are devoted to the relative merits of lenses for employment in portraiture with magnesium light.

The book is a useful contribution to photographic literature, and we can only regret that it is printed in the German language, else would it secure many readers in this country. It contains fifteen cuts, has sixty-two pages, and sells at three marks.

MARINE PHOTOGRAPHS.

FROM Mr. James E. Goold, Newcastle-on-Tyne, we have received two large and fine photographs of H.M.S. *Victoria*, being respectively bow and stern views. They are taken while the ship is under full way, and while the guns in the turret are being fired. Mr. Goold's efforts to capture this man-of-war have been entirely successful.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,374.—"Improvements in Photograph Vignettors." T. A. MASE.—*Dated November 18, 1889.*

No. 18,453.—"An Improved Holder for Adjusting Limelight Jets in Optical Lanterns and the like." H. STANFORTH.—*Dated November 19, 1889.*

No. 18,523.—"Improvements in Apparatus for the Exhibition of Photographs, Pictures, Views, and the like." J. T. LIGHTON.—*Dated November 19, 1889.*

No. 18,547.—"A New or Improved Compound for Use in Photography." B. JUMEAUX.—*Dated November 20, 1889.*

No. 18,583.—"Improvements in Optical Lanterns." A. HUGHES.—*Dated November 20, 1889.*

No. 18,584.—"Improvements in Cameras." W. R. BAKER.—*Dated November 20, 1889.*

No. 18,609.—"An Improved Appliance for Use when Cutting Photographic Prints, Pictures, Mounts, and the like." B. JUMEAUX.—*Dated November 21, 1889.*

No. 18,634.—"An Improved Lens Mount." W. C. CHIFFER.—*Dated November 21, 1889.*

No. 18,689.—"Washing Photographic Silver and other Prints." B. ACRES.—*Dated November 21, 1889.*

No. 18,826.—"Improvements in and in connexion with Cameras." C. LAWRENCE.—*Dated November 23, 1889.*

PATENTS COMPLETED.

IMPROVEMENTS IN OR RELATING TO PRINTING PHOTOGRAPHS, ESPECIALLY "BLUE PRINTING," AND IN APPARATUS THEREFOR.

No. 16,715. ARTHUR RICHARD BROWN, The Park, Harrow, Middlesex.—*November 2, 1889.*

THIS invention relates to improvements in the method of and apparatus employed in photographic printing. The objects of my invention being to make a portable apparatus for photographic printing, and one more simple, cheaper, and much lighter than the frames at present used; at the same time, to take out creases from a crumpled tracing, and also to enable two different tracings to be printed at the same time with one apparatus.

I effect this result by means of an air or fluid pressure cushion or bag, preferably made of indiarubber or some such material, in combination with clips for stretching the tracing, thus doing away with the heavy plate glass usually employed. The sensitive paper is kept tight against the tracing by means of the air bag.

The clips for taking two prints at once may form a rectangular frame, open front and back. If one tracing alone is being printed it is then desirable to have pieces of webbing or canvas, &c., to form a back to the frame.

The frame when used is made in such a manner that it can quickly be taken apart and rolled up with the bag.

The air bag can if necessary be used with only a drawing-board or card-board to form a back for the bag, and the tracing pinned or fixed by means of clips to the board.

Also the bag can be used by itself for taking prints of letters from a letter book, or any book printed on one side, with a clip or its equivalent to hold the edge of the page down whilst printing.

The construction of the clips or frames, as will readily be understood, may be considerably varied, but I will describe some of the more likely forms.

Where a drawing-board is used simple spring clips may be employed in place of drawing-pins for fastening the paper to the board. Where the drawing-board is dispensed with and a frame of some kind has to be used, I prefer to employ light wooden longitudinal rods, say, for example, three, with cross bands of webbing where required, though in many instances the webbing can be entirely dispensed with. The papers are fastened by the ends, and for this purpose I employ any convenient form of preferably steel spring clips, which may extend across the whole length of each end, or may be divided, or several entirely separate clips may be employed; however, I prefer for this construction to employ a single long clip at each end, and so arrange it that the papers having been turned over a metal or other rod can be slipped in under the clips, which are sufficiently strong to prevent back-sliding; by this arrangement the papers are sufficiently firmly stretched, and the inflation of the bag will take out any unevenness, and also place the two papers in intimate contact.

If desired, a complete open frame may be made jointed at the corners, preferably by hinges with removable pins; a suitable groove or recess passes round this frame, and spring clips are so placed that when the papers turn round the rods are inserted in the groove, both rods and papers are securely held. Instead of using clips the framework may be divided at the groove, and when the rods and papers are inserted therein the divided portion of the frame may be brought together in any convenient manner as by screws and thumb-nuts.

Instead of the bands of webbing above mentioned a sheet of canvas or equivalent, paper or the like, may be used, and instead of the drawing-board a sheet of card or millboard can be employed.

Where it is desired to take two prints at once it will be understood that the bag is inserted in any suitable frame or clips, and lies between the two sets of papers, so that both are stretched as required.

The claims are:—1. A frame for stretching and holding papers, tracings, or other matter for the purpose, as described, of photographic printing or copying. 2. An indiarubber or its equivalent air or fluid pressure cushion or bag, for the purpose of pressing sensitive paper against tracings or matter to be copied or photographically printed. 3. A pad made thick at the centre and tapered away on all sides, of felt or other suitable material, for use with apparatus for photographic printing, or copying tracings, or other matter. 4. The use of a card-board, wooden board, or its equivalent, for the purpose of holding and pressing sensitive paper against tracings or matter to be copied or photographically printed, in combination with a suitable apparatus for stretching and holding the same, as described. 5. The use of a drawing-board or other board in combination with means for holding the tracings or matter to be photographically printed, as described. 6. The general combination of parts forming my improved apparatus for photographic printing, substantially as shown and described.

[Doubtless, the patentee is not aware that air cushions in the printing frame, for the purpose of keeping the paper uniformly pressed against the negative, have been in use for many years—nay, they have since thirty years ago formed the subject of patents, none of which, so far as we recollect, are now in force.—Ed.]

IMPROVEMENTS IN INSTANTANEOUS SHUTTERS FOR PHOTOGRAPHIC APPARATUS AND THE LIKE.

No. 18,150. EMILE TOURTIN and LOUISE PARSY, 8, Boulevard des Italiens, Paris, France.—*November 2, 1889.*

OUR invention is based on the observation of the following principle, the application of which by us is, we believe, entirely novel:—

If an opaque screen of any given shape is placed in sufficient proximity to a photographic lens, either in front of, at the back of, or between the system of lenses, like a diaphragm, the formation of images at the focal plane is not altered in any way; the sharpness remains as perfect, the luminous intensity only being reduced in the same ratio as that of the surface of the opaque screen to that of the lens.

If the screen so interposed in the direction of the luminous rays be in the shape of a grating, that is to say, with alternating plain and hollow parts, the above-mentioned fact will occur. In effect, the light rays emanating from an object situate at any distance greater than the focal length of the lens are in no way checked by the interposition of the grating, and are refracted in exactly the same manner as if there was no obstruction; the light rays striking against the plain parts of the grating are, it is true, lost, but the image remains quite as sharp although it is less brilliant.

If another identical grating is placed in front of the former one, the plain parts of one corresponding to the hollow parts of the other, and is made to slide against it, it will, at both the beginning and the end of the journey, act as an obturator, and meanwhile the openings of the fixed gratings will have been gradually opened and shut again, the greatest amount of light being admitted when the openings of the two gratings exactly correspond with each other.

If this apparatus is adapted to a lens placed in front of a camera, and is operated, the usual luminous impression will be obtained at the focal plane, with this advantage, that, as the displacement of the moveable grating may be made as short as desired by multiplying the number of bars, the duration of exposure is proportionately reduced and can be made to correspond to almost absolute instantaneousness.

But such a shutter, absorbing a great proportion of the light (a minimum of one half in the theoretical supposition of the bars and the hollows being of equal widths), could only be used for photographic purposes in the case of an exceptionally intense light being available. The same reasoning applies to a shutter with bars and hollows radiating from a centre, but the latter offers this disadvantage, that the central rays of light which are the more important would be intercepted.

The arrangements described would prove very suitable for photographic purposes if the substances used were of a sufficient degree of sensitiveness; but with the materials actually to be obtained in the market, we construct our

shutter with a series of parallel blades similar to those of a venetian blind, and which are acted upon by means of an appropriate mechanism; they turn together of a same angular motion and without losing their parallelism.

Each blade is mounted on two pivots, one at each end, lodged in the casing of the camera, and also provided with a pinion. All these pinions are in gear with a toothed rack, the forward and backward motion of which causes all the blades to simultaneously turn in one direction or in the other. The motion of the blades could equally be obtained by means of mechanical arrangements of any other description, such as pulleys and tape or string, articulated levers, &c.

If the rack or rod is pushed home in one direction, the blades are all closed, and a spring catch maintains the shutter so constituted closed until it is released by means of the ordinary pneumatic india-rubber ball, or any other contrivance; at that moment the rack or rod is shot to the other extreme position by means of a spring provided for the purpose. In the interval the shutter has been opened and shut again.

The tension of the spring and the consequent degree of instantaneousness which it is desired to obtain may be regulated at will by means of a thumb-screw, and is indicated on a dial by a pointer following the motion of the regulating thumb-screw.

The angular motion of the blades is about 180 degrees; they overlap each other so as to constitute a perfect obturator, and their number may vary from one single one to any number.

When the shutter is arranged to act in a vertical direction, the spring may be dispensed with if the weight of the rack or rod is sufficient to ensure the working of the system: the action of gravitation may even be retarded, if found too quick, by means of a brake or friction piece, dash pot, &c.

The shutter may be fixed in front or at the back of the lens, or even between the system of lenses; it is set in the centre of the apparatus by means of three set screws.

It will be readily understood that in our system of shutter the quickness obtained is greater than with the guillotine, either single or double, horizontal or vertical.

In the latter case, in effect, the light acts, at the same moment, upon the totality of the sensitised plate; small at first, it gradually increases to gradually decrease again, and the motion of the object to be photographed affects the plate from the beginning to the end of the exposure.

With our shutter the plate is only gradually affected, the luminous beam travelling in a direction opposite to that of the blades; the said beam is wider or narrower according to the distance between the blades and the width of the said. Consequently, should the width of the beam be equal to one half of the height of the sensitised plate, the same quickness as that obtained with a guillotine shutter will be obtained with our blade shutter in half the time.

Another advantage of our system is that its speed remains constant whatever the size of the lens, as the blades always travel the same distance.

As to the amount of light intercepted by the blades it is almost insignificant, not exceeding the proportion of about one in thirty.

Our shutter is applicable to other apparatus, such as magic lanterns, projection, and other apparatus intended for the instantaneous sending or receiving of beams or flashes of light.

What is claimed is:—The construction of an obturator or instantaneous shutter, for photographic or other purposes, and made of a series of revolving blades, substantially as set forth and illustrated.

IMPROVEMENTS IN AND CONNECTED WITH PHOTOGRAPHIC CAMERAS.

No. 18,403. PAUL JULIUS GUITON, I, Boulevard St. Denis, Paris, France.—
November 2, 1889.

With portable photographic apparatus, such as those used by tourists, there is always a difficulty in the replacing of the sensitive plates after each operation. This replacing takes some time and is somewhat difficult.

Now the object of my invention is to construct a multiplex sensitised plate carrier in which the changes of the plates can be quickly and readily effected. For this purpose I employ a frame divided into any suitable number of compartments, in which the sensitised plates or glasses are lodged. These compartments are uncovered in succession by an endless band furnished with slips of wood. A part of the surface of this band equivalent to that of one compartment is cut out, and at this place it carries the dark chamber. The dark chamber follows the movement of the endless band, and is therefore put in communication with each sensitised glass in succession; it is separated therefrom by a shutter which is drawn out at the time of the operation. At one of the sides of the frame I form opposite each compartment a notch, with which a small rod or stud fixed to the dark chamber engages. The chamber is thus guided to the proper position at each change, and its stability is ensured during the operation.

It will be understood that I can double the frame and have two rows of sensitised plates, and cause the dark chamber to turn around the frame; or I can give a rectilinear movement to the band and have any desired number of compartments; or the frame can be fitted to a fixed dark chamber, and in this case the frame would move.

The claim is:—A multiplex sensitised plate carrier constructed substantially as hereinbefore described for the purpose set forth.

A PHOTOGRAPHIC Society, to be called "The Blackpool Photographic Society," and which will hold its meetings at the Adelphi Hotel, Church-street, Blackpool, at Eight o'clock in the evenings of the first and third Tuesday in the month, has been formed in that town. The officers are as follows:—*President*: Alderman John Bickerstaffe, Mayor of Blackpool.—*Chairman of Committee*: Mr. Samuel Beverley.—*Committee*: Messrs. F. Gregson, T. S. Thompson, J. Wright, M. G. Wilde, W. H. Terry, D. Mitchell, and S. Beverley.—*Treasurer*: Mr. Isaac Wilde.—*Secretary*: Mr. S. Wolstenholme, Wellington Studio, Blackpool.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 2	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
" 3	North London	Myddelton Hall, Upper-st., Islington
" 3	Holmfirth	
" 3	Sutton	Society's Rooms, Sutton, Surrey.
" 3	Sheffield Photo. Society	Masonic Hall.
" 3	Paisley	Paisley Museum.
" 3	Bolton Club	The Studio, Chancery-lane, Bolton.
" 4	Coventry and Midland	The Dispensary, Coventry.
" 4	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 4	Photographic Club	Auderton's Hotel, Fleet-street, E.C.
" 5	Bolton Photographic Society	The Baths, Bridgman-street.
" 5	Leeds	Philosophical Hall, Leeds.
" 5	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 5	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 5	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 6	Sheffield Camera Club	

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

NOVEMBER 26,—Mr. Chapman Jones in the chair.

Mr. A. Dawson, of the Typographic Etching Company, showed a number of works similar to those which had figured in the recent exhibition of the Society. They were mostly of rather warm tone, not unlike that at one time common with silver prints on salted paper. The negatives of some of the prints shown had been made with orthochromatic plates and a yellow screen, and he had been surprised at the remarkable efficacy of this plan in bringing out the dark colours of paintings that had been copied in this manner. The plates had all been worked upon before printing, either with the graver and burnisher or by protecting certain portions and biting in other portions more deeply with acid. It would be possible to produce plates which would serve without this manipulation, but in that case the relief would be low and the plate would not stand the wear of printing off, say, five hundred copies. There was some copper known as French, which was somewhat harder and would stand rather longer than that used in England, but in any case if many impressions were wanted the plate must be bitten in deeply in places.

Mr. LEON WARNERKE inquired where a yellow screen had been used, and being informed that it was in connexion with the lens, asked if definition was not thereby seriously interfered with.

Mr. DAWSON replied that definition was somewhat injured, but for the class of subjects in question not seriously so.

Mr. WARNERKE said that the best plan was to use coloured illumination. He employed a magnesium lamp with a glass front. This glass could be coloured of any required depth. Another advantage of using this lamp for copying, was that by placing it during half the exposure on one side of the picture and for the other half on the other side, the unevenness of surface did not show. Thus a paper with folds and wrinkles might be copied without these irregularities being visible. Another advantage of the lamp method was that a definite exposure could be given, independent of the fluctuations of the weather. There were some points of novelty contained in the lamp which he would bring to the next technical meeting of the Society. Had Mr. Dawson encountered difficulties with those caverns in the copper which were so troublesome in etching processes, and which he (Mr. Warnerke) had found especially vexatious, and to what cause would he attribute them?

Mr. DAWSON said that sometimes they were due to holes in the negative, sometimes to holes in the copper, but generally to cracks in the gelatine.

Mr. WARNERKE said that in Vienna copper deposited by galvanic action was principally used for photo-etching work. He had heard that sometimes there were particles of iron in English copper, which would account for holes being formed. It was also a fact that English brass wire was not so good as that made abroad; after a short time it became so brittle as to break readily.

Mr. J. A. HARRISON remarked that Bristol brass was much better in that respect.

Mr. ATKINSON inquired whether paraffin lamp light had been used for picture copying to produce orthochromatic effect.

Mr. WARNERKE replied that it had, and was very good, but for extreme cases was not yellow enough unless screened by a coloured glass.

Mr. Harrison showed us an historical curiosity, a Latimer Clarke stereoscopic camera, with one lens and moving camera.

Mr. Friese Greene produced some photographic prints by Victor Selb, of Antwerp. They were understood to be developed prints upon an emulsion containing starch. They were mostly of a nearly matt surface, but one or two were glazed. They were remarkable for the brilliancy and completeness of gradation in the shadows, being, as was observed by some of the members, the most perfect examples of deep gradation in prints without glazed surface that had been seen.

Mr. Montefiore then handed round some prints on albumen paper and one on salted paper, toned by Mr. Lyonel Clarke's formula containing chloroplatinate of potassium.

It was announced that the next technical meeting would be held on the fifth Tuesday in December—the 31st—as the fourth Tuesday would be Christmas Eve.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 21,—Mr. J. Nesbitt in the chair.

Mr. Kerr showed his detective camera, to which some improvements and additions had been made since it was last exhibited. The camera is one of the kind in which, after each exposure, the plate (fitted in sheaths) is drawn up by hand through the thickness of a cloth bag and placed at the back of the supply. The action of opening the lid was made to work simultaneously upon

movements that covered the plate, and drew it partly up so that it could easily be reached by the fingers, and that then set the shutter ready for use. Another improvement was that there was a blank or dummy sheath at the back of the set of plates (eighteen), and that this dummy was made so that it would not lift by the opening of the lid. The operator was thus informed that the plates had all been exposed and there was no danger of repeating exposures upon plates already used.

It was asked whether there was not a tendency to dust spots in cameras where the plate had to be manipulated through a cloth bag, and it was replied that in the present camera the cloth was of waterproof material with the rubber side in, and that no dust from the cause suggested had been observed.

The CHAIRMAN, noticing that the opening in the lens appeared to be large, inquired what was the ratio, and being informed that it was $f/5$, No. 24 on the universal system, said that anything larger than $f/16$ was useless for general views.

Mr. KERR replied that he had got very good results with $f/8$, and Mr. W. E. DEBENHAM recalled some very effective instantaneous pictures in the wet collodion times, when, generally speaking, no smaller openings would be practicable for such work. This referred especially to small pictures.

Eikonogen having been announced as a subject for the evening's discussion, Mr. A. COWAN said that he thought that eikonogen was destined to be as far in advance of hydroquinone as hydroquinone had been said to be in advance of pyro. It developed with a minimum of alkali, kept very well in mixed solution, and gave good colour; especially esteemed for lantern slides. It also gave the fullest detail without staining the plate, a result very liable to occur when using pyro and pushing development to the utmost.

Mr. W. COLLES remarked, with regard to the absence of staining, that the same thing was true of pyro when sulphite was used. He queried whether without sulphite there would be any advantage over pyro similarly treated. As to the quantity of sulphite generally recommended to be used with pyro, he thought it too great. With four parts sulphite to one of pyro, there was liability to excessive density in the lights, the details of which were thereby lost. He preferred two parts of sulphite, sufficient to prevent staining of the fingers.

Mr. J. H. B. WELLINGTON remarked upon the different qualities of the water found in certain districts, as affecting the character of the negative unless allowance was made. With soft water two parts of sulphite to one of pyro was sufficient in the constituents of the developer.

Mr. COLLES said that in one town he had developed plates without adding alkali. There had been some alterations going on at the waterworks, and there was sufficient lime in the water supplied to develop with the pyro.

Mr. ARCHER CLARKE said that when hydroquinone first came out he was not prepared for the length of time required in developing. The first plate put in the solution took a quarter of an hour to develop, and each succeeding one longer, until the sixth plate, which required an hour and a quarter.

The CHAIRMAN remarked that he could not have patience to rock plates during such long exposures, and if they were allowed to remain without rocking they became mottled. If a plate was developed in the light, the separation of the developer into mottled shapes similar to those seen on the developed negative could be observed.

Mr. CLARKE suggested turning the plate over to prevent mottling.

Mr. HADDON suggested that a vertical position of the plate would prevent mottling.

Mr. COWAN said that mottling took place with plates developed upside down. In one of a set of experiments that had been previously described, he had developed a plate in so weak a solution that it took fifteen hours. He had put the plate upside down in a basin, on the sloping sides of which the corners rested, but mottling had ensued. As to the new white eikonogen, he found that the solution after mixing did not oxidise so freely as with the original kind.

Mr. DEBENHAM inquired whether any member had had experience with the form of eikonogen developer recommended for insufficiently exposed negatives, both with and without the preliminary bath of mercury.

Mr. COWAN had noticed that with the latest issue of eikonogen the mention of the preliminary bath had been omitted. He had not found any advantage when using it.

Mr. TRAFF showed a transparency which had been intensified with uranium, and in which after an hour's washing the deepest shadows had become thinner, indeed, than the next tone.

Mr. DEBENHAM said that the deposit resulting from uranium intensification was slightly soluble, and therefore the process was not suited for gelatine negatives where a long washing was a necessity. With the thin film of collodion, which might be washed in a minute or two, the uranium process might be successfully practised.

CAMERA CLUB.

NOVEMBER 21.—Mr. Lionel Ashburner in the chair.

A paper, entitled *The Progress of Hydroquinone*, was read by Mr. A. MASKELL. The lecturer reviewed the advances made by hydroquinone in the past year. His own view of it was that, although pyro and ammonia was the more effective developer in the hands of the thoroughly practised, highest class of workers, hydroquinone proved a safer means of development for those not so highly trained in observation and practice. He considered it an advantage to be able, under some circumstances, to have one developer which would serve for negatives, transparencies, and bromide paper equally. Hydroquinone was found to be capable of this general use. The lecturer also exhibited samples of hydroquinone, and gave formulae and other practical notes, pointing out that hydroquinone might be found especially useful in enlarging, by first of all soaking the bromide paper in the developer and then exposing it wet for the enlargement. This would permit of examination of the print as the exposure proceeded, and local development or restraint would be possible.

Amongst other objects handed round in illustration of the lecture, were a series of negatives carefully tabulated and prepared by Mr. Swan (Messrs. Mawson & Swan), and a collection of excellent stripping-film negatives taken and developed by the Chairman (Mr. Ashburner).

In the discussion, Messrs. Stroh, Davison, Elder, Clark, Major Nott, the Chairman, and others, took part.

On Thursday evening, December 5, Mr. A. Horsley Hinton will read a paper entitled *The Standard of Excellence in our Art*.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 19.—Mr. G. J. Clarke in the chair.

Mr. J. Martin was elected a member.

It was decided to hold the annual dinner of the Society on January 21, and also to form a library.

Mr. A. MACKIE then gave a short explanation of the working of the optical lantern, and some excellent slides were afterwards exhibited on the screen, including a series of flowers by Mr. J. Carpenter, the negatives of which were taken on Edwards's isochromatic plates, the transparencies being on Thomas's lantern plates developed with eikonogen. The following formula was used:—

Eikonogen	1 ounce.
Sulphite of soda	2 ounces.
Water to make	50 "

Alkali:—

Caustic potash	1 ounce,
Water	10½ ounces,

one drachm of the alkali being used to each ounce of the eikonogen solution. Other slides were also contributed by Messrs. Mackie, Healy, Clarke, Brickdale, Purton, Powell, Walker, Grover, Coventon, Reader, Few, and Collins.

The next meeting will be on December 3, when Mr. W. Bishop will read a paper on *Lantern-slide Making*.

WEST LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 22.—The President (Mr. Charles Bilton) in the chair.

The evening was devoted to the exhibition of members' slides by means of the lantern.

The SECRETARY announced that Mr. Stein would read a paper on *Hand Cameras* at the meeting of December 13. Those interested in the subject are invited to attend.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 15.—Mr. H. Banks in the chair.

Mr. E. Orme was elected a member.

Mr. MATHICE HOWELL gave an address on *The Early History of Photography*, illustrated by specimens of Daguerreotype and a large number of Talbotype executed by himself many years ago.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 14.—Annual meeting.—The President (Mr. Paul Lange) in the chair.

The SECRETARY read the annual report, after which the TREASURER read his statement of accounts, both of which were adopted.

The following officers and members of the Council were elected for the ensuing year:—*President*: Mr. P. H. Phillips.—*Vice President*: Mr. H. H. Williams.—*Council*: Messrs. H. Lupton, H. Wilkinson, T. S. Mayne, F. N. Eaton, W. Faltin, F. Hope-Jones, J. L. Mackrell, and Paul Lange.—*Auditors*: Messrs. A. Bradbury and G. A. Carruthers.—*Librarian*: Mr. J. A. Forrest.—*Treasurer*: Mr. E. M. Tunstall.—*Secretary*: Mr. C. B. Reader.

The awards made by the Judges in the annual competitions for 1889 were then read by the President:—"For the best set of six pictures over half-plate," silver medal: Mr. J. L. Mackrell. "For the best set of six pictures under half-plate," silver medal: Mr. H. Wilkinson. "For the best set of six instantaneous pictures," bronze medal: Mr. H. Wilkinson. "For the best enlargement," bronze medal: Mr. J. L. Mackrell.

It was unanimously decided to have a social evening, one of the members (Mr. W. H. Hunt, Mus. Doc.) having kindly undertaken the musical arrangements for the same.

A lantern exhibition of members' slides then followed, some of which were of very high merit.

BRADFORD PHOTOGRAPHIC SOCIETY.

NOVEMBER 19.—The Rev. Dr. Aston in the chair.

The PRESIDENT (Mr. A. Keighley) gave his inaugural address on *Photographic Printing Processes*. Having explained the general chemical principles involved in photographic printing, he explained the special ones in silver, iron, and chromium printing. Various chemical experiments illustrative of the action of these salts were made, and specimen prints by each of the different processes were developed, &c., before the members. At the close of his lecture Mr. Keighley called attention to the prints around the room, which would represent the capabilities of each process he had described. These prints were of excellent artistic and technical finish, and were greatly admired by the members.

The Committee has decided to give a *conversazione* on Tuesday, December 10, at which an exhibition of members' work, microscopes, stereoscopes, &c., will take place. There will also be a lantern-slide exhibition. Members and their friends are cordially invited, and tickets and other information may be obtained from the Hon. Secretary (Mr. Walter Leach), 50, Godwin-street, Bradford.

WALLASEY PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 6.—Annual meeting.—The President (Mr. H. Wilkinson) in the chair.

Mr. WILKINSON, in his opening address, stated that the Association was now in its fourth year of existence, and had steadily increased in numbers and

usefulness, and the members had attained a higher standard of work, as would be seen by the pictures hung round the room which had been sent in for the annual prize competition.

The HON. SECRETARY reported that the membership roll showed an increase of one hundred per cent. since last annual meeting; that twelve meetings of the Association had been held, at which papers of photographic interest had been read and practical demonstrations of the various processes given. The winners of the medals were Messrs. J. L. Mackrell, H. Wilkinson, J. W. Gregg, J. Gill, and C. B. Reader.

The officers for the ensuing year were elected, and are as follows:—*President*: Colonel E. T. D. Cotton, M.P.—*Vice-Presidents*: Messrs. Edwin Kite and J. W. Gregg.—*Hon. Auditor*: Mr. J. Hardsley.—*Hon. Treasurer*: Mr. J. Fullerton.—*Hon. Secretary*: Mr. G. Bredding, Church-street, Egrement. With a Council of six members.

CHELTEMHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 7.

Captain HARRISON exhibited a collection of marine and other views which he had taken, the former in the Solent from the deck of a steamer in motion. Two of the photographs shown had only received an exposure of one-one-hundredth of a second, and yet all the details were perfectly brought out. The developer used was composed of—

Eikonogen	15 grains,
Soda sulphite	15 "
Caustic soda	15 "
Water to	1 ounce,

and Captain Harrison stated that he had found this developer coax out detail which would not show itself under any other developer he had tried.

Mr. Nash showed bromide prints which he had developed with a ferrous oxalate developer, the iron solution being composed of—

Ammonio-sulphate of iron	1 ounce.
Meta-bisulphite of potash	2 drachms.
Water to	5 ounces.

This solution to be mixed in the usual proportions with the oxalate of potash solution. The peculiarity of this developer is that it dispenses with the acid water wash after development, and gives a fine blue-black tone unattainable by the ordinary oxalate developer.

Mr. PARSONS handed round some cabinet portraits which had been toned in a borax bath, and in answer to a question as to how he managed to obtain such purple tones with borax, he said that he found the addition of half a drachm of strong liquor ammonia to one gallon of water, for the last washing before toning, enabled him to obtain the good purple tone noticed.

THE PHOTOGRAPHIC SOCIETY OF JAPAN.

SEPTEMBER 27 (at the Masonic Hall, Yokohama).—The chair was occupied by Lieutenant Bull. The meeting was of a technical character; that is to say, it was for the purpose of exhibiting anything that might be considered in any way new in connexion with photography in Japan.

The following gentlemen were elected members of the Society: Messrs. Kusaka, M. Nakashima, B. Hayashi, B. H. Pearson.

After some formal business had been concluded, Mr. Kajima exhibited several cameras of English design and Japanese manufacture. These were cheaper than the corresponding English cameras, and the workmanship was generally pronounced to be very creditable.

Mr. K. Ogawa showed some remarkably fine collotype prints, and briefly described the process. The printing is done in a press directly from a plate that has been prepared with a sensitive surface of gelatine and bichromate, and that has been exposed under a negative. The parts that have been insolated will take a fatty ink, the others will not, and it is thus possible to ink up the plate and to draw proofs from it. Several hundred proofs can be drawn from one plate, and an indefinite number of plates can be made from one negative.

Mr. C. D. West showed an arrangement that he had designed for taking photographs of one boat from another. The arrangement consists essentially of a bracket that can be fixed to the main or foremast of a sailing boat, and a universal joint with arrangements for holding a camera which may be aimed at any object, and caused to follow it till an exposure is made. Some examples of photographs taken by the aid of this apparatus were shown.

Mr. W. K. Burton showed silver prints made on Whatman's drawing paper and on very thin Japanese paper. The process consists in coating the paper with an emulsion of resin and gelatine, in which is dissolved a small quantity of a soluble chloride. The paper is then dried, and is sensitised with an ammonio-nitrate of silver solution, the sensitising being twice repeated in the case of the drawing paper.

Mr. Kajima showed some Japanese fans which were decorated with photographs produced directly on the paper of which they were made. These were much admired.

Messrs. Cocking & Co. sent a large and interesting exhibit of lenses and other photographic apparatus. Amongst the things shown were a very fine camera by Meagher & Co. of London, and lenses of Suter and of Dallmeyer, the latter including several of the new "rectilinear landscape lenses."

Mr. Konishi showed a sample of the new developer "eikonogen," and the CHAIRMAN promptly ruled that it should be appropriated by the Society, and that certain members should be appointed to experiment with it, and to report to the Society on the results of the experiments.

Messrs. K. Ogawa and W. K. Burton were instructed to undertake the experiments.

The meeting concluded with a vote of thanks to the lender of the hall and to the Chairman.

The next meeting will be held on October 13. It is to be a camera field-day, and the place selected is Kamakura. No particular hour is fixed, as it is hoped that some will be able to come early in the morning, and there is no reason why camera work should not be kept up through the whole day. Probably some members will extend their trip to Enoshima.

Correspondence.

Correspondents should never write on both sides of the paper.

ELECTRIC LIGHT IN THE LANTERN.

To the Editor.

SIR,—My only reason for any reply to Mr. Baker's letter is that, if I make none, some of your readers may gather from it that there are difficulties which really do not exist in availing themselves of a light which, for those who have current available, is singularly handy and convenient for making enlargements. To take size first, my own lantern is large enough as it is; but if it were not, surely it would never occur to any one but an optician to build another special lantern, when it is so easy to remove the slide-tray and elevate the lantern on some little wooden base. Of course, if any one is buying a new lantern and all, he would have it an easy size; but people need not and should not write of "special" lanterns for such ABC matters as this, as if there were real difficulty to be overcome in using this light.

I have been pretty familiar with electric lights of all sorts for years past, though my efforts have chiefly been directed to finding a perfectly steady arc light with only one luminous point, in which I am glad to say I have succeeded. Hence I was not so much surprised at the heat of a 100-candle incandescent lamp, as Mr. Baker appears to have been. But I do not consider the radiation so great as that of an 800-candle jet which I use at times; and there need be no fear of it in any lantern with proper space and ventilation for an oxy-hydrogen jet. The lamp is hardly likely to be used in a binnial, but is essentially a single-lantern light; and it is also to be remembered that, as there is no combustion and no ascending vapour, but simply radiation, the lanternist can open and alter his top or his chimney in any way he likes with no difficulty. The whole matter would be a case of *soloitur ambulando* with any one of common intelligence. We do owe, I am glad to learn, to Dr. Fleming credit and thanks for inducing the Company to put on the market an optical lamp made on the grating system—but that being done for us, the object should be to spread knowledge of the convenience, and not to hedge it about with difficulties that do not really exist. Few would have gathered from Mr. Baker's first letter that the light could be got by any one from the vendors for a few shillings, or otherwise than by purchasing a "special" lantern and apparatus from Messrs. Steward.

London, November 22.

LEWIS WRIGHT.

FOG ON DRY PLATES.

To the Editor.

SIR,—May I be permitted herewith to thank Mr. Lyonel Clarke for his communication to THE BRITISH JOURNAL OF PHOTOGRAPHY of the 15th instant, on *Another Cause of Fog on Dry Plates*?

Curiously enough, the day after reading the above I was asked to examine a number of negatives taken by a gentleman in the country. It appeared they were very unsatisfactory, would not print, &c., and he was beginning to think "Photography a failure."

They certainly were all badly fogged, and as the exposures, developer, and dark-room lamp ("perfection") were all seemingly correct, I was puzzled to account for the cause. Then, suddenly remembering the article in your JOURNAL, I asked to see the camera, and there, sure enough, were several patches of green mould, about one cubic millimetre square.

These were then immediately removed with a dry cloth, and we went out and made several exposures, and developed in same manner as before. The results were entire freedom from fog; and so I think, with Mr. Clarke, that all will do well (especially this damp weather) to examine camera interiors very carefully and keep them in a dry place.

As to the action of the fungus on the sensitive salt, I am divided as to opinion at present. That it acts most powerfully and instantaneously I have found by a few experiments. I rather incline to the notion that mildew possesses luminosity, which, though practically invisible, is highly actinic, probably down to the ultra-violet end of the spectrum. Many fungi are distinctly luminous; touchwood, for instance, which is wood eaten up by the mycelium of fungoid growths, is so. Further, is it not a fact that a magnet is photographable by a light it emits? also a boiling kettle? Well, as the boiling kettle is to the red end of the spectrum, so, I have an idea, is this fungus luminosity to the violet end.

I should be deeply gratified if such great experimentalists as Captain Abney and others, with their vast resources for conducting experiments, would investigate this matter, and let us have the benefit of their experiences.—I am, yours, &c.,

A. HOWARD BENHAM.

66, Wigmore-street, W., November 25, 1889.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—Mr. W. Durrant says he has read my letter, but he seems to have forgotten that I therein profess to be but an indifferent worker with the

* This because I could find no traces of any spores on the film with the microscope.

camera. He further says that when he has seen my work he will be better able to determine whether my criticism of Mr. Robinson's is worth consideration.

If I grant, for argument's sake, that my photography is altogether bad, what has that to do with my opinion of other people's? Without being able to make a sovereign, I may know one from a counterfeit coin when I see it. Unless he proves that I have made statements which are not strictly and altogether true respecting the works of Mr. Robinson, his letter, I think, will have no value in the esteem of unprejudiced readers. If I have said of them what is true, then they have no claim to be considered works of art. Did an artist ever paint a picture in which different objects therein are represented as throwing sun shadows in different directions? And would a painter who did so be regarded as an artist by any one possessing common sense, to say nothing of artistic knowledge and feeling?—I am yours, &c.,

The Arts Club.

BARR. ROUS.

PROPOSAL FOR A NATIONAL PHOTOGRAPHIC UNION.

To the Editor.

SIR,—I enclose a copy of Resolutions unanimously adopted at the last meeting of the North Surrey Photographic Society.

I may say that these Resolutions are the outcome of deliberations of some months past amongst our members, which have assumed a more definite form, owing to the notice of the Society being called to a proposal in circulation for an institute founded on lines strongly objected to by the members.

At present there exists no body representative of photographic interests to be consulted either for legislative or other purposes.

As examples of the utility of such an Union, attention need only be directed to the great advantages derived from similar bodies at present existing in the Angling and Cycling worlds.

With a view of convening in London a preliminary meeting, all those willing to co-operate in the movement are requested to communicate with me at 369, Norwood-road, S.E.—I am, yours, &c.,

J. LARCOMBE, Hon. Secretary.

I. At a meeting of this Society, held on the 19th November, 1889, it was resolved that it is desirable to found a National Photographic Union, so constituted as to fairly represent all photographers in the United Kingdom. The object of such Union being to benefit photographers and all those connected with the art by watching over their interests generally; and being made representative by inviting every society to send delegates to sit on its Council. The scheme of its work to be drawn up by the delegate representing the societies.

II. That the foregoing Resolution be forwarded to the Photographic Press and the Photographic Societies; and that the latter be requested to give their opinion on the question, and to say whether they are prepared to co-operate in forming such an Union.

A PHOTOGRAPHIC BLUE BOOK.

To the Editor.

SIR,—I am glad to be able to throw some light on the authorship of the book described by Mr. William Lang, jun., in your issue of October 25, to which my attention has just been directed.

"A. A." were the initials of Mrs. Atkins, who lived for many years at Halstead Park, Kent, and died there in June, 1871. She was the daughter of Mr. John George Children, Assistant Librarian (i.e., keeper of the zoological department) of the British Museum from 1816 to 1839. On his retirement he lived with his daughter at Halstead; he died January 1, 1852, and a memoir of him by Mrs. Atkins was privately printed in 1853. Mrs. Atkins had a large collection of British plants, which, at her death, was bequeathed to the British Museum, and is now incorporated in the British herbarium there. She also collected a little in Normandy.

We have also, in three volumes, each prefaced with title and list of species, the collection of cyanotype impressions described by Mr. Lang. The first volume contains one hundred and sixty-two plates, the second one hundred and fifty-one, and the third ninety-eight, making a total of four hundred and eleven, as against three hundred and seventy-seven in the series seen by Mr. Lang. The interesting prefatory matter quoted by Mr. Lang does not appear, except the last paragraph, which stands at the foot of the Appendix to the third volume; it is followed by a page of "errata." The date in our copy is, I think, "1853," not "1859" as given by Mr. Lang.—I am, yours, &c.,

JAMES BRITTON.

Department of Botany, Natural History Museum, Nov. 22, 1889.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—Perhaps you will allow me to say a word or two on this vexing question. Time was when the greater number of amateurs were wealthy men with leisure, who found in photography a congenial occupation in one or other of its branches—scientific or industrial. Now the "cheap set" trade has opened the way to the multitude, and instead of having to reckon with a gentleman, the professional of to-day has very often to put up with the impertinences of a snob.

The following short dialogue may be taken as a type of what often occurs in the middle of a business day.

Enter "cheap set" man, after long inspection of your specimens. "Aw not a bad thing that of—; what time of the day did you get it? I am photographing about here, don't you know. Down for my holiday. I am in one of the departments of the Customs. I have got some splendid pictures. Do you mind developing a few negatives for me? Whose plates do you prefer—developer, lenses, cameras?" &c.

You get rather riled to hear your picture, which may have cost you a long hunt to get, called a "thing," but your usual courtesy to a brother-photographer holds you back, and you probably end by giving up your dark room for a couple of hours to the upsetting of all your own business system, and probably one or two stock bottles.

By-and-by you are repaid by seeing a series of caricatures of your best work appear in the shop window as cheap opals, or in the guise of birthday cards, and these you recognise as the work of your amateur friend. I presume your correspondent, J. Storey, would call this "honest labour, to put bread and butter into the mouths of his family;" and he would say to the professional, "Providence has not intended you for the vocation. Go, seek work of another kind." Oh, Chadband! But, you see, these public offices are not open to us yet.

I must take exception to the statement that professionals have done little to perfect the art. Why, the journals for the last thirty years teem with the experiences of the best workers—experiences which it is the fashion nowadays to dig up and serve as a new discovery by your trading amateur.—I am, yours, &c.,

LINTERN.

To the Editor.

SIR,—Since this discussion upon the amateur question has waxed so warm, there have been many hard things said on both sides. There have been some capital common-sense letters. Your correspondent indeed must strike a tender spot in the consciences of some of our professionals. I say advisedly "some," for, thank goodness, they are not all alike. Are not almost all inventions in photographic matters originated by amateurs who give not only their money, but the best years of their life, to the advancement of the engrossing art-science? And who benefits by the inventions of amateurs? Why, professionals, of course. They do not even try to perfect or improve upon a process, but simply wait until the whole process is published in detail with the latest improved formulae. I cannot but think that the root of the bitter feelings that are expressed towards amateurs is attributable principally to jealousy, for many professionals turn out work which would put to shame a second year's amateur. Professionals should not fear much harm at the hands of amateurs, for, as a rule, the most he can get in the way of remuneration is "costs out of pocket." Then how can professionals expect that dealers are going to help them to "squash" the unfortunate amateur? Where would eight out of ten of the dealers be if it were not for this class of man, whose every photograph, I might say, costs him treble what he could get one professionally taken for, because he is not satisfied with the colour of this or the density of that; or the picture when mounted looks unimportant, and should have been mounted on a "plate-snuk" mount or a plush one? Then he must spend more money in repeating the print and getting another frame. If the professional can only swallow his petty jealousy and acknowledge the truth, he would say that the amateur is "not quite so black as he has endeavoured to paint" him.—I am, yours, &c.,

London, N.W.

FREDK. W. MUNCEY.

To the Editor.

SIR,—A correspondent suggests that in order to do away with the amateur difficulty, that the four developing agents—pyro, oxalate of potash, quinol, and eikonogen—should be highly taxed. For some reasons, perhaps, this might be a desirable thing, inasmuch as it might prevent amateurs aiming so much at quantity at the expense of quality. But would it not affect the professional quite as much as the amateur, especially considering the number of positions they are in the habit of taking one in nowadays? Your correspondent must also have overlooked the fact that the developer is, after all, only one of the minor items of expense.—I am, yours, &c.,

A. F. JONES.

The Lindens, St. Leonards-on-Sea.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange quarter-plate set, complete, for half-plate camera or set, complete.—Address, K., 189, Southampton-street, Reading.

James's triple flash lamp, good as new, in exchange for whole-plate printing frames.—Address, J. DAVIS, 31, Cambridge-road, Barking, Essex.

A Boston Humber tripper tricycle (suit either sex) offered in exchange for a light 15x12 camera and lens.—Address, PHOTO, Museum-parade, Matlock Bath.

Good head and body-rest, a metal chair ditto, office copying press, half-plate box, camera, and back; want shutter and tripod.—Address, W. C. CHIFFIN, 39, Highgate-hill, N.

Ross's wide-angle stereoscope lens; will exchange for half-plate camera, two or more double dark slides, reversible back.—Address, BROS & SON, Chemists, &c., Halstead, Essex.

Double lantern objective of large diameter wanted in exchange for three-draw telescope, one and a half inch object glass.—Address, GRANGER, Photographer, Rotherham.

Wanted, posing chair with two or three backs; will exchange portrait lens by Pain, of Cambridge, eleven inches focus, lenses three and a half inches diameter. Wanted also, some 15x12 or 12x10 dishes in exchange for portrait lens, six and a half inches focus, lenses two and a quarter inches diameter.—Address, FELLOWS, Old Court-house, Enfield Town.

Answers to Correspondents.

* Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

G. W. Webster, Chester.—Two photographs of Master Taylor.

P. S. Lankester, Tunbridge Wells.—Two photographs of group of shooting party.

AULD REEKIE.—1. In Japan only, we believe.—2. Write to Liesegang, Dusseldorf; he will, no doubt, supply the article needed.

WOODPECKER.—One lens will have nearly double the rapidity of the other, supposing both to be worked with their full aperture.

WILTS.—The marks on the two plates are due to the coating. Evidently they were coated by machinery which was out of order at the time.

P.—For general cabinet work the No. 2 of the maker named will prove more useful to you than his No. 3. The 5p will serve for the larger heads.

INSTANTO.—The only secret in taking first-class instantaneous pictures is a quick-acting lens, a good light, a very sensitive plate, and a rapid shutter.

J. E. G.—The yellow spots appear to be sulphide of silver, caused by the hyposulphite of soda not having had equal access to all the surface during the operation of fixing.

TRANSFERO (York).—Yes. Bichromated gelatine paper can be printed by the electric light. Of course the arc light must be employed. The exposure will be somewhat long.

GEM.—1. Perforating machines are supplied by those who deal in printers' materials.—2. Paint the design required on a light frame with an opening, and suspend in front of the sifter.

49.—1. Neutralise the solution with carbonate of soda and then make it distinctly acid with nitric acid.—2. Yes. Better get the citrate of soda. Bicarbonate of soda is doubtless meant.

ALICE ROBERTS.—As we said in the article referred to, the paper is not at the present time an article of commerce; therefore, we fear, you will have to prepare it for yourself. This you can do according to the instructions given.

B. MOREY.—From a feeble negative which will not yield a bright silver print it will be impossible to obtain a good print by the platinotype process. Vigorous prints may, however, be obtained by using bromide paper, with care in the exposure and development.

A. B. (Wood Green).—The only method of recovering the platinum is to burn the paper and send the ashes to a refiner to be reduced; but unless you have a considerable quantity it will possibly not pay for the trouble. Platinum is a very refractory metal to deal with.

A. FRASER.—If you mean collotype printing, try the London Stereoscopic Company or Waterlow & Sons. We cannot give an estimate of the comparative prices in London or Paris, but we think this country will, as regards favourable terms, hold its own against others.

W. J. CARTER.—There is very little doubt about it. The marks or bands on the plates which have been kept so long in the slides are due to the leather or other material of the hinge. Better return the slide to the maker to remedy with fresh hinges of a different material.

S. C. BOYES.—The only suggestion we can make with regard to the "pyro solution which has gone bad" is to throw it away and make fresh. At most it did not cost more than a few pence. It is, as a rule, false economy to attempt to doctor any solutions which have become deteriorated.

A.—If the quantity of liver of sulphur added is not sufficient to precipitate the whole of the silver, more must be employed. You say the addition of "the liver of sulphur does not have the desired effect." If by this is meant that no precipitate is produced, then there is no silver in the solution to throw down. We do not remember what the previous query was.

LANTERN.—None of the ordinary four-inch condensers of commerce, at any rate, none that we have examined, will properly illuminate the corners of a slide the size of which measures a little over three-and-three-quarter inches diagonally. It would, however, be possible to construct a condenser that would do so, especially if the slide was placed very close to it.

W. BELL writes: "I have an old portrait lens by Voigtlander, which does not work to focus, but I have been told how much alteration to make after focussing. With such a lens, is it possible to take as good pictures as if its optical and visual foci were coincident?"—If the right adjustment be made—after visually focussing—all things being equal, quite as good results will be obtained.

VERAX.—1. We do not know where the Japanese varnish can be procured.—2. Full accounts of the Wothly method of uranium printing will be found in our volumes for 1864 and 1865. The Wothlytype process was worked commercially by the United Association of Photography, a company which ceased to exist more than twenty years ago. The prints were silver prints, the uranium acted merely as a species of developing agent.

G. KERSHAW.—The most successful block process is, perhaps, that of the Meisenbach Company. These blocks are well adapted for printing with type. The process is not published, nor, indeed, are the details of any of the most successful block processes. Collotype plates cannot be worked with type. The other process mentioned is, we think, a collotype. Collotype is worked under several different names by different firms. Obtain Mr. Wilkinson's book.

E. B. asks: 1. When gas cylinders are used is it more economical to work the mixed jet than the blow-through jet?—2. Is it quite safe to use the mixed jet with the gas in cylinders without pumice chambers or other similar contrivance being employed?—3. Is the safety of the jet affected by the gases being under different pressures?—In reply: 1. Light for light the mixed jet is the more economical.—2. Not if governors are used on the cylinders.—3. Yes; very materially.

GEO. CLEARY has been experimenting in albumenising paper, and sends some examples. He wishes to know the cause of the defects—streaks and want of gloss. He says he used pure white of fresh eggs only.—The streaks are due to the albumen not being sufficiently beaten. It should be entirely converted into froth, so that when the vessel containing it is inverted nothing will run out. Unless it is got into this state in the first instance unevenness must be expected. The lack of gloss is due to the paper. This appears to be a common sample of printing paper—not photographic paper—which has absorbed the greater portion of the albumen instead of retaining it upon the surface.

J. T. LEON writes: "I have a photograph which has been stuck on a sheet of glass and framed with a glass in front of it. Probably owing to damp, mildew has appeared on the surface, and also a number of yellow spots, going right through the paper. The photograph is a silver print on albumenised paper, and as it is a valuable one I should be glad if you could suggest any means of removing the yellow spots. They are like yellow spots which occur during toning and fixing."—Probably the print has been kept in a damp place, and the cement used in mounting contained mildew germs. There is no remedy. The best thing to do is to copy the picture and touch out the defects in the negative.

C. A. says: "I have just purchased a lantern with a three-wick lamp for paraffin oil. The light is fairly good, but the fumes from it are most unpleasant. Of course one expects this when the wicks are turned too high, but this lamp smells when the wicks are at the right height. Can anything be done to avoid this?"—A great deal depends upon the management of the lamp. The wicks must be kept trimmed perfectly even with the tubes. If there are projecting pieces smell is almost certain. The outside of the lamp and wick tubes should be kept scrupulously clean. Most of the smell arising from paraffin lamps is due to oil on the surface, which with the heat is evaporated, hence the unpleasantness.

DAVID GREEN writes: "Can you help me in explaining the nature of the spots on the enclosed prints? They have been shut up in the cigar-box, and have made their appearance during the last six months. It is quite impossible that any foreign matter could have fallen on them, as they have been locked up in a cupboard, and only handled by myself. Two distinct brands of paper have been affected alike, while prints from the same sheets of paper, not packed in the box, remain unchanged. The spots have formed apparently on the albumen side of the paper. The prints were not rolled together, but thrown in loosely in the box; about two dozen prints, every print spotted. I may say that I am a most careful worker, and have forwarded you the identical box in which the evil has taken place. If you can solve the mystery I shall be very grateful."—In reply: There is an exudation from the cedar-wood cigar-box in question, which would congeal in resinous globules on the prints; but there is, in addition to what the cedar itself is capable of, the further exudation from the essential oils with which cigar-boxes are impregnated and the cigars themselves frequently well sprinkled in addition, for the purpose of imparting Havana and similar characteristic flavours.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, December 4, 1889, *Dark-room Appliances.*

Great Thoughts, a weekly journal which has much attracted our attention of late by the excellence of its portraits of famous men and women, no less than by its sound literary merits, is to commence its new volume by a serial story by Dr. Joseph Parker, of the City Temple, London.

RECEIVED from Marion & Co.:—*A Complete Treatise on the Art of Retouching Photographic Negatives, and Directions how to Finish and Colour Photographs*, by Robert Johnson. Also received:—*Revised Formulae for the Production of Transparencies on Cowan's Chloride and Chloro-bromide Lantern Plates*. A review of these will appear in our next.

A new society has been formed in Bolton under the name of "The Bolton Camera Club," to hold its meetings every Wednesday, at half-past seven p.m., at the Studio, 21, Bury New-road, Bolton. The officers elected are:—*President*: Mr. John Johnston, M.D.—*Council*: Messrs. Thomas Parkinson, sen., Jonas Royle, James Turner, Walter Russell, and Joseph Berry.—*Treasurer*: Mr. Jabez Boothroyd.—*Hon. Secretary and Librarian*: Mr. Thomas Parkinson, jun., 117, Westbrook-street, Bolton.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1544. VOL. XXXVI.—DECEMBER 6, 1889.

MEANS OF PRODUCING HEAT.

THE rather sudden advent of weather that is unusually cold prompts us to look at this from a photographic point of view equally as did a high thermal range several months ago.

Cold is altogether inimical to many chemical operations, in particular to those relating to photography, and one evening lately, when things were not proceeding in our laboratory as they ought to have done, it needed but a glance at the thermometer to indicate the cause. It is now axiomatic that all chemical action is aided by heat; and it is *per contra* retarded by cold. As cold may be produced by the admixture of certain substances, so may heat by means analogous. In a former article we showed in what way solutions which in a torrid climate acted prejudicially upon a sensitive plate when in course of development and subsequent treatment could be cooled down to any degree desired; and antithetically we now go on the opposite tack and show that by certain additions to water, whatever its temperature, a considerable degree of heat may be obtained.

The best of all substances for this purpose of which we are aware is happily also one of the cheapest. Out of its calorific properties arose a species of trick experiment known to all schoolboys who dabbled in chemistry. Having obtained a very thin glass bottle, half fill it with water and give it to a friend to hold firmly in his grasp; now pour slowly into it ordinary sulphuric acid. The effect will be that such a degree of heat will have been engendered, that long before the bottle has been filled the holder will have set it down.

The knowledge of this may prove useful to some who desire ready means of intensifying the action of either developer or fixing solution which have become sluggish, if not altogether inert, owing to their low temperature. We have tried both developing and fixing negatives by means of solutions of the excellence and certainty of action of which at ordinary temperature we were well assured, but which at the time of our trial had been suffered to fall to about two degrees above the freezing point. Chemical action seemed as if arrested. The solutions had been placed in two thin, flat dishes made of well-spanned tin ware, and each was placed in a larger vessel containing water. A few drops of sulphuric acid were now poured at short intervals into the outer vessel containing the water, and it soon began to tell upon the solutions in the trays, developing and fixing proceeding as when normal temperature prevailed.

We here throw out a suggestion that a small condensing tub having a worm composed of leaden pipe running through it might at times be found convenient by some who have no appliances handy for raising the temperature of any fluid—

spirit lamps, bunsen burners, or similar calorific appliances being assumed to be absent at the time—for by an admixture of sulphuric acid and water a considerable amount of heat could thus be obtained. The ingenious photographer will soon discover various ways in which to apply this system.

Some substances retain heat much longer than others. A few years ago a metallic case filled with acetate of soda and then sealed was much employed as a means of retaining heat for a long time, and numerous applications of it were suggested at the time. When immersed in boiling water for a time and afterwards taken out, it was found to retain its heat for a longer period than any other means hitherto tried. We well recollect at the time heating up a copper vessel filled with the acetate and afterwards transferring it from the boiling water to a small Norwegian stove to find that the day following it was still quite hot.

But there are other salts which are known to require, when in saturated solution, a higher temperature to raise them to the boiling point than acetate of soda, chloride of calcium surpassing it in this respect. The boiling point of the calcium salt is found to be 355° Fahr., which exceeds by nearly 100° that of the soda.

It is not, however, our intention to here enter into the domain of physics further than indicating as we have done a simple way by which the photographer, when other agents are absent, may be enabled to work successfully in even the coldest weather.

NEGLECTED PROCESSES.—BLACK VIGNETTES— DENIER EFFECTS.

THE above might possibly be classed as neglected styles rather than "neglected processes." Yet there was in each style a sufficient departure from the ordinary method of working to warrant both being alluded to in this article. Moreover, now that popular taste in photographs is undoubtedly undergoing a marked change, it may be worth consideration as to whether, if these were again introduced, they, the latter especially, would not meet with a certain amount of success commercially.

We shall first allude to the pictures of Bergamasco. About twenty years or so ago this Russian photographer exhibited in this country a novel style of portraiture. It was a large size vignettied head and shoulders, the head being some three or four inches, and sometimes even larger. The peculiarity in the pictures was that the figure instead of being vignettied into a white ground, as usual, was shaded into a black or nearly a black one. The lighting of these portraits was bolder and more vigorous than usual, so that the contrasts were strong and

forceful. Furthermore, the pictures were always mounted in dark and massive frames; hence the portrait itself looked exceedingly rich and brilliant. The negatives were said to be vignettied in the camera, therefore the prints were as readily produced as ordinary non-vignettied ones. Of course, the same result could be obtained by double printing, instead of taking a negative specially for the purpose. The principal features in Bergamasco's pictures were their large size and their force and vigour, to which effect the dark vignetting and style of framing largely contributed.

The Denier pictures were a decided novelty at the time they were introduced. They were of a somewhat large size, but the peculiarity in them is difficult to describe. There was a certain softness, or indistinctness, about them, yet if they were closely examined they appeared to be perfectly sharp. This characteristic gave them the appearance of being on porcelain rather than on paper. Perhaps the effect may be better described if we liken it to a picture made on the transparent side of a thin piece of flashed opal glass. The pictures were certainly very brilliant, and were generally admired for their artistic qualities. How they were produced was never published, that is to say, with the authentication of the introducer. It was a "secret process," and it was the intention of Denier to sell it as such in this country to a certain number of subscribers. But these were never obtained.

When the pictures were first shown, there were many suggestions as to how they were produced, several of which we shall now allude to. The method most credited as being that used by the originator was that two negatives, duplicates of each other, were taken and developed only to half the requisite density had they been used separately. These two negatives were then superimposed, the one upon the other, and the print made from the compound negative. Another suggestion was that the plate was sensitised on both sides with a thin film, so as to secure a sharp image on one side and an out-of-focus one on the other. One plan was that of making part of the exposure with the image in focus and a part with it out of focus, both backward and forward: for example, by giving half the exposure with the lens in focus, and a quarter with it racked a little inwards, and the remainder of the time with it a trifle outwards of the sharpest focus. By this means we at the time obtained results analogous to those of Denier.

Here is another method, and it answered well:—Make a portion of the exposure with the lens, a portrait combination, stopped down, and then remove the stop and finish the exposure with the full opening. This produced a pleasing effect, particularly if the lens possessed a considerable amount of spherical aberration. One proposition was to give a part of the exposure with the camera stationary, and a portion with it in a state of vibration. This was to be managed in the following manner:—A cord was strained from the camera to a rigid object, say the floor, and then, when part of the exposure had been given, the cord was put in a state of vibration by drawing a violin bow across it and the exposure continued. The interposition of a sheet of glass between the lens and the sensitive plate was also suggested.

The following method was used for producing these pictures, and it is one by which we have obtained results equal in every respect to those of Denier, while it has the advantage that any negative already in stock can be utilised:—The print is partly made with the paper in close contact with the negative. It is then removed, and a thin sheet of glass, or one or more thicknesses of transparent gelatine, interposed, and the printing

afterwards continued to the requisite depth. By varying the depth of printing with the paper in contact with the negative and the extent of the separation afterwards, any degree of sharpness or softness can be obtained at will. In America specially constructed printing frames were introduced for producing this effect. Those who essayed this class of picture when it was first introduced mostly confined their efforts to small sizes, and for these this style is certainly not well adapted. Its special province is that of large portraiture.

At the present time excessive sharpness—crispness—in large portraits is not so much sought after as it formerly was; therefore, if the Denier style of picture were now reintroduced there would be a fair prospect of its proving a commercial success. With this process very little retouching of the negatives is necessary, and every portraitist knows that the retouching of large heads is an important matter; for unless it be skilfully accomplished the picture, as a picture, is utterly ruined. This has undoubtedly been the case with many of the large direct portraits which have appeared in recent exhibitions. Much of this would be obviated by adopting the Denier style.

THE occultation of Jupiter by the moon, on September 3, occurred in this country at a time eminently unfavourable for observation or photographing, but in America the conditions were more suitable, and we learn that at the Smith Observatory, Geneva, New York, Mr. W. R. Brooks obtained several good negatives of the phenomena. That gentleman states that the relative apparent size of Jupiter and the moon as seen upon the sky is well shown in the negatives, and by comparison of different views the motion of the moon towards Jupiter is impressively recorded. Although the image of Jupiter is so small the belts may easily be seen in the negatives by the aid of a magnifying glass.

It has often been attempted to introduce into photographic views of evening effects, or of pseudo-moonlight pictures, a representation of that luminary herself, and, of course, it is a common expedient of the artist-painter. Yet how rarely is the result a success! The circle of white always looks artificial, and invariably seems to want some unknown alteration to produce the appearance of nature. The deficiency really consists in a want of true proportion in the representation. Few observers have the slightest idea how large the moon appears to them; in other words, what object held at arm's length and compared with the moon would appear to the eye as of the same size? If the question is asked it is very unusual to receive a correct reply, the usual comparisons varying from a dinner plate to a half-crown piece. As a matter of fact, an ordinary sized pea so held is the nearest approach to a true comparison.

A STANDARD of light is as much a necessity for the scientific photographer as to the gas manufacturer; but the latter is compelled by Act of Parliament to standardise his products, while public demand alone affects the former. This demand, however, is sufficiently strong to cause the dry-plate maker to cater for its supply, and he in consequence either calls his plates so many times quicker than the standard of wet plates, or, more scientifically, refers them to M. Warnerke's well-known standard, and gives upon the label the number of the sensitometer they develop to. Some of our readers have, doubtless, been amused by quotations in print of "35" or "40 sensitometer," still more, have been perplexed to understand the meaning intended in some cases by the sensitometer number attached, plates by different makers varying in sensitiveness as one to three (and sometimes more) being labelled by one and the same sensitometer number. The molten platinum standard is not a practical one, and, taking all points into consideration, the pentane lamp has most promise. These, and others,

are succinctly and well described in *Practical Photometry*, a work recently published at the office of the *Journal of Gas Lighting*.

QUITE lately still another method of testing the power of light has been invented, and described by M. G. Lion, who utilises the decomposition of nitrogen iodide by light. This preparation, which, when dry, is a most powerful explosive, is quite innocuous under water, and is made by digesting iodine in ammonia at a temperature of 22° C. According to this gentleman, it is decomposed exactly in proportion to the strength of the incident light, and the amount of decomposition is measured by the volume of the nitrogen gas disengaged, which is exactly proportional to it.

THE users of electric light for photographic purposes, in common with others, will have received a shock in reading how it is looked upon as certain that one of the most disastrous fires ever recorded, even in America, has been caused by the wires in connexion with the electric lighting in a warehouse. Of course, these risks are no new discovery, and the proper way to encounter them, to provide against danger of fire, has been long ago enunciated. It is to be hoped that the insurance companies will not make it a pretext for increasing their premiums to the long-suffering photographer, who is now far more heavily rated than the risk warrants. Can any of our readers explain why the risk in a photographer's premises is looked upon as so great? Although he has barbed, in the majority of cases, the dangerous ether, no relief of his rates is vouchsafed.

At a meeting of the Queckett Club about three years ago, Mr. J. D. Hardy exhibited an arrangement he had devised for photographing an object under the microscope without having to alter the position of the instrument in any way. It was, however, of metal, and too heavy for use; but at the Royal Microscopical Society's meeting last month he introduced a variation in form and material in the shape of a somewhat similar instrument made of wood, and weighing little more than an ounce, which it may be anticipated will be of real use.

WE draw attention by way of record to a long paper upon *A New Process for the Volumetric Estimation of Bromine in Presence of Chlorine and Iodine*, by Mr. Norman McCulloch, in last week's *Chemical News*. The paper, which is unsuitable for abbreviation, is interesting and useful. As, however, a small number only of our readers are likely to take a special interest in the subject, which, in some instances, would be of great value to the experimenter and investigator, we content ourselves with reference to page 259, *et seq.*, vol. lx., of that journal.

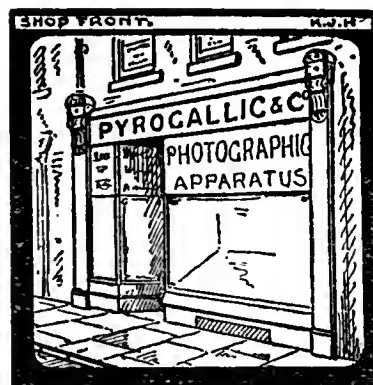
PREPARING AND MARKING SLIDES FOR THE LANTERN.
MUCH confusion formerly prevailed relative to the placing of the slides properly in the lantern. Not unfrequently they were seen upside down on the screen, or back side foremost, causing a reversal of the image. To obviate this some makers adopted one system of marking their slides, but as others adopted a reverse system, confusion became still more confounded when the unhappy demonstrator was called upon, often at a moment's notice, to exhibit a collection emanating from various sources, and marked in a heterogeneous manner.

The Photographic Club, which is composed of members of various societies in London, set themselves to reform this by adopting a general standard, and this system is now becoming generally adopted.

We are pleased to find that an influential body in the provinces—the Birmingham Photographic Society—have in their Annual Report given a “deliverance” on this subject, and it is so concise and good that we extract it in full:—

“Attention is again directed to the marking of slides. The proper method of labelling a lantern slide is to attach the name or title, so

that it may be seen on the front of the picture—preferably at the top—when viewed in its correct position. An example is given in the sketch:—



“All slides for exhibition should be three and a quarter inches square and properly mounted. They should bear the title legibly written.”

Here the whole matter is so well stated that we have only to urge upon our readers all over the world its general adoption.

COLOURED PHOTOGRAPHS.

XV.

IN our last paper we have arrived at a point which brings us face to face with the actual work of painting a picture. As I before suggested, we must look upon the presence of the photograph as we would upon a most elaborate sketch. Needless to say, in this regard the photographs will present some difficulties, such as the heaviness of many of the shadows, and the general colour of the print, the latter being not at all advantageous. This, however, may be obviated if we have everything under our control, as we may then select a method of printing which may afford little, if any, disadvantage. Suppose we had to paint a head and bust on porcelain, we can have the same printed on a carbon tissue, either in photographic tint or the more delicate and, if I may so express it, *friendly red tint*. This latter is somewhat the colour of the old red chalk drawings. If, however, we have not the option, and are obliged to work on a carbon film having the image printed in photographic tint, we can *rub down* this image to such an extent as to remove all its objectionable qualities. By *rubbing down* we can secure a perfect sketch, and of such delicacy that the tone or tint of the photograph will but little, if at all, interfere with the successful working of our colours.

When our photographic base is on, say, *albumenised* paper, matters are different, but our difficulties are not overwhelming. We have many ways of treating this kind of picture. We can use, if the picture be very dark, a little Chinese white with our first wash of colour, which will tend to remove the heaviness, and enable us in after work to secure better and more natural tones in our flesh. As I have already said, in a former paper, that the use of Chinese white should be very limited, especially in this respect, I wish it to be understood that what I have just said must not be taken to disprove the same. A photograph of the density to render its use *almost* indispensable is but seldom presented to an artist for colouring, but when such is the case I think it may be considered allowable to use it. I always prefer pure colouring if it can be successfully carried out, and in most cases *strength* of colour will be sufficient to kill the neutral and anything but life-like tone of the photograph, and in its place leave one that will truthfully represent nature. These remarks apply also to pictures printed in platinum, bromide, and such-like cool tones.

We will pursue the system of colouring as though we had made our sketch, and compare from time to time in order to thoroughly appreciate how much of this style of work is honestly applicable to colouring a photograph. We will find that nearly all the rules for painting (when the sketch as well is our own work) will apply to our colouring of a photograph, although, perhaps, not in the same order of working. To explain this point before we go any further, I will give an example. Where we make our own sketch, our first task with colour would be to secure the outline in appropriate colours, and then apply what we may term the dead colouring. Now, with a photo-

graphic base this would not be so: we should rather give our *broad wash first*, which would give a good warm tint to all the flesh, and then proceed with the colouring of the outline and other portions, as we might find most desirable.

It may not be amiss to divide the process of colouring, whether it be on a sketch or a photograph, into three distinct parts. The first of these we may restrict to the outline and the placing of the local washes representing the *masses* of colour. The second consists of what we may term the painting or working out of all the delicate details of the portrait. And the third may be set down as the finishing of our work in every detail, both as regards general effect as well as style of manipulation.

It is rather difficult to carry on this comparison, so I hope my readers will kindly be more disposed to follow the spirit of what I set down than try to find out a weak point in it. We will, supposing we understand each other up to now, proceed with the colouring of a head of a fair subject.

In the case of a sketch, we would find in all probability that our outline was rather strong; we would, therefore, reduce it by rubbing a little bread or indiarubber over it, so as to leave a very faint indication, but not to obliterate it. In this condition the colour of the pencil will not interfere with the purity of the colours when applied. In a carbon on porcelain the treatment would be somewhat the same. We are almost certain to find the *print* too strong, a fact which would, if not altered, injure the purity of our colouring. We would, therefore, proceed to rub it down with eraser, working it slowly and carefully, until we had but a faint indication wherever great delicacy of colour was necessary.

In the sketch, we would now make a firm outline with the brush, of course laying the proper colours on each part as we proceeded. We should also try to do this in such a way as to represent the full strength at once; we should also be very careful to represent faithfully the various forms, and, if possible, improve the drawing. As an example of this, should the eye be a blue one, put the iris in with cobalt; this we can lower in tone for a grey eye with sepia, or Vandyck brown for a dark eye. The pupil we can paint with sepia, should it not be too dark. The eyelashes we can paint also with sepia, and indicate the eyebrows as well. If the nose be in more or less shadow, it will be found advantageous to mark it out with brown madder. The ear may be outlined with the same beautiful and useful colour. The same colour may be used for the nostrils, but it will be found of considerable advantage to mix a little pink madder with it. This latter combination may also be used for the deep shadows of the mouth.

The leading and most characteristic shadows and other markings of the face should now be put in, and this, too, as near their full strength as is possible. A general shadow colour which is well suited for this purpose may be made by a combination of Indian red and cobalt, care being taken not to allow the latter to predominate and so produce a slaty tint. I do not think there is any better, more useful, or cleaner colour for painting in the shadows on flesh than that resulting from the judicious combination of Indian red and cobalt. The most important shadows to require treatment are those which indicate the sockets of the eyes, the lower parts of the nose, and also that below it, under the chin, and below or behind the ear. In working these shadows we should use considerable judgment, as beautiful effects may be gained by a skilful combination of washing and hatching. If there be a bluish shadow under the lower lip, put it in with cobalt.

The lips come next for treatment. These we paint with a mixture or tint composed of vermilion and pink madder. As a rule, it will be found best to stipple on this colour; we can secure the lights on the lips by either leaving them in the first instance or taking them out afterwards with a wet brush. This done, we give a general wash of Venetian red or light red all over the face, excepting only the eyes. Now, while this is drying we can outline and wash in, with sepia, the most prominent markings in the hair, securing any peculiarities that may happen to be there. It will be advisable to begin with the darkest and most decided forms, and so proceed until we have put in the entire of the hair in touches as nearly of proper strength as possible. If there be white linen next the skin it will be well to now outline it with a delicate tint made by mixing cobalt and sepia. All the rest of the objects in the picture should now be outlined in their respective colours, and then washed in. To do this, the best way is, as before, to start with the decided tones and leading touches which indicate the form of the object, and then give a general wash over all.

Having gone thus far, we have secured, I will presume, an accurate and coloured outline in which all the leading shadows and principal details are fully defined. It is a very uphill struggle to complete a successful picture by means of shadows and colours, if we have to a serious extent failed in correctly carrying out these preliminary points.

On the contrary, if we are successful in the execution of this portion of our work, we can rest assured we have secured the resemblance as well as the general effect at the very beginning of our picture.

Before going further, we will see how far all this can be successfully applied to a photograph. Really there is but little to do except to somewhat alter the rotation of our work. On the sketch, we painted in our leading shadows and details and then placed a general *wash*, while on the photograph we must do exactly the reverse. On the photograph, our masses of colour must be washed in first, our leading shadows after. There are many reasons for this being necessary. On the majority of papers used for photographic pictures, the colour rests too much on the surface, and is too likely to *lick up*, to admit of the same treatment as a water-colour on the ordinary Whatman or other papers, which absorb and hold the colour firmly. Of course, there are some papers where this is not the case, and in such we are at liberty to do as we may each think best. On a platinum base either may be worked, so also on bromide or salted paper, but on carbon or albumenised paper it would be next to an impossibility. I feel sure this will be self-evident to all beginners on the very first trial.

By the time we have carefully finished outlining and massing the shadows on the hair, dress, and other objects, the wash of Venetian red will have dried upon the face and be ready for further work. It will be found advisable now it is dry to hatch over the entire face with the same colour. Let your colour be *thin* and flowing, taking care at the same time that it is not too wet. It is best to begin this hatching upon the forehead, and directing your strokes in such a manner as to indicate the roundness which this part of the face has in nature. Much of the breadth and vigour of the head, as well as its roundness and beauty, depend upon our accomplishing this treatment successfully.

This process of hatching having been *once* completed, we must do it again, only this time we must *cross* the hatching by slightly altering the direction of our strokes. It is not necessary that the lines should cross each other much, but, above all, care must be taken to avoid crossing them at *right angles*. To cross at right angles would be simply fatal, as nothing soft or graceful could ever result from such a treatment. This method of laying on colour should be practised until a certain facility is gained, as it may be laid down as a rule that in painting flesh all the colours used must be *hatched* and not *washed*, save and except in the first instance, when we give a *wash* of venetian red. In the case of men's portraits it will be found necessary, at times, to hatch a rather light tint of Indian red over the lower portion of the face in addition to the Venetian red.

Let us see now where we are, both as regards the portrait whereof we have made the sketch and also the photograph. It is laid down that we must secure all our outlines and leading shadows in the various colours of nature, or those that represent that effect as nearly as possible, then lay a wash of Venetian red over the face and leave to dry. When dry, we cross hatch with Venetian red until a certain degree of power, roundness, and warmth is secured, which may be said to be the successful termination of our first painting. I think if this be closely considered, all these points can be carried out successfully in painting a photograph. The fact of our being almost obliged to give the *wash* first, instead of later on, will not to any material extent alter the beauty or truthfulness of our portrait, or render the treatment of our picture less artistic. Indeed, the order to be observed in painting a portrait on a photographic base, say carbon tissue on porcelain, can be equally carried out with success upon Whatman's paper. I think it may be fairly set down as a matter of *expediency* which we adopt, and not be considered as in any way interfering with the value of the portrait from the point of its artistic merit.

As I say, our *photographic outline* (for as such we can truly look upon it) can be so thoroughly brought to suit the requirements of an artist about to make a painting, that we can treat it according to all the best rules laid down by the most eminent authorities for the production of a so-called legitimate painting. REDMOND BARRETT.

COMPARISON OF EIKONOGEN AND PYROGALLOL DEVELOPERS.

[Abstract of an article read before the Chemical Society of Washington, U.S.A.]

THE ordinary photographic developer is composed essentially of a reducing agent—pyrogallol, hydroquinone, &c.—and an alkali. A new developing agent has recently been introduced, under the name of eikonogen. This is the sodium salt of amido-B-naphthol=B-sulphonic acid, $C_{10}H_5\begin{Bmatrix} HSO_3 \\ NH_2 \\ H \end{Bmatrix}$

The comparison of developing agents should be made with reference:

to the quantity of alkali required to develop a properly exposed plate. Pyrogallol being the agent most generally in use, it was chosen for comparison with eikonogen. Experiments showed that about three times the weight of pyrogallol was a good proportion of eikonogen; hence the following formulae were made out, which, on trial, proved satisfactory:—

PYROGALLOL SOLUTION.—P.

Pyrogallol	2 grammes.
Sat. sol. sodium sulphite	50 c.c.
Water to make	300 c.c.

EIKONOGEN SOLUTION.—E.

Eikonogen	6 grammes.
Sat. sol. sodium sulphite	50 c.c.
Water to make	300 c.c.

ALKALI SOLUTION.—A.

Potassium carbonate, dry	20 grammes.
Water	200 c.c.

For development, mix three parts of P or E with one part of A. This gives developers containing in each 100 c.c.

Pyrogallol	0.5 gramme.
Eikonogen	1.5 "
Alkali	2.5 grammes.

The comparisons were made by exposing plates in the camera, cutting them vertically across, and developing the halves in the different developers. Development was carried on for the same length of time for the halves of each plate, and they were passed through alum bath and hyposulphite together. The negatives and prints were shown.

The results are summed up as follows:—

1. Eikonogen, used in the proportion of 1.5 gramme to 100 c.c. of mixed developer yields denser negatives than pyrogallol used in the proportion of 0.5 gramme to 100 c.c., the quantity of alkali being the same in both developers.
2. When the proportion of eikonogen is reduced to one-half the quantity given above, using the same amount of alkali, the density of the negative is not quite equal to the density given by 0.5 gramme of pyrogallol.
3. There is no difficulty about getting any desired degree of density with eikonogen; the plates do not become stained.
4. Eikonogen negatives print much quicker than pyrogallol negatives of apparently the same density.

ROMY HITCHCOCK.

THE IMPROVEMENT OF FAULTY NEGATIVES.

No. II.

In a previous article I referred to such faults in negatives as those showing opaque and transparent appearances, and instanced a case of the former kind. I now proceed to describe a method of working which I have found most serviceable in the way of removing those faults that are opaque in the negative.

Whenever it happens that a flaw assumes such a shape as to be next to impossible to deal with or overcome in the negative, perhaps there is no better way of proceeding than by making a transparency of the same size, but little consideration will be required to understand that, when this is done, such opaque faults will assume a transparent appearance in the positive, and, as I stated previously, it is nearly at all times a matter of much simplicity to deal with a fault when it assumes a transparent shape. It then comes within the scope of most amateurs to deal with in the usual way of spotting or retouching out with a lead pencil, or, in stubborn cases, the aid of a fine sable brush and a little colour will generally be found useful. In the course of my practice I find it is not this working up of the transparency that gives my pupils so much thought, although doubtless there are numerous gentlemen who at first consider modelling a negative quite beyond them. Still, when they get a little insight into the practice of retouching, they soon find out it is quite within their power to do a considerable amount in this way. I find it is the pulling off and getting a good transparency of the same size that gives them most trouble. Here, doubtless, the rule with most amateurs is to put a dry bromide plate into contact with the negative in an ordinary printing frame, and, by a quick exposure to daylight, or a somewhat longer to artificial light, make the transparency. And here is just where they begin to go wrong in this class of work. I am no believer in the making of a transparency by contact. It is so simple, some say, and so much easier than by the roundabout method of exposing through the camera, that doubtless many are found who never

try the more scientific way of going about the operation. Still, I think but little consideration will be required at the hands of my readers to see that, when doing this work by contact, and using a fast bromide dry plate, an operator is almost powerless to cope with many of the imperfections, such as thinness in some parts of a negative, or over-density in others, both of which are quite easily dealt with in the case of slow printing by shielding, or printing up, dodging, &c., but which, when working with a fast bromide plate in contact, gets completely beyond his power to satisfactorily cope with. Were there no other objections to contact work, this alone, in my estimation, is quite sufficient to show that, in but few cases, can any one expect to turn out such good results by contact as by the more scientific way of working through a camera. I am quite aware that it is not every worker who is provided with a copying box to enable him to go about the work as I suggest, but the rigging up of copying box is such an easy thing to do that no one need really advance such an objection. In the making of a copying box there need be no launching out into an expensive article. I find some of my friends get along first rate with the rough-and-ready, home-made article, which is nothing more or less than a suitable box with an aperture cut in the bottom, against which the negative is supported with the aid of a few tacks. Armed with such, an amateur can go ahead and produce from faulty negatives transparencies of much evenness and pluck, for there need be no difficulty, after a single trial, in hitting off the correct time. In the work we are considering very much depends in being able to pull off from a faulty negative a really good transparency. By this I mean a positive showing the finest details, and one that on development gives full range of tone from high lights to detail in shadows. And, to do this, I know for certain there is no better way of going about the work than by the aid of a copying box and camera.

Where is the worker who can at all times depend on having all his negatives right in the way of equality in thickness of the films? When printing such through a copying box it is a matter of much ease to so shield off the thin parts with the aid of a little bit of paper by wafting it in front of the negative in such a manner as to equalise the amount of light that is passing through. There is no difficulty in doing this when a camera is brought into requisition and a small stop used, even should the worker be exposing a runaway dry plate, for by stopping down, and, if necessary, interposing a sheet of ground glass or tissue paper between the light and negative, matters can be easily arranged so as to permit of exposures ranging well on to a minute through the camera, if, in fact, in many cases even much longer time will not be required, so that an operator has his hands quite free to shield or dodge up his exposures. Not so, however, when attempting this work by contact. So much, therefore, in the matter of the best way of making a transparency. Now just a few words as to what, in my opinion, is the most desirable plate to use. In my practice I invariably use collodion, but I am quite aware not one in fifty amateurs or professionals either, for that matter, could now be found who know how to work a wet plate—more's the pity. If a bromide dry plate is the most convenient, or, in fact, the only opportunity an operator has of doing the work, by all means let him get as slow a plate as he can, and by a tentative system of development let him do all in his power to produce an A 1 transparency. When he has obtained this he is master of the situation, and any faults in the original negative now apparent in the positive must now be dealt with. In my previous article I referred to a case of opacity that had to be removed. A very little consideration will now suffice to show my readers that in the case referred to the removal of the fault becomes so easy in the transparency as to be quite within the scope of any one; in fact, all that is required being a few judicious touches of an ordinary lead pencil. This done, the positive is again placed in the box, and another sensitive plate inserted in the slide. This time a negative is pulled off, and on this any little retouching or modelling that may be required is done, the result being a negative free from the original flaw or eyecore, and very likely in some other respects much superior also. It is quite wonderful what an amount of improvement can be effected on a negative by working on the lines I have laid down.

I have instanced a case of faulty posing, but it is not in this alone in portraiture that we meet with cases of opacity which become an eyecore, or at least faulty in the finished print.

In the matter of lighting we frequently find errors are committed which can also be overcome quite conveniently by the method I have stated. I quite recently met with a case of a gentleman whose tender point was his grey hairs. Like every one else, he felt years did bring a few, but in the picture sent him, owing to faulty lighting, his hair came out on one side snowy white, and this was more than he could stand, so he returned the proof, saying he knew he had a few grey hairs, but was not quite so far gone in that direction as the photograph showed; in other respects the picture gave satisfaction.

I can remember well pulling off a transparency, dodging it up, printing a new negative, and sending a picture entirely free of grey hairs, and, need I add, it was prized very much. Such are a couple of cases that have come within my own experience lately in portraiture where flaws of opacity have been entirely overcome.

At present I am dealing with a somewhat similar trouble in the shape of a case of halation. Here a splendid negative of an interior is much marred by a glaring case of this annoying trouble. From time to time one hears of this and that preventative in the shape of backing the plates previous to inserting them in the slide, &c. I do not know whether or not I am singular to others in my experience, but I have always found the best way to prevent halation is to deal with the offending light that comes through the window. I am no believer in the backing of a plate as being a sure preventative. In my opinion the only way to get entirely rid of this nuisance, in the case of interiors, is by so blocking out the light as not to cause the offence. But in cases where any one has to make the best of what they have placed before them, I know much may be done to mend matters, if not, indeed, entirely remove the results of halation, by carefully working up the positive previous to pulling off the final negative. In attempting this, however, it is not at all times an easy matter to fill up broad spaces of halation with the aid of a pencil or stump. I often, in such instances, get along first-rate by flooding the glass side of the positive with ground-glass varnish and working in same with the aid of a sable brush and a modicum of Chinese white, working in with pencil, &c., as much as can be done on the film in the way of detail. This sort of work takes a little patience and neat-handedness, but the worker gets his reward when he looks with pride on the success which finally attends his efforts. In my next I hope to refer to a few other cases.

T. N. ARMSTRONG.

AMATEUR LANDSCAPE WORK IN PLANE PERSPECTIVE.

THERE is strange perversity in human nature, or, at least, in some types of it, and the amateur photographer occasionally exhibits forcible examples thereof. That the eyes can see only the amount of their trained capacity is an oft-repeated truism, but it has rarely been so well exemplified as in a recent case, which may point a moral, if it does not adorn a tale.

A landed gentleman having an estate in the North of Scotland, bitten by the photographic craze, began it, and with the pertinacity of a Scotsman, determined to become as good a photographer as he had already made himself a banker, a farmer, arboriculturist, &c. So far as the most lavish outlay, the best text-books, and assiduous practice could do to help a person naturally clever, he succeeded in being able to make very presentable negatives of the wild mountain scenery around his highland home. During the currency of his last year's residence there, among many others he had secured one which he considered his best photographic attempt, and which embraced several cherished bits of scenery he had never seen previously depicted. The subject was a wild highland valley, or rather mountainous gorge, through which a peaty burn came rushing and tumbling: here over a pebbly bed, there over a miniature fall, and anon dashing itself into spray against the huge rocks bounding it on either hand, till coming nearer the foreground they narrowed almost to a crevice, through which it rushed; and comparative smoothness was secured by a strongly built curved embankment forming a roadway, which was partly cut out of the slope of the mountain side and partly sustained by this built up from the bed of the torrent, by which comparatively easy access could be got to a favourite, deep, still pool—the delight of his heart—and from which he had inveigled many “a lusty trout.” The scene was closed in the distance with the high-towered mansion perched above the densely wooded slope, on which it had been built with a fine eye for the picturesque outlook from the smoking room which formed the upper storey of the tower, one side looking down the burn, which in spate was a rearing torrent, and the others commanding views of the more or less varied mountain scenery around it. Altogether it was a charming spot, and the picture, as a negative, beautifully executed but for one slight defect. In order to get in the house and surroundings with a peep of sky, while keeping in the favourite pool in the foreground, the lens had been strained to its utmost, and the camera had been slightly tilted, and, what was not so much noticed, in the small upright *carte* print it had also been deficient in the true horizontality. This, however, he did not see, or his eye had been accustomed to the defect.

Our amateur friend, pressed by his family, determined to have an oil picture painted from one of the remaining copies, the negative having come under the usual fate of favourites—got broken or destroyed; and he gave the commission to an artist, of whom he had had

several landscape pictures, with strict injunctions to keep to the photograph. It was in vain that the latter stated that he had never been in that part of the country in any of his sketching trips, and so could not do justice to the subject with its local colour and other such items, but, as stated, with no effect. Was there not the card, the verisimilitude of the place, and from a point on which no artist would dare to perch himself by choice? and did it not show every stone, and pool, and shrub, and tree, and the mansion itself? and then it was the only photograph which had ever been taken from that point, and being a photograph, and a good one, it must be all right. The additional remarks that he liked the artist's work so well that he had selected him in preference to others who were mentioned, together with the injunction to put his best efforts on the picture and charge his own price, were quite temptations enough, and the commission was accepted.

In order to be as exact as possible, the artist, Mr. W—, a well-known man, determined to get it enlarged photographically to about three feet in height, thus necessitating a new negative and transparency, which allowed of careful drawing in of the landscape portion of the work, as the tilting and unevenness of the original did not much matter, for the rocks or river on which that sort of error occurs does not tell so severely. A slight tilt more or less to the already contorted strata, or an inclination of a degree or two to the trend of the trees, did not much affect the general truthfulness of the picture; but the enlargement showed the defects mentioned on the building, and after some consideration he decided to have that portion of the subject photographed and printed on the canvas, which was done from a 14×12 negative.

In order that the lines should be kept true and square, and for reference in finishing, true square lines were drawn crossing each other before printing the house in its place. During the progress of the work the client called several times, but could not, or would not, see the defects in the drawing of the building, and ultimately insisted on it being finished as he had photographed it, thus proving the assertions at the commencement of this article, which amount to the old proverb, “That there are none so blind as those who won't see.”

The artist, like Mr. W—, who is no photographer, thought he could improve the foreground, and did so with considerable addition to the picturesque effect, in my own judgment and that of others quite as fitted to criticise and accustomed to judge; but this also had to be erased, and the original faulty photograph followed as closely as if it had been absolutely correct.

The slightest knowledge of the principles of plane perspective would have insensibly trained the eye and formed the judgment of our amateur picturist and saved the perpetuation of what is really wrong in depiction, no matter whether executed by the camera or drawn and painted by the artist.

W. H. DAVIES.

A NEW PLATINUM TONING PROCESS.*

I WILL assume, therefore, that paper has either been bought or sensitised at home, and the proof is in the printing frame. It is, of course, evident that the progress of the print can be watched in the usual manner, but the extent to which printing is to be carried on to compensate for loss in the subsequent substitution process demands a few words.

There is but slight loss from this cause in this process. Some diminution of tone is, of course, observable, but in giving working directions, I should say that the loss is about the same as that in gold toning, and I print therefore till the high lights just show signs of degradation. However, in the demonstration with which I will conclude this paper, you will be able to see for yourselves the actual loss of detail. It must also be remembered that plain paper prints always lose in intensity proportionally more than albumenised prints. This loss takes place in the preliminary washing to remove the free nitrate. It therefore follows that these papers should be printed somewhat deeper than albumenised ones.

On removal from the printing frame the print should be well washed in several changes of water till all the milkiness disappears. The presence of these free silver salts do not in any way injure the subsequent toning processes, but they render the toning solution, which is used in a somewhat concentrated state, somewhat dirty and cloudy. I therefore prefer to wash thoroughly.

The toning solution is made up as follows:—

Stock solution A, chloroplatinite of potassium 60 grains.
Distilled water 2 fluid ounces.

This is the ordinary solution as given by the Platinotype Company:—

Take of A 1 drachm.
Water up to 2 fluid ounces.
Nitric acid 2 or 3 drops.

* Concluded from page 782.

I prefer to add HNO_3 to the solution to ensure its being in an acid condition, the least trace of alkalinity being sufficient to considerably retard the action, but with many papers it is unnecessary.

For those workers who do not use the platinotype formula, I would point out that the above solution means two grains to the ounce of water, and, therefore, the sixty-grain tube can be at once made up to thirty ounces and duly acidified.

If the weather is cold, I prefer to warm the solution, say, up to 80° Fahr.; this has always an accelerating effect, but too much heat should not be applied to a strong solution, as it will eat away the half tones.

The prints can either be immersed in this solution, or if only a few are to be done, can be floated on a small quantity of the solution poured over a levelled plate-glass dish. With the above strength, the toning process takes place very rapidly, in from two to five minutes, according to the tone it is wished to obtain. If stopped at an early stage, the prints have a brownish colour, whilst if carried on till all redness, as viewed by transmitted light, disappears, they become of the well-known platinum black. If several prints are to be toned at once, it is perhaps best to still further dilute toning solution, or its action will not be under proper control. In fact, in all cases where it is wished to obtain warm tones, and to have the action well under control, I should advise a considerable weakening of the developer, and to make it up as follows:—

Stock solution A.....	1 drachm.
Water up to	8 fluid ounces.
Nitric acid	2 or 3 drops.

Several prints can then be immersed in the above bath, and turned over and watched as the toning proceeds.

After removal from the toning bath, the prints should be placed in a basin of water rendered alkaline by carbonate of soda or ammonia; this is to neutralise the free acid of the toning bath, which, if carried over into the hyposulphite, would cause a precipitate of sulphur, and a probable yellowing of the high lights of the print. Where only a few prints are being manipulated, the hyposulphite bath itself can of course be rendered alkaline. In the fixing bath, if the toning has been complete, the prints should not change colour and lose nothing in intensity; but if the toning has been stopped at the reddish purple stage, they will change to a brownish black, this colour depending, however, somewhat on the process by which the print has been prepared. This change of colour is due to the silver salts that are left in the paper being altered in colour by the action of the hyposulphite of soda. When, therefore, it is desired to match any given tone, it is advisable to treat the prints before toning with a weak solution of salt in water. The action of this is to dissolve out all the purple subchloride, and leave only the red or brown suborganate of silver. As I have mentioned, in the early part of my paper, this has no action on the toning action, if we except a very slight general reduction of intensity.

The several prints handed round to you have been prepared with the idea of showing some few of the different tones that can be obtained by different salting and sensitising mixtures in connexion with different materials. They are on silk, nainsook, satin jean, Whatman's rough surface drawing papers, Creswick paper of 1865, having a slightly yellow tinge; also a thin bank post paper, that appears to promise excellent results, and is almost thin enough to permit of its being mounted in printed books without bulging them too much. Many samples on ordinary commercial barium salted paper are also shown, and some on Watson's matt-surface sensitised paper. Generally speaking, I may remark that the English animal-sized papers tone with more difficulty than the starch or resin-sized German or French papers. This is probably due to the fact that the decomposed sizing is in an alkaline condition, in which case a preliminary bath of citric or acetic acid would appear to be advisable.

Before I proceed to my demonstration, I presume I must say a few words as to the permanency of this process. I had hoped to find that the substitution of the platinum was complete, but I am obliged to confess that this is not so. It is possible to replace the silver to a very large extent, but not completely. This is equivalent to saying that the process is not as permanent as the ordinary platinotypes of Willis.

I have here silver prints toned by gold by my own process, and a print by the cold-bath process of Willis. These proofs were torn into strips and subjected to (1) chlorine gas, formed by the addition of hydrochloric acid to bleaching powder (hypochlorite of lime); (2) chromic acid; (3) sulphuretted hydrogen (formed by the addition of sulphuric acid to a soluble sulphide); (4) bichloride of mercury; (5) alum $\text{AlK}(\text{SO}_4)_2$, slightly acidulated with sulphuric acid (to represent the condition of a sour paste containing alum). I must here bear witness to the remarkable stability of the cold-bath platinum prints, which passed through the above ordeals absolutely unchanged. The gold-toned prints (gold chloride and car-

bonate of soda) were unaffected, or only slightly affected by the mercury, showing that the toning was pretty complete; but the chlorine had entirely eaten off every trace of the image, leaving only white paper. The sulphuration first somewhat darkened, but then yellowed, the colour of the deposit. The alum also had a very decided lowering of the tone. In the prints prepared by my own process, the mercury had not the slightest effect; the moist chlorine had, however, considerably damaged the image, but still there was a very considerable amount left; the sulphuration and the other tests had very much the same result as on the gold prints, but in a less degree. Some similar prints on plain fixed chloride, and developed bromide of silver papers, were, with the exception of the sulphuration and alum tests, of course absolutely destroyed.

From the above results I deduct, therefore, that prints prepared by my process, although vastly inferior to the ordinary platinotype prints, are yet a good deal more stable than those prepared in a similar manner, but toned with gold and vastly superior to developed bromide papers. Looking at the well-known longevity of such prints, when carefully prepared, this may be assumed to promise them a fairly long life.

LYONEL CLARK.

[Mr. Clark then proceeded to tone some prints that had been previously printed on some of Watson's matt-surface sensitised paper. The toning dish consisted of an ordinary glass-bottomed dish, provided with three levelling screws. This dish was first levelled by means of an ordinary level, and four ounces of toning solution were poured on it. With this some twenty 12×10 and 10×8 prints were rapidly and successfully toned.]

AMATEURS AND TONING.

OF all the various operations connected with the production of pictures by photography, perhaps there is no other that presents more difficulties to the amateur than that known as "toning," and yet an amateur who devotes any appreciable amount of time and care to the art he loves should, as a matter of fact, be able to tone as well as the professional, or, we will say, the average professional. That the general run of amateurs find the operation a veritable stumbling-block in their path is clearly proved by the number of letters weekly received by the editor of this paper, and which he states usually enclose examples "showing an entire misconception on the subject of toning generally." The failures he attributes mainly to over-toning, and to the manipulations, the paper employed, and lastly, but not least, to the negatives themselves.

On the subject of taking the negative, it is not my intention to write in the present paper, as I believe a fairly good tone can be obtained whenever a fairly good print is given to operate upon. With regard to the paper I would decidedly say a few words, and herein I consider lies the cause of the majority of amateurs' failures to obtain a good or pleasing tone. Most amateurs, in fact fully ninety per cent., use commercial ready-sensitised paper for their prints, and though there are a few brands of this that both print and tone well, there are also many with which it is next door to an impossibility to obtain anything like a decent tone. I speak from experience, having had many prints produced by amateurs sent to me to tone and finish. The presence of acid in the paper, while tending to improve its keeping qualities, has just the reverse effect when the operation of toning is considered. The amateur who does his or her own toning had better by far go direct to the photographer for sensitised paper which, if it will not keep colour so long as the dealers' ready-sensitised, will at any rate tone much more easily, and at the same time yield much better results.

Another prolific cause of failure is the use of too new or too strong a toning bath. An amateur who has a few prints to tone, as a rule pours a little water into a dish, adds thereto a little gold and a little acetate of soda, and forthwith commences the operation of toning, with the result that his prints go mealy, and tone at the edges before the centre is touched. I once pointed this out to an amateur as the cause of his failure, and was astonished to hear that in his opinion so long as the gold had been in solution for twenty-four hours he might mix the bath and use it at once. In case others might share this opinion I would specially impress upon them that even though the chloride of gold has been in solution for twelve months, the acetate of soda toning bath must be made up at least twenty-four hours before use if it is desired that good tones are to be obtained, and, what is more, it will act far better if it has been made up twenty-four days instead of twenty-four hours.

Too strong a bath has an equally bad result as one that is too new; true, it tones more quickly, but here the old dictum of "more haste, less speed," well applies. Even if the prints be good, the paper and the bath all that can be desired, it is still possible to fail in obtaining

a good tone, and many such a failure is attributable to the insufficient washing of the print before immersing it in the toning solution.

The prints to be toned should be washed thoroughly in at least three changes of water, in fact, until no milky appearance is given to the latter: failing this the tone is sure to be degraded, and the whole print will have a muddy appearance—the dirty brown or murky grey which many amateurs recognise only too well.

As it is justly observed in the sub-leader on page 679, "The particular toning bath employed has very little influence on the colour of the print." The toning agent in all is chloride of gold, and whether it be combined in solution with acetate of soda, carbonate of soda, borax, or what not, almost identical tones can be obtained with each and every bath. However, the general requirement of the great body of amateur photographers seems to be for a good and reliable formula, and one that is easy to make and easy to use; hence I am induced to give for their benefit the following formula, which I have used for years, and which, if good prints are given printed on good paper, I have never known to fail in giving satisfactory results:—Into a gallon stone jar break a fifteen-grain tube of chloride of gold, and add half an ounce of acetate of soda, and a small pinch of chloride of sodium (common salt), pour on this about a pint of boiling water and let it stand for an hour or so, then fill up the jar with rain or distilled water, and let it stand for at least twenty-four hours before using. When the bath is required for toning, pour into the dish just the quantity required for present use, and when the toning is completed throw the used solution away. That in the jar will keep good for years, and as no used-up or partially used-up solution is poured back, it can be used to the last drop without requiring the addition of fresh gold, added to which it cannot become contaminated by anything which might find its way into the toning dish, or that portion which has been used therein.

The best way of judging the colour of the print is by holding it up to the light and looking through it, as some papers acquire a surface-tone very quickly, which disappears in the fixing.

C. BRANGWIN BARNES.

EXPERIENCES OF AN AMATEUR PHOTOGRAPHER.

I SHOULD lead you through a tangled maze were you to follow me into even a casual reference to the innumerable experiments which have been made to simplify and popularise the processes by which a photograph is brought to its conclusion. The literature of the subject is at once exhaustive and exhausting.

Within a few years the wet plates have largely given place to the dry, and it has been delusively suggested, possibly by a far-sighted commercial enterprise, that any one can take a creditable picture. As a consequence, a host of amateurs have arisen, who have ignorantly worshipped the sun, and coaxed him to do a great deal of work of which he is probably ashamed. This host infest the highways and byways of creation, making nature almost sorry that she ever condescended to show her face, and sick at heart that she can possibly look as she is sometimes represented. For myself, I confess to having had in the past a desire to look into the scientific elements of the problem more thoroughly than is common, but my ardour was somewhat dampened when I found, after meditating on this simple theorem for a couple of hours,



that it did not present itself to my mind with that lucidity which I am apt to enjoy on some other subjects. I safely concluded that the gentleman who made the equation was entirely correct, and that it would be verging on impertinence to even corroborate his statement by any little demonstration of my own. The originator of this puzzle is Lecturer on Photographic Chemistry at the Imperial Technical Academy of Vienna, and is accustomed to deal in axiomatic truths, of which this must be one, as every thoughtful mind will instantly discover. I have no desire to doubt his statement, not the least in the world, for I have great respect for mystery. Acquiescing, therefore, in the most cordial manner in the profound and beautiful truth contained in the above hieroglyphics, and inspired thereby to exercise my own creative faculty, I have produced a proposition which, it seems to me, is equally self-evident, viz., $\text{A M A T E U R} + \text{O U T F I T} = \20 . This equation interested me exceedingly, and I proceeded at once to investigate the intricacies of the chemical combinations of the white of an egg and washing soda.

My personal experiences must needs be sung in the minor key. Had I not been possessed of qualities which somewhat resemble obstinacy of purpose I would have sunk into a photographic grave long since.

Fired with zeal to put all the beautiful nooks and corners of the world into one vast picture-book, I hid me to a large dealer in cameras. Perhaps it is unnecessary to say that I was received with flattering consideration, for I took my wallet out at the beginning of the interview, and was immediately assured that modern invention had at last reduced photography to a mere matter of routine. All one needed to do, so I was

assured, was to follow the instructions laid down in the manuals, and he would soon find himself the astonished and happy possessor of numberless mementoes of a summer vacation. Mistakes were sometimes made, but they were the result of an unpardonable carelessness, and in my case that was not supposable. I had absolutely nothing to do except to expose the plate properly, develop it with judicious care, print from it, tone and fix the prints skilfully, and then I should be master of the art. All this fell on my unaccustomed ear with a sweetly solemn sound, and I forgot for the nonce that I had yet to learn the meaning of the words—developing, toning, fixing, and printing. With a dim feeling that the impatient world had waited long enough for me to show it what a real genius could do, I purchased everything necessary to a complete outfit, and quite a number of articles which I have up to this moment found no earthly use for, and probably shall not while my eyes are strong enough to focus a landscape. The liberality of my commercial friend in advising me concerning what I ought to have was simply astounding. At the end of a very delightful interview my wallet had a lean and hungry look, and I was still indebted to my "guide, photographer, and friend" to a considerable amount. I had purchased a fine camera and lens, a dozen dry plates, a cartload of chemicals, and innumerable *et cetera*, and I retired with the boundless hope of a resplendent future. The wheels of my chariot had not yet touched the corduroy road which lay between me and the achievement of my purpose, and which was destined to jolt every bone of my body out of place, and reduce me morally to the consistency of a jelly-fish.

My home for the summer was on the shore of Casco Bay, in Maine. With twenty or thirty rocky and sandy islands in view, it was easy to find lovely spots which seemed anxious to be transferred to glass. I restrained my impetuosity, however, until I had gleaned from my manuals some indistinct idea of the conditions to be observed before a picture could be obtained. I knew that after the sun had done his part of the work, the oxalate of potash and the protosulphite of iron and the hyposulphite of soda were to be skilfully harnessed, not abreast by any means, a mistake to which beginners are too prone, but tandem, that they might drag the unwilling image from its hiding-place in the nitrate of silver on the dry plate; but such malignant circumstanced got control of me that I actually tried twenty-two times before I succeeded in producing any picture at all. Whether I was unusually stupid—an intimation to which I am not over-hospitable—or whether the cunning powers of the air took especial pains to balk me, I cannot say. Time and again, so frequently that the harrowing remembrance of those unhappy days almost makes each individual hair stand on end, I put the plate into chemical number one, carefully prepared according to the formula which my friend the merchant assured me admitted of no possible mistake, and watched with anxious delight the outlines of beauty as they leaped with astonishing rapidity into view; and just an equal number of times my heart sank, and I expressed an opinion remarkable for its candour, though it need not be repeated here, when a dull grey cloud gradually overspread the plate like a thick sheet of lead, and my picture disappeared into the regions of the unknown. I tried to resuscitate it by pouring a portion of every chemical I had upon its face, but in no instance was I able to call it back. I sighed, I even spoke of myself with opprobrious epithets, but it availed not. On other occasions the developer did its work more deliberately, and I was charmed with the bit of landscape that became visible, but when I put the plate into the soda a change occurred, and it grew blacker and blacker, until at last, when I removed it and held it up to the light, I had a 5×8 pane of clear window glass, with not a vestige of anything on it. The length of exposure was, of course, my first stumbling-block, as it is to all amateurs. I sought information very diligently on this subject, but somehow photographers always evaded it; and though I discussed the matter with a very eminent artist for a full half hour, I came away with a dull feeling of dense ignorance in my heart. I was told that everything depends on the time of day, the state of the atmosphere, the cloudiness of the sky, and many other things which I have forgotten; and when I insisted that he ought to be able to tell me within sixty minutes of the right time, he grimly smiled, and answered that in one instance his camera was in position in gloomy Trinity Church for twenty-four hours before the light made its impression; and that in another instance a perfect picture was taken by the flash from two Leyden jars, or in about the twenty-four-thousandth part of a second.

With these two extremes in mind, I focussed my lens on a dwelling-house, removed the cap, and waited fifteen minutes. It was a bright, cloudless day, and the sun was shining in a blaze of glory at my back. The picture which was the result of the experiment was not in every respect a success, as my fellow-artists can easily guess, for when it came out of the developing bath it looked like a thin coating of disgusted clay, with here and there a splash of black, but with the house so far in the remote background that it was quite invisible. My perplexity was increased by this experience. Being far removed from any professional friend, I could not decide whether the exposure had been too long or too short. I reasoned from the slender premises at my command that the sun ought not to be tinted as to time, and if I was generous with him, he would, in turn, be generous with me, and do the work thoroughly well. The grossly ignorant may not be aware of the fact that the sun had finished his task at the end of about three seconds, and he spent

the remaining fourteen minutes and fifty-seven seconds in spoiling the picture out of revenge for my stupidity.

I try to get one afternoon a week for a photographic tramp, and it refreshes me for all the other days of sedentary toil. Within half an hour of my residence there are little nooks and corners waiting to be copied on sensitised paper. I pack up my valuables, rush for the cars, and enter at once on a new life.

Let me describe one of my trips, and perhaps some forlorn and shipwrecked or health-wrecked brother will go and do likewise. It was a beautiful day in December, and the air had a crispness in it which made one's blood tingle. I was in the midst of some frightfully tangled work. I had tugged at it with desperate earnestness, or rather earnest desperation, but it was obstinate, and would not allow a single ray of daylight to penetrate. My brain felt as if it were slowly undergoing ossification, with the process pretty well advanced. As I stood looking out of my window, which commands a view of the Jersey hills, I felt an indefinable drawing. "Perhaps," I said to myself, and then I cast my eyes inquiringly on the tripod, that, too, seemed to say "Perhaps," and my camera really looked as though it were languishing for "a day out." So I at once set about packing-up, not enthusiastically, but with a feeling that I must have a change in order to stop this transmutation of my brain into molten lead. Half an hour afterwards I was on the Weehawken ferry boat.

I had somehow got the impression that at Weehawken I could take the cars up the river—the present station had not then been built—for a dozen miles or so, but I soon found out my mistake. I made inquiries, and found that there was no station and no railroad, and that I had wandered into a section of Deutschland. Not even a condemned vessel was in sight on which to try my "prentice hand," nor a specially ragged netchin to griu at me while I took his picture. Here was a dilemma indeed. Shanties there were, but they were dreadfully commonplace. In my despair I sought information in a beer saloon, which seemed to be so filled by a leviathan of a woman and an ichthyosaurus of a man, that there was hardly room for me to sit down. They paid no sort of attention to me at first, regarding me, perhaps, as a peddler wanting to barter his wares for Schweizerkase and Schwarzes Brod.

"Is there any stable near by?" I ventured to ask.

"Nein," replied Leviathan, in a voice which seemed to say that I was in good condition to be served up as Kalbfleisch.

"But," I persisted, "isn't there a horse in this region I can hire?"

"Only one, and be list mein," answered she.

"Could you have him tackled up, and convey me to the nearest railroad station?" I asked.

"Yah," very deliberately; "p'raps."

"How much?"

She looked at me, wondering whether I was peddler or prince, and then, as though she had struck an average, replied, "Two tollar."

"Good! Fetch him along, and I'll be off."

The boy driver and I reached Schnetzen Park in due time, traversing the dreariest road, and meandering through acres of swamp.

"Good place for fever and chills," I suggested.

The little sphinx at my side gave the horse a resounding blow with his whip, and simply answered, "You bet!"

When we reached the park I persuaded the youth to stand at the horse's head, and in a few minutes I had a picture of the funniest boy, the largest horse, and the most dilapidated wagon imaginable.

Then came the hunt for subjects. I saw a group of men standing on the platform of the station-house, so I brought my lens to bear on them, and cried out, with true professional emphasis, "Gentlemen, one instant, if you please."

One, two, three, and the work is done. "Thanks, gentlemen;" and I began to pack up.

Then I took a bit of winding road, at a point where two arching trees interlaced their branches, and it was no sooner done than up came a troop of wild, laughing girls from the silk factory, on their way to lunch. They gathered about me like so many bees.

"Shall I take you girls?" I asked.

Such a scream! and off they scampered. The feminine gender, however, has peculiarities which no mere man can comprehend, and in a few minutes they came rushing back, stood together in a very pretty group, and said, in chorus, "Mister, you may. Of course I complied."

By this time I was tired, healthily and gloriously tired. The sun was bright, the air was brisk and fresh, and the appetite, which had been dormant, began to resemble that of the *Uroa Americanus* in the spring, after winter's hibernation. My whole interior being—moral, physical, and intellectual—began to feel the effects of the tramp and the new experience, and I almost renewed my youth. I am assured that a photographic apparatus, with its delightful allurements, is a more valuable possession than Aladdin's lamp, or an ounce vial of the alchemist's *elixir vite*. Well, I had just one dry plate left. I was wondering what I should do next, when I heard a voice behind me, attuned to the true Celtic accent.

"Say, misther! say, misther!"

I turned to find a youngish woman, meanly clad, but with a bright gleam in her eye and great eagerness in every feature.

"Well, my good woman, what is it?"

She summoned all her resolution, and while the blood mantled her cheek, she asked, with an outburst of motherly affection, "Misther, will ye tak me babby?"

I confess to being touched by the pathos of that appeal. I had suddenly come into contact with a genuine bit of the best kind of human nature. Of course I melted at once.

"It will give me great pleasure, madam, to take a picture of your baby," I answered.

She actually cantered on her way back to the shanty which the husband and child had converted into a home. One thing, however, and a very important one, she had altogether forgotten. It did not occur to her, so great was her eagerness, until she nearly reached the house, and then she came to a standstill as suddenly as though she had run against a stone wall. I felt in my heart that some strange contiguity had arisen, and the feeling was confirmed when, with pathetic tremulousness, she cried out, "Misther, how much will it be?"

The desire to have the picture of that "babby" had partly crowded out the fact that this is a mercenary world. I determined that the mercenary side should not be visible on this occasion at least, so I screamed back, "Nothing, madam; nothing at all."

She started once more into the canter, but I heard her say, "Thank God, chape enough!" and I chuckled to myself at being taken for a professional, seeking the dimes and quarters of poor people.

I took both mother and child, and the picture is one of my best, and also one of my most valuable souvenirs of travel.

When I reached my study in town I was thoroughly worn out and jaded. The sun had dipped below the Jersey hills which made my horizon line, and I was gloriously and refreshingly used up, with a five hours' jaunt behind me. I had a good story to tell my friends who called in the evening, six pictures which I wouldn't part with for money, and the precious memory of a happy mother's face. The fresh air was in my lungs, and that night I slept the sleep of a man who has done his duty to his fellows and to himself. When I wrestled with the tangled problem the next morning, I was surprised to find that it was not so much of a problem after all.

I have but one bit of advice for all men of sedentary habits, viz., go and do likewise.

GEORGE H. HARWORTH.

—Harper's Monthly.

INVISIBLE STARS.

ST. GEORGE'S HALL, London, was crowded on Sunday afternoon, when the last of the first series of lectures to be delivered under the auspices of the Sunday Lecture Society was given by Sir Robert Ball, F.R.S., L.L.D., the Astronomer Royal for Ireland, on "Invisible Stars; the Use of the Camera in the Observatory." The lecturer commenced by describing how the number of stars visible to astronomers had been increased. At first about 6,000 were counted with the naked eye, but then on taking a small telescope places in which before only a few gleams of light could be seen were found to be studded with thousands of stars, while other places which had appeared to the eye quite barren, in turn glittered with innumerable specks, but even with the small telescope as many as half a million of stars could be discerned. On a mountain site, however, and using the largest and finest telescope procurable, it was seen that the stars numbered millions, and were as numerous as the population of one of the great nations of the earth. Even that, however, did not content the astronomer, as no matter how large his telescope was, he found there were yet points of light which were only just brought into view, and which indicated the existence of new stars. It was, however, impossible for opticians to give any more assistance, but photography had been pressed into the service with the most wonderful and satisfactory results.

An interesting description of the plates and telescopes and the methods of employing them followed, and was illustrated by a number of views exhibited by the aid of a lantern. The plates, which were so extremely sensitive as to be capable of receiving an impression in the one-hundredth part of a second, were placed in the telescope, and allowed to remain there in some cases for hours, the observer meanwhile using a twin telescope and keeping the portion of the sky under observation within range. When these plates were developed millions of stars which were before invisible, could be seen, whilst the most wonderful and important facts concerning others which were before entirely unknown had been ascertained. The action of the light from the stars was, of course, extremely slight, but as it was cumulative it gradually had its effect on the plates, and now at a very moderate estimate the number of stars known to exist was 100,000,000; but if his hearers in relating the points of his lecture liked to add a nought or two, no doubt they would be well within the truth. Each of these stars was probably a sun, and the centre of a planetary system like our own. Photography had also enabled astronomers to obtain some very beautiful views of the various nebulous bodies, some of which, including several photographs of the nebulae of Orion, Andromeda, and the Pleiades, were given on the screen. In attempting to give an idea of the immense size of these bodies, Sir Robert, speaking of one which, as it was shown on the screen, appeared to be nearly two feet in diameter, said the tip of his wand would cover a surface of something like two hundred millions of miles. The concentric rings which

were found round some of these nebulae tended to confirm the theory that they were gaseous masses of fire gradually cooling down, and would in course of time become suns and centres of systems of their own.

The lecture was listened to throughout with the greatest attention by a most appreciative audience. Next Sunday the first of the second series of lectures will be delivered by Mr. William Lant Carpenter on "The Wonders of the Yellowstone Park, the Recreation Ground of America."—*Chronicle*.

MY FIRST 'YACHT STUDY.'

EARLY in the summer I was asked by a friend whether I would care to spend a part of my holiday on board his father's yacht, in which he, with two of his brothers and some friends, intended taking a fortnight's cruise round the coast. I had made no arrangements for my vacation, which was then near at hand, and spoke truly when I said that I'd be delighted to take advantage of his kind offer.

'Don't fail to bring your photographic outfit along, old man,' he said, as we parted, after chatting further of the intended trip; 'you will be certain to find work to do with it. The fellows will ask you to take a group of them, or I'm much mistaken, and you must try, too, to get a picture of the *Go-ahead* for the governor. He intended giving the work to a professional photographer, but won't need to do that, I'm sure, now that you have promised to come with us.'

I had started photography only a year previously, but suppose that there were few more enthusiastic amateurs than I had already become. Commencing with 'baby' Willie, I had, within a week of the purchase of my 'kit,' exposed plates upon every member of our household, not forgetting (and I promise you that I, for one, shall not easily forget) 'Thomas,' the cat. The resulting negatives were not, in every case, entirely successful. The baby's, for instance, would have turned out much better had not the stupid little fellow lost his balance, and fallen from the table upon which I had seated him almost immediately I had removed the cap from the lens. In consequence of this mishap the picture necessarily suffered somewhat, as indeed (if one might judge from the absurd uproar he made) did Master Willie himself.

But these early attempts of mine have nothing whatever to do with the matter in hand. Mistakes in manipulation I had made without number from the very first, but in store for me there lay a far more serious trouble than any I had yet encountered, and it is of this that I want to speak just now.

Details of my meeting with the cutter's 'crew' would be out of place here, and, for the same reason, I omit all description of the first week of our 'voyage,' very pleasant though it proved to each of us.

I must say a word, though, about the groups. They were disposed of on the second day, but did not turn out as well as I could have wished. The two first were capitally sharp, but I unfortunately omitted to reverse my dark slide after exposing No. 1, and so took them both on one plate. Had it not been for this little slip on my part I believe they would have printed well. Nos. 3 and 4 were slightly out of focus; but, as I explained to the fellows, who did not seem altogether satisfied with the 'rough proofs' I showed them later, the fault, if indeed it could be so called, would tend only to give a more artistic appearance to the finished picture. They would notice, too, I went on, that it imparted an atmospheric effect seldom to be found in the finished pictures exhibited by professional photographers.

All this might be very true, admitted one of the men; but at the same time he thought that in this particular case the atmosphere had been somewhat over-done. 'Why,' he went on, 'I've been puzzling for quite a while as to whether I am represented here' (pointing to one of the prints) 'by this blur in front, or the smudge farther back towards the side.'

'The "blur," as you are pleased to term it,' I answered, 'is the foot of the mast, round which you will remember you grouped yourselves.' Then I saw that he was laughing at me, and, feeling a bit sore, went on, 'I should say that the "smudge" is your photograph, old man, and I'll ask our friends here if they do not agree with me in thinking it a most excellent likeness.'

This seemed to be a fit point in the conversation to air one of my pet art references, and I was not slow to take advantage of it. 'The true artist,' I said, 'invariably leaves something to the imagination of the spectator.'

'Then,' said he, with a quiet smile, the meaning of which I couldn't begin to understand, 'old fellow, I apologise! Looked at from that point of view, this picture of yours can put forward really the strongest claims to be called "artistic." The subject was then dropped.

We had dull weather for three days after this, and I almost hoped that the idea of photographing the yacht would be abandoned. No such luck!

'How will this morning do for your work?' asked the 'skipper' when the sun was shining brightly again.

'Well enough,' I replied, 'and if you'll make your preparations I'll set about it at once.'

It was finally arranged that I should take up my position in the 'dingey' which was being towed astern. My traps were handed over to me, and, after some difficulty, I managed to fix my tripod in the little boat.

'Are you quite comfortable?' shouted one of the fellows.

Now, standing, as I was, at the extreme end of the unstable little craft, a double dark slide under one arm, the other fully occupied with the

camera cloth, and much of my attention devoted to keeping the camera itself in position, I was in considerable doubt as to whether I really was feeling quite unconcerned and happy. But, not wishing to delay further (failing, in fact, to see any real advantage in so doing), I said all was right, and asked that the rope holding me to the cutter's side might be paid out. The tide was 'running strong' (I didn't even guess this was so until told of it afterwards by the 'skipper'), and with my head under the focussing cloth, doing my best to get the image centred on the ground glass, I was carried swiftly away from the *Go-ahead*. Just then I saw my picture—every line true and sharp, all as it should be—on the ground glass screen. This much I remember most distinctly, and I shall always believe that, had time been given me in which to decide whether the better negatives would be obtained by (1) 'exposing' before placing in position the slide carrying my plates, or (2) pushing the dark slide home to uncap the lens without first withdrawing the shutter of the former, that the result would have been—well, to say the least of it, surprising. But, alas! time for reflection there was none; and though interested as much, perhaps, as any one there in all that was going forward, I am not able to recall with clearness anything that happened immediately after the focussing of my picture.

The 'skipper'—and his word is borne out by the crew—told me later what it was that so suddenly cut short my operations. 'While you had your head smothered up in that black cloth,' said he, 'and just when you called out, asking us to "keep steady for a moment, please," the painter holding you to the yacht was drawn taut (the dingy having drifted away from us with the tide) and we saw you—by Jove, how scared you looked!' ('Yes; quite upset, poor fellow,' interrupted the man whom I had chaffed about his portrait in the group), 'that concertina-like square box, and the three sticks attached to its base, and the mahogany case you held under your arm—make a wild dive backwards over the stern of the boat. Our "first mate" here jumped over with a rope, and we soon hauled you both aboard, but I'm afraid, dear boy, that by this time your complete outfit's puzzling the fishes.'

'Yes,' I said, going downstairs ('below' is, I believe, the more correct term) to find a dry suit of flannels, 'and the "pro," will have to do the job after all. I've read often of its various manipulations, but until to-day had no idea that an instantaneous result was so easily obtainable by the so-called "wet process!"'

NOTES FROM NEWCASTLE.

Our local Society had before them at their meeting the other night a proposal for an exhibition of photographs at an early date, and a small Sub-Committee was appointed to consider the matter. I hope for a favourable report at the next meeting in December, but should have been more sanguine had the Committee been a little larger and somewhat differently constituted.

At the same meeting a collection of photographs, the result of the amateur photographer 'Hayfield' and 'Animal Life' prize competition, was shown; they do not call for much comment. Several new members were enrolled, and the new rule reducing the amount of subscription was passed.

The local craft have no reason to complain of business just now. Every photographer I meet tells me that business is splendid; very good; pretty fair; or not so bad: so I conclude things are prosperous.

I cannot congratulate the *Graphic* on their reproduction of Mr. Gould's photograph of H.M.S. *Victoria* gun trials; it does very little justice to the original.

Mr. Arthur Brown, artist, and one of the oldest of our photographers, gave his lecture on the yellowstone region (United States) the other evening at the Y.M.C.A. before a good audience, and illustrated the same with some capital slides, most of them reproduced from his own negatives and drawings, and very good they are. Mr. Brown is a capital lecturer, complete master of his subject, and full of anecdote. I have often wondered the Newcastle Association does not invite Mr. Brown to give a lecture before the members.

D. D.

Foreign Notes and News.

THE Council of the Italian Photographic Society are making arrangements for holding a public competition of instantaneous photographs, in which all amateurs, both Italian and foreign, will be invited to take part. All the views sent in will be exhibited at the sittings of the Society, and the public will be admitted. A special announcement will appear later on to indicate the exact date of the competition, in which so large a number of competitors have already stated their attention of taking part that its success may be looked upon as already assured.

THE Germans have been finding "Nuktigonia" out. Dr. Vogel exhibited the substance at the last meeting of the Verein zur Förderung der Photographie, *apropos* of which Dr. Miethe points out in the *Wochenblatt* that

the special tip recommended in the prospectus consists of employing a changing box with sleeve, a contrivance which, as he very correctly remarks, has been in use for the last twenty years. "One thus sees," continues Dr. Miethe, "that the whole business is neither new nor particularly ingenious, especially on discovering that Naktigonia is nothing but a concentrated solution of a well known reddish-brown azo colouring matter, otherwise known as 'Tripaolin.' This," he concludes, "ought to be sufficient warning to our readers to keep clear of the Naktigonia Company and their productions."

THE Circolo Fotografico Lombardo has opened an exhibition with the first of this month, consisting of the following divisions:—

1. Composition, landscape, architecture (size 13×18).
2. Studies from nature (sizes 9×12 and 13×18).
3. Instantaneous photographs (size 9×12).
4. General division, consisting of any exhibits displaying the application of photography to industrial and scientific purposes.

THE Bulletin de la Société Photographique gives an excellent receipt by E. Gosselin for reducing too intense negatives. The negative must be first washed for half an hour and then immersed in a bath of the following composition:—

Water.....	100 c.cm.
Sulphuric acid	4 "
Chromate of potash, solution three per cent.	6 "

The reduction takes place very rapidly without causing spotting; and subsequent intensification, if necessary, can be easily accomplished.

THE connexion between electricity and photo-chemical action has been now for some time thoroughly established as the result of a variety of observations. For instance, it has been frequently shown that when an electric spark has passed across an ordinary dry plate its path becomes visible on developing. Mons. Philippe Braham in a recent communication to the *Journal de l'Industrie Photographique*, has, however, shown that a magnetic action can, under certain circumstances, take place upon the sensitive film. Mons. Braham placed a rapid plate in the field of a powerful electro-magnet, the poles of which were fifteen millimetres apart. The circuit was then closed for a certain time and the plate subsequently developed. On development, a dark spot surrounded by a nebulous halo appeared at that spot through which a line joining the poles would pass. The discovery, which certainly forms an interesting contribution to the theory of connexion between the different molecular forces, will, it is to be hoped, be followed by others in the same direction.

ON December 14 Herr Theodor Primm, one of the best-known portrait photographers of Berlin, will celebrate the twenty-fifth anniversary of the establishment of his business. The occasion is to be celebrated in the convivial manner dear to the Teutonic heart.

MESSERS. GILLES and MESS. SCHNEIDER & Co., of the great Crenset iron and steel works, who recently electrified the industrial world by their plans for a proposed bridge across the Channel, read at the Paris meeting of the Iron and Steel Institute, have recently distinguished themselves still further by constructing a new photographic apparatus, which is a triumph of mechanical skill. It would be impossible to describe this rather elaborate device at length, but it may be mentioned that the camera can be pointed in all azimuths with equal facility, that the front and back portions have independent movements, that each of the three parts of the camera can be separately removed, and also pointed at different angles, and that the ground-glass focusing plate can be moved about quite independently of the camera box. The apparatus appears to be specially designed for taking architectural views.

A DAY IN THE PRINTING ROOM.

To speak of the printing room, in many cases, even in otherwise excellent and large establishments, is an euphuism, the glamour of which disappears the moment we cross the threshold of the doorway. I have seen a stable utilised for the purpose; also an underground cavernous den, where the water would occasionally well up through the floor and flood to the depth of two or three inches; a staircase at the top of the house; a rough tumbledown shanty in a corner of the yard, where the rain would pour in almost as through a riddle, &c.; and all these where a high-class and, in some cases, extensive business was carried on. Such things as these are disgraces which should be blotted out, for surely some means might be found to improve them out of existence. The poor printer is supposed to be able to flourish in any out-of-the-way corner, and to produce his things of beauty which are to provide joy, if not for ever, at least as long as they can reasonably be expected to remain so, under circumstances which in such cases are almost sufficient to tempt him to commit suicide; or, at least, to look upon photography as being the handmaid of despair.

In different establishments the printer's duties somewhat vary, as for instance, Mr. A. will only expect him to attend to the printing and its concomitants proper; but Mr. Z. will also expect him to work out all negatives for orders, spot them, put them into condition generally, assist in mount-

ing, spotting, rolling, &c. &c.; these, however, are but smaller matters, which we need not here stay to consider. We, therefore, will only take note of positive duties. These duties should really commence the previous evening by taking stock of the amount and character of the work likely to be required to be done; then strengthen the silver bath from a stock bottle kept for that purpose, and see that it is in a neutral condition. The ordinary strength of the silver solution should be about fifty grains per ounce of water, certainly not less than forty-five. After each three or four sheets have been prepared, add from the special stock bottle as much as will restore the bath to its pristine strength, remembering that each sheet will extract from it about twenty grains. See also that the albumenised paper, especially if it be doubly albumenised, as much as will be required for use, is put into an absolutely cool and, if possible, damp place; the reasons for which, as well as for other things herein stated, I cannot enlarge upon here further than to say that my experience of twenty-six years has shown me how necessary they are under many circumstances for successful and harmonious work. Strengthen the toning bath, too, with gold solution, so as to ripen for the next batch of prints, always keeping two working baths, and using them on alternate days. I have never found anything, in all things, to equal the old acetate of soda bath, consisting of three grains to the ounce of water. For stock solution to strengthen with, I put one ounce of acetate of soda and two tubes of gold to eighty ounces of water. This, too, keeps up the quantity of the bath, and allows the sludge to be cast aside, which may be allowed to accumulate in consideration of the residues.

Commence the day's labours with the preparation of the paper, in the intervals of which place the fresh negatives in proper frames, fitting up vignettes, &c. &c. Every printer, of course, knows the details of these things, but system is half of the work. When the paper is dry, carefully roll it all up, surface outwards, on a clean roller, with clean hands, keeping it in a cool place, and taking it off sheet by sheet as it is required for use. Cut it all up, especially that to be used for portraits, in one direction of the sheet, the lengthway of the sheet to be used upright in the frame; that is to say, from head to foot of the portrait, as when wet it expands more in one direction than the other, producing in some cases manifest distortion of the features. If it be possible, let all the printing be done in the shade, but especially portraits and thin negatives. For dense negatives, but particularly those showing violent contrasts, it is better to prepare the paper upon a weaker bath; and inversely for weak negatives, it should be prepared upon a stronger bath, say quite twenty-five grains less and more per ounce each way. In winter, when the light is feeble and bad weather prevails, the sensitive paper will speedily discolour, especially when two or three days are required for one print. Backing it up in the frame with sodic paper will wonderfully preserve it, but is somewhat troublesome, as it absorbs moisture from the atmosphere, and will be in danger of ruining the negative; therefore, it must occasionally be taken out and dried before the fire. Backed up, too, with old and discoloured silver paper will greatly assist in keeping it in condition, and is not any further trouble; but if, notwithstanding, it should become much degraded, even until apparently worthless, it may be saved by putting it, before toning and afterwards, into water which contains about one to fifty of its quantity of ammonia, and also a little ammonia in the bath: the restoration is truly wonderful.

As the prints are taken out of the frames, keep them flat under pressure, the advantage of which will be found when the operation of trimming comes into hand, which should be accomplished before toning, as it saves both time and gold, and is then more easily and readily performed. In cold weather keep the toning baths and, in fact, all solutions, which have to be used in connexion with the prints in a tolerably warm place, as then their action is more free, even, and successful. Even in the preparatory washings see that the water is not absolutely cold, both for comfort and keeping all things in an even balance. Put them into the water one by one, changing it repeatedly, until no further milkiness is observed; for the more perfectly the silver is washed off previously to being toned, the less they will change in colour when placed in the hypo. When well washed, put them for a few minutes into water slightly acidulated with glacial acetic acid, rinsing them again before toning; from the toning bath drop each print into salt water, as it prevents the further action of any gold which is carried with them. See that the fixing bath is neutralised from any possible taint of acid by adding to it, say, half an ounce of liquor ammonia, which will also exist in quelling any insubordination in the shape of blisters. This bath should consist of two ounces of hyposulphite of soda to each pound of water. Allow the prints to remain in this solution not less than a quarter of an hour, keeping them in motion all the time; as, in fact, they should be in every operation, with plenty of room to move about freely. When properly fixed, never lift them out of the bath nor pour it out from them, but have salt water of the same temperature in readiness, gently pouring it into the dish and gradually flooding the hypo out; then, after a few minutes, let the water through a pipe from the tap also gently flow through them, so that the change of heat be not violently arrested, when they may be finally disposed of to wash for the night. Having prepared the hypo for the following day, proceed as previously directed.

Let every operation be conducted with the strictest regard to cleanliness, and let there be a perfect isolation of every chemical, in solution or otherwise. Keep the hands scrupulously clean and dry, and see that

every utensil is well washed out, both after using and before using again. Have a separate dish for every purpose, and let it not be used for any other. I have seen in a large place of business one dish used for every operation but that of toning. What wonder if stains should appear, or even a whole batch of prints be ruined? And the proprietor of that establishment had a well-deserved reputation throughout England.

Let all things be done with care, assiduity, and intelligence; and let both master and servant continually bear in mind that in no small degree the credit and reputation of the business they represent are in the hands of the printer, even though he be relegated to a "back slum," and but too often the recipient of the splenetic wrath of those that surround him.

G. H. E. SUTTON.

[The foregoing was written for the ALMANAC, but being received late had to be considerably condensed. We now give it in full.—Ed.]

Our Editorial Table.

THE ART OF RETOUCHING NEGATIVES AND FINISHING AND COLOURING PHOTOGRAPHS.

By ROBERT JOHNSON. (London: Marion & Co.)

ALTHOUGH not so stated in the volume itself, this book is really a second edition of the one which, under the same name, was published by Messrs. Marion in 1886, being enriched by the addition of eight extra chapters, which refer to artistic composition, and which occupy between forty and fifty pages in themselves. We may here reiterate that the portion of the work devoted to retouching is written in a very lucid style, and the various working directions are given with full detail, the whole being enriched by numerous illustrations, and tending to make a good retoucher of any one who will take the pains to read and carefully study the work and follow the directions therein given. In the portion devoted to artistic composition, Mr. Johnson endeavours to answer the question—"You say such a photograph is artistic and such another is the reverse. Why is the one artistic and not the other?" In his chapter entitled "The Eye Compared with the Lens and Camera" the author does not quite show his realisation of the fact that the portrait lens, equally as much as the landscape lens, shows everything in perspective, and that the representation of the front elements in a group of persons on a scale very much larger than those at the back does not depend upon the employment of any special class of lens, but is a necessity of linear perspective. Many useful hints can be obtained from the chapters on "Accessories," "Perspective in Backgrounds," and "Simplicity in Composition," and we commend their perusal, together with the other portion of the work, to our readers.

WE have also received from Messrs. Marion *Revised Formule* for the production of transparencies, by which cold, warm, or extra warm tones can be obtained at pleasure, either on Cowan's chloride contact lantern plates, or on chloro-bromide plates.

FURTHER, and from the same firm, we have received one of their "Norser" vignettters, which is capable of printing a vignette of any size within the limit of the frame for which it is intended. By adjustable masks the opening is adapted to the shape of the print desired, while provision is made to place these as near to, or far from, the negative as considered desirable. When once fixed and adjusted, which occupies only a few seconds, it serves for an unlimited number of prints.

MR. A. R. WORMALD sends us samples of some "symmetrical" lantern masks he is issuing. In these we are glad to see that he has adopted Mr. Pumphrey's system of having one side of the mat white, while the other is black, by which the "sorting" of the slides is facilitated. Mr. Wormald adopts various forms of aperture.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,907.—"Improvements in Means or Apparatus for Registering or Controlling the Supply of the Gases used in Dissolving-view Lanterns." E. GALOPIN.—*Dated November 25, 1889.*

No. 18,936.—"Improvements in Apparatus for Holding and Automatically Exhibiting Photographs and other like Views." R. TIMPERLEY.—*Dated November 26, 1889.*

No. 18,955.—"An Improved Dark Slide for Photographic Cameras." F. H. SANDERSON.—*Dated November 26, 1889.*

No. 19,024.—"Improvements in Means or Apparatus Employed for Obtaining Instantaneous Photographs by Artificial Light." F. J. SMITH.—*Dated November 26, 1889.*

No. 19,099.—"A New or Improved Appliance for Excluding Light from the

Focussing Screens of Photographic Cameras." A. K. SIMPSON.—*Dated November 28, 1889.*

No. 19,157.—"Improvements in Photograph Preservers." Communicated by E. F. Von der Hoele. E. EDWARDS.—*Dated November 28, 1889.*

No. 19,191.—"Photographic Camera and Apparatus connected therewith." W. R. BAKER.—*Dated November 29, 1889.*

No. 19,198.—"Improvements in and in the Means and Method of Operating Flash Lamps for Photographic and other Purposes." A. C. JACKSON.—*Dated November 29, 1889.*

No. 19,205.—"An Improved Process or Means for Giving a Matt Surface to Albumenised Silver Paper Photographs or Prints." Communicated by F. C. BINNS. J. B. PAYNE.—*Dated November 29, 1889.*

No. 19,229.—"Improvements in or appertaining to Photographic Cameras." R. FOWLER.—*Dated November 29, 1889.*

PATENTS COMPLETED.

NEW OR IMPROVED HOLDERS OR LIFTERS FOR PHOTOGRAPHIC PLATES, FILMS, AND PAPERS.

No. 7675. THOMAS STANWAY, 24, Cauldon-road, Hanley, Staffordshire.—*November 9, 1889.*

My invention relates to holders or lifters for photographic plates, films, and papers; and my said invention has for its object a new or improved method of constructing same, whereby said plates, films, and papers may be easily manipulated without risk of injuring them.

My invention consists in making holders or lifters for photographic plates, films, and papers, in the form of loops which fit on the ends of the plates. Each loop is made with a suitable handle or finger hole to lift it with, and also with one or more stops to keep said holders or lifters at the ends of the plate being manipulated.

In using holders or lifters constructed according to my invention, one is held in each hand and slipped on the ends of the plate. The holders or lifters are then slightly pressed towards each other to prevent them slipping off the plate. The plate is then manipulated in the ordinary manner. When they are used for papers and films, said papers and films are first damped and laid upon a sheet of glass, and manipulated as before.

Claim:—A holder or lifter for photographic plates, films, and papers, constructed in the form of a loop provided with a suitable handle or finger hole to lift it by, and one or more stops to keep it in position, substantially as herein set forth and shown.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 9.....	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 10.....	Great Britain	5A, Pall Mall East.
" 10.....	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
" 10.....	Derby	Society's Rooms, 3, Derwent-bldgs.
" 10.....	Bradford	55, North Parade.
" 10.....	Manchester Amateur	Manchester Athenæum.
" 10.....	Bilton Club	The Studio, Chancery-lane, Bolton.
" 11.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 12.....	Birkenhead	Free Public Library, Hamilton-st.
" 12.....	Cheltenham	
" 12.....	Manchester Photo. Society	36, George-street.
" 12.....	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 13.....	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 28.—Mr. Archer Clark in the chair.

MR. P. EVERETT discoursed on the subject which had been announced for the evening—*The Action of Ferricyanide of Potassium on Developed Negatives*. He said that an experience which he had had two years ago had caused him to take the matter in hand. He had wished to make a positive by superposition, and had trusted to rapid opening and closing of the dark room to give the exposure. The negative proved, however, to be greatly over-exposed, probably on the point of reversal; on this he added, as he supposed, more pyro to the developer, and, to his surprise, found the image gradually disappear. He then found that he had taken, in mistake for pyro, a solution of ferricyanide of potassium; so he rinsed the plate and applied fresh developer of pyro and alkali. An image then reappeared, but this time it came not as a positive, but as a negative, although printed from a negative. The plate was foggy and weak, but the result (which was shown) struck him as being so peculiar that he had preserved it and endeavoured to trace this action of the ferricyanide. He had started by immersing a negative in a solution of ferricyanide. There was an action, but it took a very long time to complete—about thirty-six hours. He then repeated the experiment with the addition of a small proportion of bromide of potassium. The image was now changed in about a quarter of an hour. He had also repeated the experiment with iodide and with chloride in place of bromide; in each case the conversion was sufficiently rapid, but the chloride was much slower than the bromide. He then tried redeveloping with pyro and sulphite, and found that the bromide and chloride films rapidly yielded, but the iodide did not. There was a difference in the results obtained with bromide and with chloride. With the latter the image redeveloped darker and browner in colour, and he thought, therefore, that if the original negative had been a grey one it would be found to have gained in printing density. Another point which he had noted was, that with a plate which gave much iridescence this iridescence disappeared when thus bleached and redeveloped, enabling one to satisfactorily use plates which, from age or other cause, were liable to this defect. The plates shown illustrating the various experiments had been treated with a mixture of one ounce each of ten per cent. solutions of ferricyanide of potassium and bromide, chloride, or iodide of potassium, as the case might be, diluted with two ounces of water,

and, with one exception, they had all been exposed for twenty-five seconds at a distance of five feet from an ordinary gas burner. The exceptional plate had been exposed for four minutes at the same distance, and would illustrate the advantage of special treatment for such a case of gross over-exposure. This particular plate flashed up, of course, in the developing, and was then washed and bleached with the mixed solution of ferricyanide and bromide. It was again washed and a fresh developing mixture applied containing five times the normal amount of pyro and but little ammonia. There was now so much density that it had to be reduced after fixing with ferricyanide. It would be seen that this transparency, although so much over-exposed, was the densest of the series.

Mr. W. E. DEBENHAM inquired whether Mr. Everett had tried the bromide treatment without ferricyanide for saving an over-exposed plate. That was a recognised method, and it would be interesting to know by a comparative experiment what influence was due to ferricyanide in this case.

Mr. EVERETT had not made the comparative experiment referred to.

Mr. G. W. ATKINS inquired whether the colour of the bleached but not redeveloped negatives was permanent.

Mr. EVERETT replied that at all events it was so for some weeks.

The CHAIRMAN said that in that case the solution should prove to be a good reducer instead of bichloride of mercury, which was sometimes used for the purpose, but the results of which changed in the light.

Mr. A. HADDON remarked upon the yellow stain which appeared upon the plates that had been submitted to the treatment described, which stain was characteristic of ferricyanide.

Mr. A. COWAN said that that was so, but that it could be removed by acid.

Mr. EVERETT said that he should like to have an explanation of the reversal of the image in the plate which he had first shown.

Mr. HADDON would explain it thus:—The plate had been, owing to over-exposure, subjected throughout to the action of the light; the upper portion of the film had, however, developed first, and to depths corresponding to the amount of action of the light. When washed and treated with ferricyanide and the bromide contained in the developing solution the reduced silver had been restored to its original unexposed condition, so that when a fresh developer was applied the lower portions, having been affected by light generally, developed up to form the reversed image. He added that Mr. Everett had set a good example in retaining, instead of throwing away, the result of an abnormal experience, and bringing it forward at that Association.

Mr. DEBENHAM fully concurred in the last remark, also generally in Mr. Haddon's explanation of the reversal of the image; but he thought the explanation might be supplemented by the suggestion that the action of the ferricyanide and bromide was more rapid upon the developed image than upon the exposed but as yet undeveloped image. Ferricyanide and bromide was supposed with the latter to restore it to its original unexposed condition, but if it had done this as rapidly as it converted the developed image, Mr. Haddon's explanation would not hold good.

Mr. HADDON acquiesced in Mr. Debenham's suggestion, and the meeting terminated with a vote of thanks to Mr. Everett.

CAMERA CLUB.

On Thursday, November 28, the usual monthly exhibition of lantern slides took place at the Camera Club. A very large number of slides were brought up by members.

Mr. Elder exhibited a series illustrating the River Thames from London round to the Essex coast, giving an interesting description with the photographs; Mr. Hansard contributed pictures of Spanish and Algerian life, scenery, and architecture; Mr. Laurie, some instantaneous views; Mr. Howlett and Mr. Williams, sets including very excellent work; Mr. Rodgers, slides from negatives taken on the Down-river Excursion; and Mr. Humphrey, transparencies from hand-camera negatives, including one picture of a scene by the St. Gothard Tunnel, very weird in character. Capital slides were shown also by Messrs. Pemberton, Sands, and Charters White. A few sent by Mr. Gale concluded the exhibition.

The subject on Thursday, December 12, will be *Tinting Shutters*, when Mr. Charlton Wollaston will open the discussion.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above Society was held at the Club Rooms, Grand Hotel, Colmore-row, on Thursday, November 28, Mr. W. Jerome Harrison, F.G.S. (Vice-President), in the chair. There was a large attendance.

The HON. SECRETARY (Mr. J. H. Pickard) read the annual report.

The average attendance at fourteen oratory meetings held at the new rooms has been seventy-four, and at three at our late room, sixty-three.

The papers read and special meetings held during the year were as follows:—*A Tour in Italy and Switzerland* (illustrated with lantern slides), A. Pumphrey; Special Meeting (new rooms); Lantern Display (members' slides), Lantern Committee; *Daguerotype*, W. S. Horton; *Kodakian*, W. Griffiths; *Photomicrography*, J. Hall Edwards; *Holiday Trips with the Camera*, E. H. Jaques; *Various Printing Processes*, W. Griffiths; *Lichenhead and Ulster* (lantern slides), Lantern Committee; *Cameras and Appliances*, B. Karleese; *Composition*, C. T. Cox; *Platinotype*, J. C. Huxley, M.D.; *Portrait Painting as applied to Photography*, J. J. Scatchall; *Light, Stops, and Lenses*, J. Edmonds; *Lantern Slide Making*, E. H. Jaques; *Lenses and Stops*, W. Griffiths; *American Lantern Slides* (per favour of Camera Club, London), Lantern Committee; *Hints to Beginners*, E. C. Middleton.

The Annual Exhibition was held in the Young Men's Christian Association's rooms, Needles-alley, on December 14, 1888. There was a good attendance of members and their friends.

The annual exhibition for 1889 has been unavoidably postponed until January, 1890.

Special rules have been issued by the Council for the government of future competitions.

During the season of 1889 fourteen excursions were arranged for. Prizes were offered by Mr. W. J. Harrison (Shakespearean Villages), Mr. J. H. Pickard (Dovedale), and Extension Committee (Shrewsbury), for the best pictures

taken upon the whole-day excursions. Bearing in mind the experience of past years, the Committee suggest that the number of excursions be materially reduced, and consider it desirable to limit them to one per month.

Your Lantern Committee has pleasure in reporting a successful year, with a numerous attendance at all meetings at which the lantern was the prominent feature, showing that this method of exhibiting photographs is becoming one of the most popular.

A letter was read from Dr. Hill Norris:—"It is with great regret that I feel myself compelled to resign the Presidency of your Society, which I have held uninterruptedly since its foundation. The cases of medical practice and the pursuit of original work in the brief intervals of leisure which the former affords leaves me but little time or strength for public life. I feel, too, that your ship has now grown to such dimensions as to require not only good subordinate officers, but also a captain at its head capable of carrying it through all weathers; this I am no longer equal to; and if you will allow me to retire in favour of younger blood, and come among you occasionally as an irresponsible social unit, freed from the tension of official position, I shall feel very grateful. Wishing the Society every possible success in the future, I am, yours faithfully, RICHARD HILL NORRIS."

Resolved, "That Dr. Norris's resignation be accepted with regret, and the hearty thanks of the Society be given to him for his duties as President for the past five years, and that Dr. Norris be elected honorary member of the Society."

The election of officers and Council was next proceeded with, and the result is as follows:—*President*: Mr. J. B. Stone, J.P., F.I.S.—*Vice-Presidents*: Messrs. W. J. Harrison, F.G.S., E. H. Jaques, and B. Karleese.—*Council*: Messrs. J. J. Buntin, A. A. Bonehill, W. S. Horton, S. G. Mason, E. C. Middleton, Dr. Nicol, William Rooke, and G. A. Thomason.—*Librarian*: Mr. S. J. Holliday.—*Treasurer*: Mr. T. Taylor.—*Hon. Secretaries*: Messrs. J. H. Pickard and A. J. Leeson.

Votes of thanks were given to the Treasurer, Librarian, Mr. Rooke (late co-Secretary), and Mr. J. H. Pickard, for their services during the year.

Mr. W. S. Houghton (Exhibition Committee) stated the postponement of the date of the exhibition till January, 1890, was owing to structural alterations being made in the building where the same will be held, and that circulars announcing date and particulars will be posted in a few days.

The HON. SECRETARY read a circular calling attention to a special meeting of the Society on December 11, when Mr. W. Jerome Harrison, F.G.S., will read a paper on *Photo-surveys*.

On the proposition of Mr. A. A. BONEHILL, that a subscription should be made towards the fund for a lantern, a number of members present subscribed together a sum of over 10*l*.; this, with the fund in hand, leaves the Society with over 14*l*. towards the purchase of a first-class optical lantern. Resolved, "That members be solicited to add further subscriptions to enable the Council to provide a lantern at once."

BATH PHOTOGRAPHIC SOCIETY.

NOVEMBER 27,—Mr. W. Pumphrey in the chair.

Miss Ashley exhibited a number of large direct photographs representing scenes in Colorado, Wyoming, and Mexico, the work of Jackson, of Denver.

Mr. FRIESE GREENE drew attention to developed prints made with an emulsion containing starch. He complained of the suken appearance, and attributed this to the base or coated surface being unsuitable.

Mr. J. Dutton showed some old wet-plate negative films transferred from glass to paper.

Circulars anent the formation of a Photographic Institute were distributed, also copies of *Scripts* and other trade price lists, which had been sent for that purpose.

Mr. H. M. SMITH, lecturer and demonstrator for the Eastman Company, then discoursed upon the subject of *Enlarging on Bromide Paper*. He commenced by describing the methods of illumination available, giving preference to an arc lamp of two-thousand candle power, next in sequence the oxyhydrogen jet, then paraffin containing a small proportion of camphor. When daylight is used, a darkened room where light can be admitted from the north was said to be preferable. Then an ordinary camera could be used, it being merely necessary to insert the negative from which an enlargement is desired in an opening just large enough to admit of it and through which light is allowed to enter. Then the adjustment of distances—camera from negative, and camera from focussing screen—was easily found, either by the tables in the *Year Books* or experiment. The question was often asked whether an ordinary magic lantern was suitable for making enlargements, and he answered yes, if the negative is not over three inches in diameter and the lantern is fitted with condensers of four and a half inches diameter; but if it be desired to enlarge from a half-plate, then the condensers ought not to be less than eight inches in diameter. Attention was drawn to such details as warming the apparatus before use, the result of a smoky flame, and of oil spilt about the burners, the advantage of a rectilinear type of lens, and the employment of a negative fully exposed. Under-exposed negatives, said the speaker, are no good at all for the purpose, they are sure to give a chalky-looking enlargement. The question of permanence was then dealt with, and the chances of fading from well-recognised causes plainly laid down. Supposing the paper to be a pure sample, the emulsion pure, and the manipulatory details which follow exposure carefully carried out, there was no reason why silver prints on bromide paper should not last as long as any other. Mr. Smith then explained the processes of developing, clearing, fixing, &c., and demonstrated these before the audience. Finished specimens were also handed round. Mr. Smith next drew attention to the new celluloid negative films which the Eastman Company will shortly place on the market. They appeared to be about the same thickness as the well-known "stripping film negatives," but more transparent and of less weight. The advantages of the new Kodak detective camera were also explained; there are several improvements in construction of lens, shutter, and general get-up.

The CHAIRMAN hoped that celluloid would replace the paper in the roll holder; it would be much more easy than the plan of film stripping, without increasing the weight, a most important consideration with tourists.

Several questions were then submitted and replied to.

The CHAIRMAN having formally thanked the lecturer, an adjournment took place to the dark room, where an enlargement was made by means of an optical lantern, and developed, &c.

The next meeting will take place on December 18, when the President will give an illustrated lecture on *The Cities of Italy*.

At the thirteenth annual exhibition of vacation sketches and paintings, opened at the Jubilee Hall, Bath, December 3, the special prizes awarded to pupils studying at Mr. Harbutt's Art Studio for series of artistic and skilful photographs were as follows:—First prize, Mr. G. Thomas; Second prize, Mr. J. Stillman Gill. Messrs. W. Pumphrey and W. M. Ashman adjudicated.

BRIGHTON PHOTOGRAPHIC SOCIETY.

NOVEMBER 26,—Mr. D. E. Caus in the chair.

The evening was devoted to an exhibition of pictures taken with detective cameras and also of detective cameras, seven being contributed by Messrs. Harcastle & Co., and several members showing theirs.

The next meeting (December 10) will be a lantern night.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The twenty-sixth annual meeting was held in the Association's Rooms, No. 3, Lord-street, on Thursday, November 28. The President (Mr. A. W. Beer) occupied the chair. There was a large number of members and friends present.

The following gentlemen were elected members of the Association:—viz., Messrs. John Woolfall, R. McGowan, and R. H. Webster, L.R.C.P.

The Treasurer's report shows a balance remaining to the credit of the Association of 48*l.* 13*s.* 8*d.*, after investing the sum of 194*l.* 14*s.*, and writing off 14*l.* 5*s.* 4*d.* as depreciation on club-room furniture, &c.

From the Secretary's report, there has been an accession of seventy-four members during the year, this being the highest number of new members since the formation of the Association. There are now two hundred and thirty-eight members.

The following gentlemen were elected as officers for the coming year:—viz., President: Mr. Paul Lange.—Vice-Presidents: Messrs. William Tomkinson and W. D. Mead.—Auditor: Mr. A. Bradbury.—Librarian: Mr. J. McDonald Bell.—Treasurer: Mr. Joseph Earp.—Secretary: Mr. Walter Hughes.

The competition prints sent in by the members had been adjudicated upon by the following gentlemen:—Messrs. G. W. Webster, John Finnie, and E. R. Dibdin, who had awarded the Association's medals as follows:—"For pictures (in sets of six) over half-plate size," Messrs. J. L. Mackrell and D. Cunningham. "For half-plate and under," Messrs. T. B. Sutton and William Tomkinson. "For set of two enlargements," Messrs. F. K. Glazebrook and J. L. Mackrell. "For the best single picture," Messrs. F. Anyon and J. L. Mackrell were bracketed equal in merit.

Lantern slides were judged by Messrs. G. E. Thompson, E. L. Grundy, P. Lange, and W. D. Mead, medals (for the best and second-best set of six) being awarded to Messrs. A. J. Cleaver and T. B. Sutton.

The whole of the slides (one hundred and thirty-eight) were then shown in the lantern.

Announcement was made that a "Social" or smoking concert would be held on Tuesday, December 17, at half-past seven p.m. A nautical sketch, entitled *All at Sea*, written and arranged by Mr. A. J. Nicholls, would be given. Also that the celebrated pictures of Mr. H. P. Robinson (Tunbridge Wells), consisting of about seventy frames, would be on view in the Rooms, No. 3, Lord-street, from December 16 to the end of January.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

NOVEMBER 6,—The President (Mr. Frederic Graff) in the chair.

After the exhibition of two Eastman cameras, and the election of new members, Mr. JOSEPH M. WILSON related some interesting experiences in connexion with a trip made through several European countries during the past summer. He carried with him a Scovill hand camera and material for about seven hundred exposures, most of which was made use of before his return. The camera, in which several ingenious modifications and improvements had been made by Mr. Wilson, was shown, and also a light and convenient alpenstock tripod of his own design, which had been carried throughout the trip.

Dr. C. L. Mitchell showed a Blaf Compact Camera mounted on a single leg or "Unipod," for use in instantaneous work in situations where a regular tripod could not conveniently be set up, and where more steadiness was desirable than could be maintained by holding the camera in the hand. With a large camera on board a yacht, or in street work, when setting up a tripod would attract a troublesome crowd, the unipod had been very useful.

Mr. Wilkinson showed Dr. Krüger's hand camera obtained by him in Germany.

Mr. FRANCIS BURROWS also showed a new hand camera of his own design, which he described as follows:—I present to you this evening another candidate for your favour, "The Ultimate," a 4×5 hand camera. It is compact, measuring 5×5½×9 inches, and yet, by drawing out the telescopic front, it will accommodate an eight-inch focus lens. The front of the box opens, allowing access to the lens and shutter, while in the rear of the lens a flap shutter may be closed during this operation. This box is fitted with a 4×5 pantagraph lens of five and three-quarter inch focus, and working *f*-6 approximately. The shutter is of the rotary type, but is peculiar from the fact that its movement is always in the same direction. A small crank on the front board sets it by a part revolution, and a little farther movement of the same exposes; by this means the shutter is set without exposure of the plate, and generally at the last moment. With the spring at this tension the exposure is rapid enough to make all ordinary work, including landscapes, marine views, or animals. However, the shutter disc is double, and by releasing this small catch one-half may be revolved independently of the other, thus, you see, making the effective opening in the shutter one-half, one-quarter, or one-twenty-fifth of its full size, and so giving the same fraction of the ordinary time of exposure. By releasing the spring the disc may be entirely revolved by hand, and the

exposure timed. The opening and closing by this method being one simple movement, it is practicable to make the exposures very short. On the bottom of this box you will notice a tripod plate and fitting for a finder. They do not belong to the box, but were placed on this, my model, for experiment. For those who wish such additions nothing can be more simple. The rear compartment, opening at the bottom, contains a new locking arrangement, which holds one plate holder rigidly in place, while the other three drop loosely in back of it. A slight pull on this lock loosens the plate holder and lifts it out, while a strong pull draws the entire mechanism from its place, and makes place for a 3½×3½ Eastman roll holder, which slides into its bed with slight pressure. The plate holders are of new design, very small, and of metal; they are double, and are loaded by removing both slides and the moveable plug from the top. As any lens from four and a half to eight inches in focus may be fitted, the question of focussing comes up. With this lens the front is drawn out about three-fourths of an inch, and there is a line drawn. In this position the lens cuts sharply to within about twenty feet. With an *f*-8 or *f*-11 stop everything beyond this distance is very sharp. Practically, I make all views at this point. About one-sixteenth of an inch back of this is another line. When drawn out to this we get better foreground effects, but the horizon will not be quite distinct, and should not be allowed to show unless it is possible to use a stop, as for instance, a well-lighted subject, or one allowing time exposure. In case I find it necessary to time a plate I am generally able to find something to place the camera upon—a railing, bench, or stone; or I have made very sharp photographs of several seconds' exposure by holding the box firmly against the side of a house or tree. For those who will carry a tripod I can suggest nothing better.

Correspondence.

SAMUEL FRY & CO., LIMITED.

To the Editor.

SIR,—We are informed by several customers that representatives of competitive firms are circulating the report that we are no longer undertaking the production of argentic-bromide enlargements, for which we have obtained some reputation.

We ask the advantage of your wide circulation to state that this is a most unscrupulous attempt to injure our business, and that the report is absolutely devoid of a vestige of truth.—We are, yours, &c.,

SAMUEL FRY & Co., Limited.
A. E. HAYMAN, Secretary.

EXHIBITION MATTERS.

To the Editor.

SIR,—I have read with pleasure the correspondence on the above subject by "Old Medallist," and would like to make a few remarks and give my experience as a young exhibitor who has not yet received a medal. This year I sent some pictures to the Exhibition, and although they were taken direct on plates 18×15, received no notice whatever in your JOURNAL. Four were hung, but would have been just as well at home, with one exception. This one being about knee-high, could sometimes be seen when not eclipsed by trousers or skirts; the remainder (all landscapes) being all "skayed," could scarcely be seen.

This year the Exhibition has been a great success as regards the number of visitors and the money taken, and, if the Exhibition is to continue so, I am convinced that steps must be taken by the Society to secure a larger room, or limit the amount of wall-space to each exhibitor, so that more justice can be shown to all whose exhibits are worth hanging, only a few being now seen to advantage as at present hung; and, as previously remarked by a correspondent, exhibitors' pictures are separated, except a favoured few and those who take the precaution to frame their exhibits in one frame. I also had half the number sent for exhibition "Middlesex Hospital way" (one rightly so, having had the glass broken in transit); not from any desire, I should think, of the Hanging Committee to disqualify them, but crowded out, I should imagine, as I received them back with numbers on the glasses, as though they had been catalogued and then displaced by later exhibits received.

I also notice with regret that preference is not now given by the Judges to photographs "untouched," but to artistic productions more or less produced by the paint-brush. This is, I think, a retrograde movement, which will not tend to improve the photographic art. I noticed also a picture conspicuously marked on the frame as untouched with a rose leaf painted in. Such representations as these may deceive some. Such photographic "lies," I think should hardly be allowed to be hung, especially on the line, as a deceiver to the innocent public.

I also think it would be well not to award medals to exhibits that have been taken for some length of time and on sale by the dozens. Such an example I also observed this year, it being an enlargement on "bromide paper" from a negative, prints of which have been on sale in London for about two years; so at least I was informed by the printseller in the City, from whom I bought a platinotype 10×8 print for 2*s.* 6*d.* of the identical picture (*Head of Derwentwater*).

Names and addresses inscribed on the pictures, I think, would be better omitted altogether until after the awards were made, and then, if attached afterwards to the exhibits, should be the privilege of all, and would save visitors a great deal of reference to catalogue. I think, if I remember right, that this rule was overlooked in the medal pictures, *Artists at Home*, the full business address appearing on each picture.

Provincial exhibitions are not yet all that could be desired. One matter I have in mind in connexion with the last Cornwall Exhibition, referred to in a previous letter, i.e., the non-publication of the names of those whose office it was to judge the various exhibits, which, I believe, was the case with this exhibition. I should like to touch on several other subjects, but fear I have already encroached too much on your valuable space.—I am, yours, &c.,

W. SCORER.

Harant, December 2, 1889.

"BRITISH PHOTOGRAPHIC UNION."

To the Editor.

SIR,—I notice a letter in your last issue from the Secretary of a proposed "National Photographic Union." The proposition therein only extends to the formation of a representative body to watch over the interests of the art and profession; but if the object of the Organizing Council develops into the foundation of a *Trade Union*—that is to say, an organization open to every operative photographer, in any branch, subject to a technical qualification, founded for the support of the workmen in trade disputes—then I claim priority for my proposal in the approaching number of *The British Journal Photographic Almanac*. The copy of my article therein was sent in on November 6, and the proof received and returned in a few days. The subject that I treat of in it has been discussed by me with the well-known trade unionist, Mr. Tom Mann, since last December.

I take this opportunity of asking all who favour the idea of a *boni fide* Trade Union, on similar lines to the Trade Unions in the kingdom, to read my article in *The British Journal Photographic Almanac* for 1890; and also to be so kind as to send me particulars of trade customs, &c., after the manner suggested in the article.—I am, yours, &c.,

Maidstone, December 2, 1889.

ARTHUR G. FIELD.

ELECTRIC LIGHT LANTERNS.

To the Editor.

SIR,—Just a few words in reply to Mr. Lewis Wright to say that, with your permission, I will shortly give the results of certain recent experiments made with both incandescent and arc-light lanterns, which will, I think, quite justify my previous statement as regards the proportionate heat of the two. I trust it will be also sufficient excuse for touching what may be considered the A B C of the subject, because to a number of your readers it is probably an elementary matter, from the fact that few have had facilities for getting the current to use either a powerful incandescent or arc electric light. My experience with arc lights dates back many years, and, in fact, during one of the earliest of the series of South Kensington Exhibitions, I carried out for the late Sir Francis Bolton some experiments with the most powerful electric-light lanterns with a view of projecting pictures on the cascade from the island in the pond from whence the prismatic fountains were worked; so I may fairly claim to know something of the subject, and am in a position to communicate results of trials or modified apparatus that in your opinion may be interesting to the readers of the *JOURNAL*.—I am, yours, &c.,

G. R. BAKER.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—the question 'Amateur versus Professional' is a very simple one—one not at all difficult to solve.

Let the advocates for the claim to monopoly which they give to the professional photographers prove their right to that claim, and then the whole question is settled. The claim must be a just one or an unjust one; it must be an honest one or a dishonest one. It is an old saying that a feather shows which way the wind blows, and writers who advocate this professional claim to monopoly from assumption without proof of their right to it sadly expose themselves. The public will judge them. I shall, therefore, only say that they are unworthy the attention of any man. The professional's right to such a claim is beyond my ken. I have photographed for thirty-nine years and never heard of such a claim till, I may say, recently from correspondence in the journals. Photography owes its existence to amateurs, and to amateurs we look for all future advances. Josiah Wedgwood, Sir Humphry Davy, Niépce de St. Victor, Henry Fox Talbot, and Louis Daguerré, the founders of photography, were amateurs; their labours were given to the world—free to all men. F. Scott Archer was an amateur, and he gave us collodion. Messrs. Kennett, Bennett, and Dr. Maddox were amateurs, and they gave us gelatine—all free.

What, then, have professionals done for photography? And what has photography done for professionals?

I endorse most emphatically every word in that sound good letter from Mr. Wm. Caldwell, of Partick, in your issue of the 22nd.—I am, yours, &c.,

November 30.

F.

To the Editor.

SIR,—Mr. A. F. Jones's letter of last week calls for a reply. He asks "Would it not affect the professional quite as much as the amateur?" Certainly not. To prove this, we must take the difference between an amateur and a professional. The professional of to-day is a man of skill; he knows how to use his brains, and with these his chemicals. On the

other side, the amateur makes a loss. I can count amongst my acquaintances six amateurs, who, were it not for the cheapness of chemicals, would leave it with the expression, "It is too expensive."

During my experience of photography, I have always found the professional to be a man who very seldom made any waste. I had a little talk with an amateur the other day in his own dark room. What do you do with these (indicating a pile of clean glass plates)? Oh, they are spoilt dry plates. How come you to make such a waste? By under and over-exposures. Now, take an all-round professional. Do you think he is troubled with the exposure of plates? Would the public pay what the amateur would be compelled to ask for, sooner than have it properly done at a professional's? Generally, a professional takes two positions; this, compared with the amateur, who gets one good negative out of three exposures, would, in the long run, tell heavily to the advantage of the professional; and sooner than waste the time and money in "studying it by oneself," go straight to the professional's, pay his price, and learn it there and then. We can only stop the "cheap set" man by increasing his costs. This can be done by making him pay for his ignorance. If the chemicals named in my last letter are only minor items of expense, it will greatly help to reach the end desired.—I am, yours, &c.,

23, Cattell-road, Birmingham.

H. VICTOR PAOR.

To the Editor.

SIR,—May I venture to suggest as a remedy the taxation, not of developing agents, but of photographers, both amateur and professional? If a Government license was required, and heavy penalties exacted from those proved to be photographing without a license, two good ends would be served—the Exchequer would be a gainer, and photographers who have legitimate establishments to keep up would secure their much-needed protection.—I am, yours, &c.,

Derby, December 4, 1889.

KAKABEKA.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—I crave a small space in your *JOURNAL* in answer to Mr. Bart Rous's letter in to-day's issue.

There are, I believe, about seventy of Mr. Robinson's pictures shown at the Camera Club. Now as Mr. Rous has chosen to condemn all these photographs as inartistic and untrue to nature, and as he deals only in generalities, will he be good enough to go a little more into detail and point out a few examples in which the "shadows are going in different directions," "combinations impossible," &c., and let us see if he be really a close student of nature?

He must pardon me in saying that when one, unknown to the profession either as a photographer or art critic comes forward and denounces in such a sweeping manner works that have been awarded the highest honours by art-judging committees in nearly all parts of the world, it is not unreasonable that we should wish to know what claim he has to do so. I think, therefore, that he is bound to substantiate the assertion he has made, and let it be seen what the pictures can say for themselves.—I am, yours, &c.,

W. DURRANT.

Torquay, November 30, 1889.

POSITIVES ON CELLULOID.

To the Editor.

SIR,—Referring to your article in to-day's *JOURNAL*, permit us to say that we now supply our sheets finished, polished one side and matt the other, without any increase in price, so that either surface is available, as the photographer's taste or fancy may wish. We think unless very great care were used in cleaning with alcohol or spirit, the finish, either matt or polished, would be destroyed, and in its place the rough unfinished cut celluloid would appear, as in sample enclosed.

We also enclose you samples of our new sheeting, and you will see we are now making it in $\frac{1}{16}$ -inch thick, and upwards by two-hundredths. We also make a sheeting $\frac{1}{32}$ -inch thick, but this we are unable to finish on both sides; either matt or polished one surface can be had, though to cut up it is easiest to score with a knife and bend the reverse way.—We are, yours, &c.,

S. GUITERMAN & Co.

5, Hart-street, Wood-street, London, E.C., November 29, 1889.

Exchange Column.

10x8 oak retouching desk, two and a quarter inch cabinet lens, half-plate box camera want good wide-angle lens.—Address, W., 39, Highgate-hill, N.

Will exchange imitation stone garden seat (reversible), with pillar and vase, for posin chair having three or four backs.—Address, C. E. WEALE, 4, London-road, King's Lynn.

Books on photography (for amateurs) and a few cabinet photographs in exchange for Wormell's *Mechanics* or Ganot's *Physics*.—Address, J. RIGBY, Howick House, Harrogate, Yorkshire.

Will exchange about four hundred BRITISH, AND LIVERPOOL, AND MANCHESTER PHOTOGRAPHIC JOURNALS, dating from January 1, 1857, for a burnisher.—Address, LOU MAX, Photographer, Rotherham.

Will exchange 7½ x 5 bellows camera, six double dark slides, Dallmeyer's triplet lens, and solid leather case, for Ross's or Dallmeyer's cabinet portrait lens.—Address, L. VARNET, Bridge-street, Buckingham.

Will exchange 9 x 7 bellows camera, brass bound, rack and pinion, and three double dark slides with cabinet carriers, for good half-plate bellows camera and dark slides. Address, J. P., Warwick House, Kidderminster.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED:—

J. Owen, Newtown, North Wales.—Three photographs of the Right Rev. Alfred George Edwards, D.D., Lord Bishop of St. Asaph.

M. BARNES.—See reply to "J. Berryman."

J. T. C.—Yes, there is much excellent matter stored away in the old volumes of this JOURNAL.

A. B.—Using the water slightly warm will make no difference; it will not account for the discrepancy.

W. A. WILLS.—Albo-carbon, if properly arranged, is best; next is paraffin with an Argand burner of small diameter.

E. L. W.—Better leave the lens as it is. However, any skilled optical brass worker can remove the bruises from the mount.

OAKLEIGH.—Both forms of limelight are good, but we prefer employing the oxyhydrogen to that in which ether plays a part.

W. E. DOWSON.—There is no reason whatever why the Eastman transferotype paper should not strip properly under the conditions mentioned.

RECTIGRAPH.—There will be no disadvantage in using the larger condenser if the slide be kept sufficiently away from it so as just to be filled to the corners by the cone of light.

CHEMICUS.—Mr. Wellington has, at page 588 of the ALMANAC for next year (published this week), supplemented what he wrote on silver intensification in the last one. To this we refer you.

C. BETTS inquires how the patent scenic backgrounds are prepared.—We do not know of any "patent" in connexion with backgrounds of the kind mentioned. Can a more explicit description or title be given?

A. S.—1. The corresponding lens by the other maker is the No. 3B Cabinet.—2. By purchasing a new lens you ensure the latest improvements, if any, and avoid any risk that pertains, more or less, to second-hand goods.

O. C. J.—No difficulty exists in obtaining permission to photograph anything in the British Museum. Write to the trustees, stating your wishes, which will be readily acceded to. There is a studio there which you may obtain the use of if requisit.

XENO.—We have not seen the work in question, so cannot answer your query. If you will send the book to us, which will be returned at once, or will extract the article, we shall give you every assistance. We strongly suspect you have misread.

R. G. EWINS.—The apparatus mentioned is well worth the money charged for it; but you must not for a moment imagine that it is to be compared with those of the more expensive kinds; nor, indeed, do the makers profess that it is. Still, we repeat, it is good value for the money.

NORTH RIDING.—The "Universal" having a larger angular aperture than the "Symmetrical," is necessarily the quicker acting of the two. There is little, if any, difference between the carte and cabinet lenses specified, and there is no difference between the No. 1 and No. 2 as regards rapidity when worked with full aperture.

LENS (Highbury).—1. The lens you desire is known in the trade as a deep periscopic, and is obtainable from any dealer in optical or spectacle-makers' sundries.—2. Much better employ two such lenses of twelve inches focus each, separating one from the other to the extent of two inches, or a little more or less, as determined by trial.

CORVIST.—Patent plate or British plate glass is useless for a mirror of the very highest class for taking reversed negatives. The glass must have an optically plane surface, which is seldom met with in commercial plate glass. Glass suitable for the purpose has to be ground and polished by an optician with the same accuracy as a lens, and it is more troublesome to do.

PANEL.—Lenses of the "rapid" type are used by many photographers for large direct portraits. Compared with portrait lenses, provided both are worked with their full opening, the former will appear slow; but if the portrait form be stopped down to the same ratio as the full aperture of the rapid—and this many portrait lenses require—their rapidity will be the same.

FERRO-CYPRIC.—The formula is quite explicit. Make a solution of the commercial perchloride of iron which registers the specific gravity given. This you will test with the hydrometer. Commercial perchloride of iron varies in the amount of water it contains, so that its weight cannot be taken as a standard. Use parts by weight. Ordinary *Saxe* or *Rives* paper. Both of these are well-sized papers and require no preparation.

W. S. writes as follows:—"Can you explain the cause of the light and white spots which continually show on my enlargements on bromide paper? You see by the pieces enclosed they render the work perfectly useless."—The spots are caused by air bubbles adhering to the paper during the development. If the paper be thoroughly and evenly wetted with water before the developer is applied the trouble will be avoided.

J. HOLMES asks why cameras are not made of ebonite, instead of wood, because it would be much lighter in weight and less costly.—Cameras have been made in this material, but chiefly in small sizes. But the material is not so well suited for large cameras on account of its brittleness under certain conditions. It is also more difficult to work than wood. If it were utilised we do not expect it would prove any cheaper than wood; and, when damaged, not so readily repaired.

J. BERRYMAN.—We cannot indicate the cause of the spots, seeing that we are not furnished with any details whatever of the method of working, or at what stage of the operation the spots first make their appearance. Such spots may be due to several different causes.

A. Z. A. inquires where the polished opal glass, such as that used some years ago in the demonstration of the "chromotype" process by M. Lambert, is to be obtained, as he says the only opal glass he can get is the matt-surface, such as that used for the pictures one sees in the shop windows.—The glass may be procured from any glass merchant who supplies photographic glass, under the name of "patent plate opal." It is a flashed glass ground and polished on the flashed side.

W. B. WOOD.—If we knew the size of the negative you wished to enlarge we could better aid you. If two condensers, one of them four and the other five inches diameter, will cover the negative, then it is needless waste of light and space to use the nine-inch one, as not only would it be of no good, but it would prove detrimental. But avoid the use of a cast-glass condenser, and procure instead one that is well polished. Better write again and give more details, together with a drawing.

SIGMA writes:—"Since your article on packing dry plates appeared, I put a plate in a dark slide with a piece of newspaper in front of it, but not touching, and after four days' exposure the plate fogged on development; while another plate, out of the same parcel, turned out perfectly clear under similar conditions of development." He says that this proves that much of the deterioration of plates by keeping may be due to the paper in which they are packed.—In the experiment, to be complete, our correspondent should have used a piece of the paper in which the plates were packed. The experiment with newspaper proves nothing, inasmuch as no maker uses newspaper for packing his plates.

J. STONE says, do what he will, his lantern lamp—a four-wick one—gives off most objectionable fumes. He wishes to know if there is any method of preventing it.—If the lamp is properly constructed it should not smell. That is, of course, if it be properly attended to. The chief thing is to see that the combustion is perfect, the flames do not smoke, but appear white and clear all over. The next point is to see that the lamp itself, and the wick tubes, are perfectly clean and dry when the lamp is lit. There is always a tendency of the oil to find its way outside the wick tubes and fittings, and this should always be carefully wiped off before attempting to light the lamp. Most of the objectionable fumes emitted by paraffin lamps proceed from the vapourisation of extraneous oil on the outside. To avoid unpleasant odours scrupulous cleanliness is essential.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, *Orthochromatics up to Date*.

ERRATUM.—In the letter of Mr. A. Howard Benham in our last, *instead of* "one cubic millimetre square," read "one centimetre square."

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary Meeting, Tuesday December 10, at 5A, Pall Mall East, at eight p.m., when papers will be read by Mr. W. E. Debenham, *On the Estimation of the Efficacy of Plate Backing*, and by Mr. G. M. Whipple (Superintendent of the Kew Observatory), *Photography applied to Meteorological purposes*.

CAMERA CLUB ANNUAL SOIREE.—A most successful *soirée*, given by the Camera Club, took place at the Suffolk-street Gallery of the Royal Society of British Artists on Wednesday evening. We observed many members from all the leading London societies present. In addition to a few choice photographs arranged on screens, on the walls were displayed the British Artists' Exhibition of paintings; besides which one room was devoted to the phonograph, which sang, played tunes, and recited, to the delight and amusement of the crowds in attendance. In another room a series of short lantern exhibitions was given at frequent intervals. The large gallery contained many specimens of high-class mechanical apparatus, including lathes and tools, together with cameras of the newest and most choice design. The attendance was very large.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—At the meeting held on November 1, 1889, the following memorial was received by the Council of the Birmingham Photographic Society:—"That the Council be requested to call a general meeting (special) to consider the feasibility of a photographic survey of Warwickshire, the object being to secure an accurate and unbiased record of the scenery, monuments, life, natural history facts, &c., of our county as they now exist." This memorial was signed by eighteen members of the Society. In accordance with the rules, the Council have, therefore, resolved to hold a general meeting at their rooms at the Grand Hotel, Colmore-row, Birmingham, on Wednesday, December 11, at half-past seven p.m., to consider the question. The President of the Society, Mr. J. B. Stone, J.P., F.G.S., F.L.S., will preside, and Mr. W. Jerome Harrison, F.G.S., will read a paper introducing the subject, which will then be open for discussion. It is hoped that the other photographic and scientific societies in the county will render their assistance in the work, and they have been invited to send representatives to the meeting.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1545. VOL. XXXVI.—DECEMBER 13, 1889.

FLASHING COMPOUNDS.

COMPOUNDS which burn with the extreme of rapidity, and emit a light of dazzling intensity, are in season at present, when the light of day is all too short, and is withal of too murky a nature to permit of photography being practised with any overweening degree of success between the rising and the setting of the sun. This is emphatically the season for the employment of flashing compounds for evening or nocturnal photography.

To avoid misconception at starting, we will state that the flashing mixtures now to be spoken of do not trench upon the prerogative of the innumerable magnesium powder lamps now so well known, that is, those in which the light is produced by a small quantity of powdered magnesium projected into or through a flame either by a puff of air from a reservoir, a pneumatic ball, or the lungs, or by centrifugal force, but they belong rather to that class to one of which the suggestive name of *blitz-pulver* (lightning powder) has been given by McCollin of Philadelphia.

The characteristic of flash powder is that it contains within itself the elements by which the flash is produced and maintained, magnesium powder being mixed with them on account of its actinic luminousness when ignited under such circumstances.

Methods of producing quick flashing powders had long previously been known, but it was only in 1865 that Mr. Hadow, of King's College, suggested the admixture of a little magnesium powder with one of these, and the present writer believes that he was the first to apply this flash powder to the actual taking of photographs of objects in motion by its agency. In addition to an article published in the spring of 1865, and referred to later on, we read, on page 587 of THE BRITISH JOURNAL OF PHOTOGRAPHY for November 17 of that year, that he, at a meeting of the South London Photographic Society, "ignited a sample of some powder which had been employed by him in the production of photographs at night with an exposure nearly instantaneous. It was composed of sulphide of antimony, chlorate of potash, sulphur, and magnesium filings." Among the photographic feats recorded as having been secured by this powerful flash light were the photographing of an engraving when it was in a state of motion, the obtaining of groups of children at play, and subjects of a like nature taken long after sunset. But this powder was then introduced long before the times were ready for it, but those who have access to our volume of the year mentioned, together with the two succeeding ones, will find that *Photography by a Flash*—as an editorial article in one of them was entitled—was even in those remote times

un fait accompli. The subject lay dormant until two German chemists about three years ago obtained a patent for it, which in the light of what we had previously published was untenable, but which gave an impetus to the introduction of the now well-established modes of instantaneous flashes.

Flash powders of the class we are now speaking of require only the impact of a flame to cause their instantaneous ignition. One of the handiest means of igniting them is that adopted in the lamp devised by Mr. T. H. McCollin for use with his blitz-pulver. The body is composed of a metallic tube filled with cotton wool, which, after being saturated with methylated spirit, is securely corked at one end, the other end being soldered up. Arising from this tube near one end is a wick holder, the wick being buried among the saturated cotton wool. A blowpipe is soldered on the upper side of the tubular body, the height of its nozzle being such as, when the spirit lamp is lighted, to deflect the flame down upon a small platform in front, upon which a charge of the blitz-pulver is placed. The blowing is effected by a rubber pneumatic ball, a flexible tube from which is sprung over the end of the blowpipe. This lamp, when used with the powder mentioned, works with great convenience and emits a most dazzling light.

Without hazarding any opinion as to the precise constitution of the American blitz-pulver, it may be interesting to give here an extract from an article we wrote for the number of this JOURNAL for May 26, 1865, page 274. "During the past few weeks it has been discovered that magnesium possesses some peculiarities which were not supposed previously to reside in it—for instance, that by mixing it with some other substances it may be imbued with explosive properties of enormous power. Within the past week we have been trying experiments with a view to ascertain the capabilities of some of these magnesium compounds for taking instantaneous pictures at night. The duration of this new magnesium flash is extremely short, occupying only a mere fractional part of a second; but its actinic power is so great that we have been enabled to produce in the camera a negative of moderate intensity." Then follows the formula suggested to us by Mr. Hadow, the Demonstrator of Chemistry in King's College, which was approximately as follows:—

Chlorate of potash	4 parts.
Sulphido of antimony	2 "
Sulphur.....	1 part.
Magnesium (in powder)	1 "

This was followed by a caution, which we here strongly emphasise: See that each article is powdered *before mixing together*; then mix carefully with a bone or wooden spatula, as the mixing of them in a mortar by means of a pestle will be

attended with danger. The proportions above given may be departed from, or changes may be made in its nature.

There are several substances which we may here mention as capable of being used in compounding a flash powder, and in these we shall omit the magnesium, leaving each experimentalist to add as much, or as little, of this necessary ingredient as he finds to fulfil his purpose in the best manner.

No. 1.	Chlorate of potash	1 part.
	Ferrocyanide of potassium	1 „
No. 2.	Chlorate of potash	2 parts.
	Sulphuret of arsenic	1 part.
No. 3.	Chlorate of potash	5 parts.
	Sulphuret of arsenic	2 „
	Ferrocyanide of potassium	1 part.
No. 4.	Chlorate of potash	9 parts.
	Sulphur	$\frac{1}{4}$ part.
	Wood charcoal	$\frac{1}{4}$ „
No. 5.	Chlorate of potash	2 parts.
	Sugar	1 part.
	Ferrocyanide of potassium	1 „

We might increase this list to an indefinite number; but from the formulæ given a fair idea of the nature of the additions and their quantities will be perceived. Each of these formulæ forms in itself an explosive mixture possessing great force, and is here given as the medium to which a large admixture of magnesium is to be made. With such an addition they go off very suddenly, and are attended with a light of great intensity. A burning match, the impact of the flame from a spirit lamp, nay, in almost all of them, a drop of sulphuric acid falling upon the powder will cause its instantaneous ignition.

SULPHUROUS ACID IN THE FIXING BATH.

UNDER the title of "The Acid Fixing Bath," several references have been made recently in the foreign journals to a combination of sodium hyposulphite with sodium bisulphite, or sulphite and an acid, for the purpose of fixing and clearing gelatine negatives in one operation. The idea of an acid fixing bath is, in the first place, especially to an "old hand," in the utmost degree heterodox, as it is well-known that acids—most acids, at least—decompose the hypo with precipitation of sulphur and other noxious compounds. Upon looking more deeply into the matter, however, there is more reason in the suggestion than would appear at first sight.

It has often been remarked how slow photographers are to adopt new ideas or suggestions, and such is the case in this instance. As far back as 1885, in a leading article published in our issue of June 5th, we described a new clearing solution for gelatine negatives and bromide prints, consisting of alum in conjunction with sulphurous, in place of citric or hydrochloric acid, as ordinarily used. A variety of methods for the preparation of the bath were described, but preference was given to the addition to the saturated solution of alum of a quantity of sulphite or bisulphite of soda. If the latter be used, the necessary conditions—free sulphurous acid—are fulfilled; and until the free acid is exhausted, the compound solution possesses strong decolourising properties. If the neutral sulphite be employed, it will be necessary to add a certain quantity of almost any acid to liberate the sulphurous, and this is, perhaps, the best plan, since by adding, in the first place, an excess of

sulphite, it may be decomposed, little by little, by successive additions of acid as its decolourising properties are exhausted, and in this manner the volatile sulphurous anhydride is economised and the nuisance of its pungent fumes prevented.

The special advantages we claimed for this bath were not only greater clearing powers, owing to the powerful bleaching action of sulphurous acid, but also that owing to the latter exerting no decomposing action on the hypo much less washing was required between clearing and fixing than is the case when citric or hydrochloric acid is employed. This is often, especially in hot weather, a matter of some importance. In view of the harmlessness of the mixture of hypo and sulphurous acid, we carried the matter still further by dispensing altogether with the alum bath and making the fixing solution perform the double function, but though we spoke of the matter to several friends at the time, we made no public mention of the novelty pending a thorough test of its reliability, which was doubted by some. Now that it has been revised, we can speak positively in favour of the innovation when suitable precautions are taken.

Some two years and a half subsequent to the article referred to, in December, 1887, Mr. Herbert B. Berkeley took out letters patent for an improved method and process for fixing negatives, consisting practically, though we forget the exact details, of a combination of sodium hyposulphite with free sulphurous acid, or its equivalent. But as Mr. Berkeley himself explained a few weeks ago, owing to protracted ill-health he has been since unable to push the matter. So much for the earlier work in connexion with the acid fixing bath.

Since the more recent revival of the idea on the Continent, we have been carefully testing the acid bath in its various forms, or, rather, comparing the different modes of preparing it, and now propose to give our experience, premising that our experiments have been rather directed towards the readiest method of preparation rather than to efficiency, of which the demonstration was not necessary.

Perhaps the simplest, as well as the best, method of procedure, when it is possible, is to add directly to the hypo solution of ordinary fixing strength a sufficient quantity of the solution of sulphurous acid obtainable commercially. This plan saves all chemical calculation, and is perfectly safe in every way, as the pure sulphurous acid has absolutely no decomposing action on hypo. But, unfortunately, sulphurous acid is not generally or readily obtainable, except in large towns, and even there the purchaser has very little guarantee of its quality. It may be weak from evaporation, more probably it is partially oxidised, and, in consequence, represents little more than an addition of very dilute sulphuric acid. On grounds of prudence and convenience, then, we can scarcely recommend the direct method.

A modification in the use of sulphurous acid pure and simple, which has the disadvantage, however, of being a little troublesome to those who are not possessed of chemical apparatus or well versed in its employment, consists in forming the gas by double decomposition and passing it into the hypo solution, where it is absorbed or dissolved. For this purpose it is necessary to provide a bottle with a perforated cork, through which is passed a bent glass tube, which should only reach a short distance through the cork in the interior side, but be long enough on the exterior side to dip into another vessel containing the hypo solution. In the bottle to which the cork is fitted is placed a solution of sulphite, bisulphite, or hyposulphite of soda—the latter being quite distinct from the

fixing solution it is intended to charge with SO_2 —and all being ready, a suitable quantity of citric or tartaric acid in crystals is thrown into the generating bottle, the cork firmly inserted, and the outlet end of the tube plunged into the vessel containing the hypo solution. As the crystals of acid dissolve, they decompose the salt already in solution, liberating sulphurous anhydride, which, passing over by the bent tube, is absorbed by the fixing solution in the other vessel. As regards quantities, the proportion of sulphite of soda used may be about one-eighth of that of the hypo in the bath to be charged; or, if bisulphite or hypo be used instead, about one-half that proportion. The quantity of acid must be sufficient to decompose the whole of the sulphite used.

The simplest of the "indirect" methods consists in the addition of any acid—preferably, however, hydrochloric—to the hypo solution itself, and allowing time for the precipitated sulphur to subside, the solution being meanwhile kept carefully corked to prevent loss of the SO_2 . This plan is, however, objectionable on the ground of the length of time required for the fine deposit of sulphur to subside.

Better is the method of decomposing either the neutral or bisulphite with hydrochloric acid, leaving, however, an excess of the salt, and adding the solution thus formed to the fixing bath. The decomposition must be complete before mixing the two solutions, otherwise any free hydrochloric acid will act upon the hypo and throw down sulphur on the bath itself. This is only objectionable on the score already mentioned of the length of time required to free the solution of the precipitate.

If this plan is followed, the quantities of sulphite or bisulphite employed may be the same as those already named—one-eighth or one-sixteenth respectively of the quantity of hypo; but the acid must be so proportioned as to leave a trace of unconverted salt.

The weak point of all these methods, however, lies in this: If a sufficiency of free sulphurous acid be formed at first to produce a useful clearing effect, it rapidly escapes by evaporation, and the bath becomes a simple fixing solution. We, therefore, prefer to keep the concentrated sulphite and acid solution separate, and to add it in small quantities to the fixing bath as the latter shows signs of losing its clearing power. Indeed, for some reasons, it is preferable to keep even the sulphite and acid separate, and to mix definite quantities of each just before adding to the hypo. The only precaution to be observed is to have always an excess of sulphite, otherwise there will be sulphur precipitated.

Observe that on no account must the decomposition of the sulphite be allowed to proceed in the presence of the hypo, that is to say, in the fixing bath itself, or there will inevitably be precipitation of sulphur.

With the precautions indicated the acid fixing bath may be used with perfect safety, and with the decided advantage of saving the separate operation of clearing either gelatine negatives or developed prints.

PHOTOGRAPHING INTERIORS.

No. III.

APPARATUS chosen, and its mechanical utilisation arranged for, it is permissible to retrace our steps and return to the more obvious order of things and dwell upon choice or arrangement of subject, consideration of which, for the reasons explained, we

deferred. Every one with much experience of the subject is aware, and those who have none will very quickly learn, that the greatest difficulties to be encountered arise from windows and open doorways, and some of them cannot be successfully encountered save by a method of evasion.

The camera is placed in a suitable position, everything looks well on the ground glass, exposure and development follow, and all looks right except the window. The sash bars have vanished; nothing is to be seen of the view. Beyond all this, all round the window—above, below, and at the sides—there is a more or less wide fringe of fog, the well-known "halation." This effect embraces far more than has yet been written about it; but for the present, working on known lines, it may be explained as being caused by the brilliant light of the image thrown upon the film passing through in part at all angles, and being reflected at the back of the plate upwards to the film again, and a portion also possibly being spread laterally by reflection within the texture of the film. The effect is to cause so much light action upon parts of the image comparatively slightly illuminated that their feeble impressions are merged entirely in this flood of reflection. As to the means of cure, they are nearer to or farther from perfection, according to the intensity of the outer light and the extent to which it is allowed to pass through the window or other opening. As regards the plate itself, a brand should be chosen which is rich in silver—a thickly coated plate, which reduces the amount of light that can possibly pass through. Next, all plates intended for use in interiors should be "backed" with a non-actinic pigment held to the glass by a medium of somewhat similar refractive power, such as gum, &c., or an opaque liquid as asphaltum varnish applied, or one actinically opaque, as collodion tinted with aurine and magenta. This treatment will minimise the evil. There are, however, other expedients sometimes far more efficacious partaking of the nature of evasions.

It will often happen that the window that causes most trouble is not the main source of the light in the room, and in that case the photographer should before exposing carefully draw the curtains, so as perfectly to cover the window and hide the outer view entirely, and then uncapp the lens. When sufficient exposure has been given, the lens should be carefully, and with a light hand, covered again, the curtains then removed from the window, put in their proper position, and, finally, the lens uncapped again for a brief period. It will be found that the folds of the curtains will receive sufficient light from the open window in their last position to be sufficiently indicated, and if not of very dark material, the impression of their folds, or their pattern when spread over the window and illuminated from other windows, will be entirely eradicated by the new and strongly illuminated image of the view seen beyond. One of the prettiest interiors we ever saw was treated this way. An old timbered room with polished oak floor opened into a spacious hall, again of polished oak, and at the farthest visible point there opened out a door showing a delightful peep of country and a brilliantly lighted, cloudy sky. An hour's exposure for the timbered apartment would have meant, under any conditions of plate-backing, a foggy, muddy doorway if the door were left open, and the picture losing more than half its charm if the view were hidden by keeping the door closed; but the photographer who took the view knew his business. He shut the door and exposed the plate for an hour, then, capping the lens, threw the door open again, and re-exposed for a couple of seconds. Even that time was too much to get a clear view of the outside; but a beautiful crisp picture, with an open door

looking out into the open air beyond, and light reflected from the polished floor, was produced by this little expedient.

There will be instances, of course, where such a method of procedure cannot possibly be adopted; the window is there, it cannot be closed or covered, and must be made the best of. But it is sometimes possible even then to evade it; a different point of view may be chosen, and the window hidden by some friendly pillar or other architectural surrounding. If even this be denied the unlucky worker, there is but one mode of amelioration left. He must choose a time of day, or a condition of light, when the sky or view outside is the least brilliant. A south window to be taken morning or evening, a west window early in the day, an east window late, and so on.

We have referred to the method of taking a picture of a room by covering a window with a curtain and allowing the light from other windows to illuminate the apartment and the objects to be photographed. If, however, the window or windows face the observer, and objects to be photographed lie between it and the camera, such a method is obviously out of question. Here, of course, ordinary methods will produce results only of a very unsatisfactory character; but a magnesium flash light can be, and has been, used with great success. We may give a case in point. There has lately been issued, illustrated by photography, a history of the Stevens' Institute of Technology, and one of the views therein depicted is an example of just the difficulty we describe, and which was overcome by magnesium. Facing the camera was a row of windows, with a multitude of dark objects dimly illuminated between camera and window, and yet all is clear and distinct. A negative had been taken first to show where the illumination was deficient when these end windows were covered with screens. Then the windows were again covered over, a long exposure given, pistol flash lights fired to illuminate the spots indicated in the trial negative, and, finally, the lens capped, the window screens removed, and a half-second's exposure given to the view beyond. The result is an excellent harmonious whole, giving detail wherever required, and exhibiting neither fog nor unnatural darkness.

From a parliamentary paper recently issued, which contains a report by the Assistant Secretary of the Marine Department of the Board of Trade, it would appear that colour blindness is on the increase rather than otherwise. Out of 789 persons who were desirous of testing their capacity to distinguish colours, without reference to further efficiency, 4.56 per cent. were rejected. Last year, with the same tests, the rejections were but 3.94 per cent. The failing colours were, as usual, black, red, and green. Thirty-two of the number tested described red as green; six, green as red; sixteen designated green as pink, and seventeen black as red, while no less than fourteen described black as green. Colour blindness, or partial colour blindness, exists to a great extent amongst photographers without their being aware of it. Some we know are quite unable to tone a batch of prints even approximately to the same colour; also that when the discrepancy—which, by the way, is often charged to carelessness—is pointed out they quite fail to realise the fact.

The early arrival of winter has been taken advantage of by many photographers to secure hoar frost and snow pictures. What is somewhat unusual with hoar frosts at this time of the year, they have been, in most districts, accompanied by a fairly good light for photography, so that good results have been obtained. Some of the pictures we know will be used for Christmas and New Year's cards. We were shown some charming frost pictures recently taken which were

printed on opal glass. Good hoar frost pictures on opal are exceedingly effective, and form capital "seasonable greetings."

THE severe weather we have already experienced—and the meteorological conditions show that the winter may be a hard one—has caused discomfort and inconvenience to many photographers in the shape of frozen water supply and burst pipes. Much of this trouble might be avoided if a few timely precautions were taken on the advent of winter. A few thicknesses of felt carpet bound round or fastened over a water pipe will generally prevent its being frozen, even in exposed situations. When a water pipe does get frozen it should at once be examined throughout its length to see if it has burst. If it has, the plumber can be sent for immediately to effect the repair. If the pipe be mended before the thaw sets in all the damage and annoyance usually accompanying a burst pipe will be averted. And what is more, while the frost lasts there is no difficulty in obtaining the services of a plumber at short notice, which is not always the case after the thaw commences, as many know to their cost. The once popular notion that the frozen pipe bursts with the thaw is not likely to be indulged in by many of our readers, as the majority of them are fully aware it is the expansion of the water in the act of freezing that produces the fracture. The effect, however, is not manifest, unless sought for, until the water regains its liquid condition.

PIPES seldom freeze during the daytime, where the water is in constant use, as the movement prevents its congealing. It is only when at rest that the trouble arises. If the tap be left slightly running the water will rarely get frozen. But this means a considerable waste which cannot always be afforded. In this case the best way of preventing the pipes freezing is to empty them every evening after the work of the day is finished. This is easily done by plugging the exit pipe at the cistern with a piece of tube—say "iron gas barrel"—long enough to reach a little above the level of the water. The end of the tube may easily be made to fit by winding round it some linen rag. When the pipe is plugged all the taps should be left open. By this means the pipes will be completely emptied, so that there is nothing to freeze. In the morning the tube is removed and the supply restored as usual. The reason for the hollow plug is, that if a solid one were used there would be no vent at the top; hence, although the taps might be opened, the pipes would still remain full. Frequently the service pipe from the main is laid so near the surface of the ground that it gets frozen. This inconvenience may generally be avoided by placing over it some more earth, or, better still, a good thickness of stable manure. This is an admirable material for covering exposed pipes during frosty weather.

IN a watchmaker's window we recently noticed a number of photographs of well-known London buildings in which the clock face had been cut out and an enamelled dial inserted in its place; in fact, a veritable timepiece was introduced in the photograph. There is no novelty in this, as real clocks in paintings are of very old date, and we saw some in photographs a few years ago. Those were silver prints, and at the same time we saw them they were showing signs of fading. We had no opportunity of judging by what process those recently seen were produced, but they had all the appearance of being silver prints, and were very indifferently coloured—yellow preponderating. If they are silver prints it will be interesting to see how they will look a few years hence. A faded and yellow photograph with a brilliantly white dial to show the time will not be a very ornamental clock.

Do photographers, as a rule, take sufficient care of their lenses? Many professional portraitists pay high prices to secure the most perfect instruments, but do they take even ordinary care to retain this perfection? The answer, in the majority of cases, must be in the negative. In many studios the lenses may be seen standing about with the glasses full exposed to light, atmosphere, and dust. When the instruments are required for use, the accumulated dust is generally wiped off with the first thing that comes to hand—say the pocket handkerchief, or, more frequently, the focussing cloth, which is often as well charged with

dust as the lens itself; hence the continual friction with the dust particles destroys the high polish of the glass, which the optician has been at such pains to obtain. We recently saw a costly portrait combination that had been many years in use in which the outer surface of the front lens, through constant careless wiping, had become quite dull and grey—about the condition that an optician would describe as semi-polished—while the inner surface retained its original polish. The contrast was great. This abrasion of the surface of a lens of course means a loss of light; but that is not all, the brilliancy or crispness of the image is also considerably impaired. Purchasers of second-hand lenses should bear this fact in mind.

WHEN a lens is accidentally dropped, if none of the glasses are broken, although the brasswork may be considerably dented, it is often thought that no actual harm has been done to the instrument. This is frequently a great mistake, as the bending of the brass may so jam or cause unequal pressure on the glass as to alter the figure of the lens and so reduce what, at one time, was a very perfect instrument to one of mediocre quality. By careless usage a lens by the best makers may ultimately be so reduced in quality that its performance is no better than one costing but half its price, or even less.

WHILE the subject of amateur and professional photography, and how the former is likely to affect the latter as a business, is once more to the fore, the following conversation recently overheard at an evening party, when some proofs of a portrait were under criticism, may be interesting:—"What enormous profits those photographers make! Charley has got a machine for taking photographs, and he told me the glasses only cost a penny each, and the papers for the pictures but a few pence a dozen. 'The things are nearly all profit.'"

SENSITOMETRY IN TWO CHAPTERS.

CHAPTER I.

THE measurement of the so-called actinic force of light and of the sensitiveness of photographic surfaces are so intimately connected that the terms "actinometry" and "sensitometry" in some senses appear almost synonymous or pass as such, though in reality they are opposite applications of the same principle. The one signifies the measurement of the chemical force of light by means of a sensitive surface of known value, the other the estimation of the sensitiveness of any given surface or preparation by exposure to a standard light under suitable conditions. Such at least is the theoretical significance of the terms, but how imperfectly the two processes are carried out in practice is only recognised by those who have carefully studied the subject, or who have endeavoured in however small a way to arrive at definite and intelligible conclusions in either direction.

The science of "photometry" as distinguished from actinometry, has been brought to a comparatively high degree of perfection of late years, and it is not difficult to arrive at closely accurate estimates of the illuminating power of lights of widely different values; but here the conditions are infinitely more simple. In comparing the relative values of two simple illuminants we have something tangible to work upon, or at least the issue is kept within a restricted area. Yet here the great existing difficulty is the want of a "standard" light by which to make the comparisons. But when we turn to actinometry, we are met by the necessity, not only of a standard light, but of one that shall be equally available for use with daylight, electric, and other artificial forms of illumination, differing vastly, not only in power, but also in character, but which shall also do duty in connexion with substances varying fully as much in general sensitiveness, and to rays of different colour and refrangibility.

In photometry, for instance, given a reliable standard of comparison, it is easy to state the value of any form of illumination in terms of so many standard units—so many "candle power" in general practice, the visual power of the two lights being compared with something like mathematical accuracy by well-known rules. But in actinometry the standard which would be reliable for one kind of light would possess little utility in connexion with one differing altogether in the rays composing it. It is equally difficult, too, to apply the same

standard to daylight, electric light, or magnesium, which are rich in rays of high refrangibility, and to gas, lamp, or candle light, in which the luminous and heat rays present the largest proportion. The impossibility further of comparing in a satisfactory manner, by means of the same standard, substances differing no more than the various haloids of silver do in their selective sensitiveness to different portions of the spectrum or so widely removed in general as well as selective sensitiveness as a rapid gelatine plate and, say, a sheet of carbon tissue, is manifest, and clearly place actinometry and sensitometry in a distinct category from photometry.

Even if we confine ourselves to the measurement or comparison of one kind of light—as, for instance, daylight at different times—or of one kind of surface—as gelatine plates of varying makes—we are met by the same kind of difficulties in only less degree. Thus, to take two instruments well known to photographers, the Warnerke actinometer and sensitometer, the former proves utterly reliable in comparing the value of bright summer sunshine at mid-day and the differently constituted light of winter or of evening. The sensitometer, too, is known to give utterly false readings of the comparative sensitiveness in the camera of films whose chemical composition is different, owing to the vast difference in selective sensitiveness between the phosphorescent tablet and daylight of ordinary quality. For the feebleness of artificial light in the one case, and the less sensitive forms of photographic surfaces in the other, both instruments are utterly useless. Still further instances may be brought forward, such as the "photometers" in ordinary use by carbon printers, and similar instruments constructed on the same principle for the estimation of camera exposures. In any of these the sensitive material employed in the instrument differing from that in the printing frame or camera can at the best of times only give an approximately accurate result, and this will vary from time to time with the time of day, period of the year, or, in fact, as the composition of the light favours more or less one or other of the sensitive materials.

It is difficult in the present state of our knowledge, and with existing facilities, to imagine the possibility of satisfying these conflicting conditions to the extent of establishing a "unit of light" for photographic purposes, if even no greater reliability than the standard candle. The importance of the question is beyond all doubt, and its very difficulties are the best explanation of the reason it has been so long apparently neglected. I say "apparently" neglected, because in reality innumerable attempts have been made by individuals and societies, and in every period of the history of photography, to cut the Gordian knot, but without success. The very vastness of the subject, the fresh ramifications it presents, the more deeply it is studied, and, above all, the great amount of close and persistent work it involves, place it altogether beyond the scope of individuals or committees whose labours are merely those of love.

It will be remembered that some eight or nine years ago the Photographic Society of Great Britain appointed a committee to investigate the matter, but the net result of their labours can scarcely be said to have advanced matters much, as they were only able to recommend the Warnerke sensitometer as the best compromise for a standard. It is not to be denied that this has proved eminently useful in many respects, and has established an approximate means of comparing, under certain necessary conditions, the relative sensitiveness of *gelatine films*; but it does not even enable us to settle the vexed question of the comparative sensitiveness of collodion and gelatine; for actual camera purposes it is useless in comparing even plain bromide and bromo-iodide plates, while for anything of a lower degree of sensibility it is utterly out of court. It can, therefore, never be accepted as a universal or international standard.

The subject was again revived at the French Congress held a few months back in Paris, but all that is definitely known, so far as the reports that have reached us are concerned, is that the question is still open for discussion at next year's Congress to be held at Brussels. There is, therefore, some hope that, though no immediate result has yet accrued from the past discussion, some ultimate benefit may be gained.

The promoters of the Congress apparently recognised the full importance of the want of a uniform standard of light by making that the first subject of discussion; but whether it is necessary that the photometric and actinometric units should correspond is open to

doubt. What practical utility there can be in "comparing spectrophotometrically with special reference to the rays in the neighbourhood of 'G' in the blue of the spectrum," a standard of luminosity with another where not luminosity but chemical action is the point, it is difficult to see. What is really required is a standard consisting of a luminous source, corresponding in its character and composition as closely as possible with sunlight, that is to say, giving a spectrum as nearly like the solar spectrum as possible. If the Violle standard or the acetate of amyl light answers these conditions, well and good; they may then be at once of some use photographically, and at the same time bring photometric and actinometric estimations within comparable distance in definite terms. It matters not how much the accepted standard may vary from solar light in absolute intensity, so long as the proportions of the visual and chemical rays in each are in tolerably close correspondence; but, failing that, no advance is made.

If, for instance, the accepted standard—be it the "Violle," the pentane, or the amyl acetate—be poorer in the rays in the neighbourhood of "G," or, what is the same thing, be richer proportionately in those about "D," than sunlight, it will be impossible to estimate in definite terms the relative degrees of practical sensitiveness of gelatino-bromide plates and, say, ordinary sensitive albumenised paper, or even of plain bromide plates and those containing iodide or chloride. The surface richer in bromide would, under such circumstances, be made proportionately more sensitive than it should be, owing to its greater sensitiveness to the rays of lower refrangibility. If, however, the relative proportions of the luminous and active rays of the standard be approximately the same as those of sunlight, it will be possible to say that a gelatino-bromide, bromo-iodide, or bromo-chloride plate is x times as rapid as albumen-chloride or platinotype paper, and in actual use the figures will closely agree.

This would, of course, necessitate the establishment of an arbitrary standard of solar light, since this varies so materially from day to day and hour to hour, and with this the artificial unit would have to be brought into co-relation. In thus fixing and comparing the natural and artificial standards or units, a standard sensitive surface would be required, and this the Congress appears to have at least partly overlooked, so far, at any rate, as concerns the new difficulties it introduces. I imagine, however, the sensitive material selected should be that which has the greatest general sensibility, or, in other words, which is acted upon by the largest number of rays of the spectrum. So far as I know, plain bromide of silver fulfils this condition; but how it is to be prepared of a uniform and invariable degree of sensitiveness forms, perhaps, one of the greatest difficulties to be encountered.

With regard to the further complications alluded to in the Congress report, as introduced by variations in development, these of course form another phase of the question requiring full discussion and investigation by a competent tribunal, and I only mention them here, in connexion with the other theoretical difficulties, in order to emphasise what I have already said as to the vastness of the subject.

The mechanical side of the question is, of course, simpler; but I should like to point out that even this is not perfectly plain sailing.

W. B. BOLTON.

THE IMPROVEMENT OF FAULTY NEGATIVES.

No. III.

HAVING in my previous articles instanced a few cases of negatives faulty in respect of posing and lighting, I now proceed to refer to some other instances in which much may be done in the way of improvement also. A by no means uncommon fault to be met with in the case of some portrait negatives is that of the catch light on the eye not being similar in both. Here a clever modeller can work wonders with a sharp needle and magnifying glass. A few judicious touches on the negatives will easily remove parts of the catch light on the faulty eye; after which, should any further modelling be needed, the negative can be varnished and touched up with pencil.

But it is not only in cases of portrait negatives that faults of opacity have to be remedied. Quite as wide a field for improvement will be found in the cases of landscape, seascape, &c.; in fact, there is no limit to the numerous instances where improvement may be effected. As I write, I have a typical case before me. The negative in question is that of a steamer going at full speed; the paddles are

churning up and leaving in her wake large masses of white foam; in this instance, through faulty development, the negative prints too hard in some parts, and no matter how careful the printer may be when printing same, by dodging up and shielding, it is almost impossible to get any softness in these opaque parts. In this case, the exposure being a rapid one, the fault lies clearly at the door of development, too much pyro having been used in bringing out the image, and also the other ingredients being over-strong. The negative shows too violent contrasts and lacks middle tint—this is a very common mistake with beginners. I find, over and over again, the idea prevails that those who have but little experience in developing such subjects as have strong contrasts, that the proper course for them to follow is to mix a developer strong in pyro, the idea evidently being that because the plate has received but a short exposure it must necessarily be forced up in development. In one sense, doubtless, this is right enough, but in such cases as I am considering such a treatment is quite wrong, and must be fatal to success. A golden rule to follow in development is, where violent contrasts exist reduce the pyro, and when but little contrasts are in the picture, such as in cases of open landscape, be liberal with the same and develop slowly, thereby in the latter cases obtaining as much vigour and contrast as possible. In the former case, however, the aim should be to avoid over-contrast, and this is best secured by a minimum quantity of pyro and sufficient accelerator as to bring out the details in the shadow parts before the high lights become over-dense. So much for prevention, which at all times is better than cure; but when the best is to be made out of an error, then I have no hesitation in saying go ahead and make a new negative by means of a transparency in which some toning down of the high lights are worked in by means of a thin wash of Chinese white or other suitable means. Such a case as I have instanced is very frequently met with, also in pictures of camp life; here the high lights are very frequently over-developed before the dark clothing of, say, a group, or it may be other surroundings, are brought out. So much for cases of faulty lighting, posing, and development.

Now let me refer to a few instances often met with through the employment of faulty apparatus. Who is there, I wonder, who in the course of his working has not met with numerous instances of annoying flaws in their negatives caused by leaky slides? And perhaps one of the most common troubles coming under this category is that where a slide, through the fault of such vile material as Yankee cloth being used in the making of the hinges, causes, after a short time of using, a fog line right across the negative, or, it may be, only partially so. I have during the late season had numerous cases of this kind brought before my notice. Here, doubtless, it will be found that the opacity penetrates deep down into the film; in fact, so much so, as to prevent the trouble being removed with a scalpel, for no matter how expert a modeller may be with a knife, when such flaws enter deep into the film it gets quite beyond his power to deal with it without a great risk of causing what is perhaps as great a trouble in another direction. I know quite well there are cases where much may be done with a knife towards the removal of flaws, but as a rule, in my opinion, such a remedy is only allowable where the fault lies on the surface of the negative. I may, just at this juncture, instance a case where such a treatment will be found to answer. It frequently happens, in the cases of some double backs, that after a time their velvets become worn, and when such are used in broad daylight they are very prone to cause surface fog just at the corners or edges of the plate. As a rule, such flashes of light do not enter deep into the film, and therefore a scalpel judiciously applied will easily remove, or, at least, considerably improve negatives faulty in this respect. Of course, much will depend on the class of subject whether or not the use of a knife be permissible. When such, however, will be found to interfere with any fine detail, it is better to avoid using it altogether and fall back on the other mode of treatment I have recommended. In cases, however, such as an ordinary seascape or landscape, where the foreground contains nothing of great importance, it is a very useful tool to employ, and often saves the necessity of the more roundabout way of making and working up a transparency.

Another class of subjects frequently met with where a considerable amount of improvement may be effected is that of groups taken in sunshine. Here it frequently happens that the high lights run too abruptly into the shadows, and no matter how carefully a modeller may work upon the edges of the high lights, so as to blend them somewhat into the shadows, the result is not always as good as could be desired. When such, however, is treated by lowering the tone of the high lights in the positive, in conjunction with as much work as is possible on the original negative, it is wonderful what an amount of improvement can be effected. Groups are, of course, best taken in a good diffused light; but where is the operator who can at all

times choose such places or obtain such circumstances as yield him the opportunity of taking them under the best conditions?

Having considered some of the many cases of faulty negatives arising out of over-opacity, I now proceed to refer to a few cases of a somewhat different type. And, first of all, perhaps there is no larger class than that of landscape negatives faulty in pluck and vigour. Since the introduction of the extra rapid series of plates very frequent trouble arises in the way of poor, thin results, and in no respect is this more noticeable than in the class of prints such plates yield. My idea of the printing quality of a negative has all along been that when such possesses the pluck and vigour which enables the shadows to become bronzed over when the high lights show a slight reduction, we have one that will yield at least fair results in printing on the ordinary albumenised paper of commerce. But, alas! how difficult it is with a very large proportion of amateurs, or professionals either for that matter, to obtain such a class of negatives with the fast, runaway plates of latter days! In place of turning out such negatives, as a rule we meet with poor, thin images, ghosts in fact, and it is enough to make one sick of trying to get anything like decent prints from same. In cases of this kind, where the sky is too thin, much may be done by working in, on the glass side, some imitations of clouds with a sable brush and Chinese white. A novice attempting this for the first time is almost certain to overdo it; that is, it is just about ten to one he will lay the colour on too thick, and therefore produce a ludicrous result in the print. What is wanted in such cases is not an actually well-defined cloud effect, but rather the securing of atmosphere. A very slight wash of the colour, applied in varied forms resembling wavelets of small dimensions, will be found to improve matters, and when such negatives are vignettised in printing, matters will be further improved.

So much for the sky. There are other portions also, such as the foreground, which can be considerably improved by working up with Chinese white or a pencil, only when doing this it is best, in fact imperative, that the modelling be done on the face of the negative, otherwise crispness would be sacrificed. Ground-glass varnish comes in also very handy, and when applied on the glass side of the negative permits of much being done in the way of procuring a little pluck. In applying this varnish, when it is desired to add density to any part of the negative it is best to flood the entire surface of the glass side, and when set, placing the negative on a retouching desk; the varnish can be scraped off from such parts as it is deemed expedient to remove it from. Too heavy shadows can also be improved by the application of this varnish, in which case the varnish should be removed from the surface of the more opaque or denser parts of the negative. Much may be done with this most useful adjunct to the printing room, and when used in conjunction with brains, and a slight modicum of wash colour, it is wonderful in how many ways improvements are effected with it. Mineral paper is also a most useful material, and in many ways serves the same purpose as ground-glass varnish; and where stumping has to be done is of the two, perhaps, the most preferable. Let some of my readers should not be aware of the best means of applying this useful material to the face of a negative, I may just say that the *modus operandi* is as follows:—

A piece of the paper is taken and cut to almost the size of the negative (just a trifle smaller, say about a sixteenth of an inch, however, is the best). This is placed in a dish of clean water for a minute or so, taken out and placed between sheets of clean blotting paper: the face of the negative (glass side) being quite clean and free from spots or specks, a camel-hair brush is dipped in gum, and a small edging of same is run round the negative; the mineral paper will now be nicely damp and limp, and is placed over the glass side of the negative and made fast by the gummed edges; it is then set up on end to dry, and in a very short time it will be found drum-tight, and giving a most excellent surface to work on with pencil or stump, or, if desired, portions may be cut out with the blade of a sharp knife. As a rule, the edges of the paper round the portions that have been removed will curl somewhat, and this is just what is required, for it prevents hard and fast lines appearing at those portions in the print where it was cut out on the face of the negative. When deciding to employ this means of improving parts of a negative, it is necessary to cut somewhat slightly inside the limits of the flaws, because the slight curling acts somewhat as a vignetter and blends the edges nicely.

In my next I hope to refer to the treatment of accidental flaws, such as cracked negatives, &c. T. N. ARMSTRONG.

SIMULTANEOUS EXPOSURE AND DEVELOPMENT OF ENLARGEMENTS.

It would be interesting to learn more fully the particulars of the method and formula used by Mr. A. Maskell for developing bromide enlargements with hydroquinone during exposure. Photographic

literature on that subject is very scanty. Indeed, with the exception of your brief report of the proceedings of the Camera Club in your issue of November 29, and my own short contribution to the *International Annual* (vol. ii., page 405), I have not observed anything written on the subject; on that account I am led to append a few jottings from my note-book which may prove of interest to those who wish to amuse themselves making enlargements during the long winter nights.

Carbonate of potash or soda is preferable in the developer to the hydrate of either, because the latter is gradually converted into a carbonate during a long exposure. It is better, therefore, to commence operations with the more stable substance. The caustic alkalies render some makes of gelatino-bromide very sloppy.

The best results are not obtained by simply floating the paper on the ordinary developer and then exposing. A very flat and feeble picture is most likely to be the result, because the paper did not contain enough of the developer to give a vigorous image. If a correctly exposed gelatino-bromide negative be soaked in a developing solution until the film is thoroughly permeated and the developer then poured off, the picture will "come out," but will be of a feeble character throughout. The analogy to the present case of enlarging on paper is too obvious to require further explanation. The addition of a large proportion of glycerine or other inert (chemically) viscid substance to the developer will enable the paper to retain a larger amount of it and produce a more brilliant result.

Rapidity of development and brilliancy of the image greatly depend on the quantity of developer retained on the paper during exposure. The greater the quantity the more brilliant the picture and the more rapid the development.

The foregoing remarks apply to enlargements made in the ordinary horizontal enlarging apparatus, or made by means of a magic lantern. During enlargement the paper is supported in a vertical position. If the paper is supported in a horizontal position and a vertical enlarging apparatus used, the difficulty of keeping plenty of developer on at once vanishes, and vastly superior results can be had without difficulty.

A dish made of opal glass for the bottom, with varnished wooden edges, is most convenient for focussing, and then to support the paper during exposure and development. It is absolutely necessary to keep the dish perfectly flat. Any dish having a perfectly flat bottom may be used for the purpose. A piece of white paper in the bottom of a black *papier maché* tray does well enough for focussing on if an opal dish cannot be obtained.

An ordinary oil or limelight lantern may be converted into a vertical enlarging apparatus by the simple addition of a small mirror placed at an angle of 45° in front of its objective. A most desirable addition to the lantern is an archimedean screw studio stand. On this stand the lantern is placed with its mirror at the proper angle in front, the opal dish is placed perfectly level on the floor, and the negative from which the enlargement is to be made is put in the place usually occupied by the slide; the picture is then focussed in the dish on the floor by turning the screw of the stand.

A limelight lantern may be placed with the objective pointing downward, but is not so good an arrangement as the mirror dodge, because particles of broken lime are constantly dropping on the condenser.

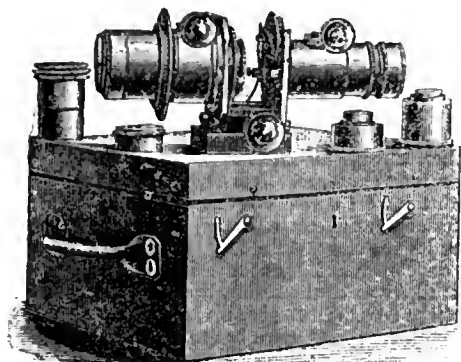
When focussing is satisfactorily accomplished, the bromide paper should be placed dry in the dish and the developer poured over it and the dish kept in motion until the paper ceases to expand. The paper is now closely drained, which will have the effect of making it lie smoothly on the bottom of the dish. The dish carrying the paper is now replaced on the floor exactly in the same spot it occupied formerly. (This is most easily found by driving three nails in the floor in the form of a right angle for the dish to be pushed up against.) If the developer is poured very gently in the centre of the dish it will not raise the paper from the bottom, and in a few seconds it will spread itself evenly over the surface of the paper. The lantern may now be uncapped and the appearance of the image watched for. About one-sixteenth of an inch in depth of developer is sufficient.

P. SWANSON.

LEACH'S IMPROVED LANTERN MICROSCOPE.

THE principle upon which this microscope is constructed was briefly described in a paper which Mr. Leach read before the Manchester Microscopical Society on January 20, 1887, an abstract of which appeared in *THE BRITISH JOURNAL OF PHOTOGRAPHY*, vol. xxxv., page 153. There was no thought when this paper was read of placing the microscope in the market, but the large amount of private correspondence which followed its publication, from many parts of

England, Wales, Scotland, Ireland, and America, led to the instrument being manufactured for sale.



The stage used in it was an old and well-known form, but it failed to give satisfaction, on account of the obstacles which the object-

can be obtained by one of the ordinary form when five inches in diameter.

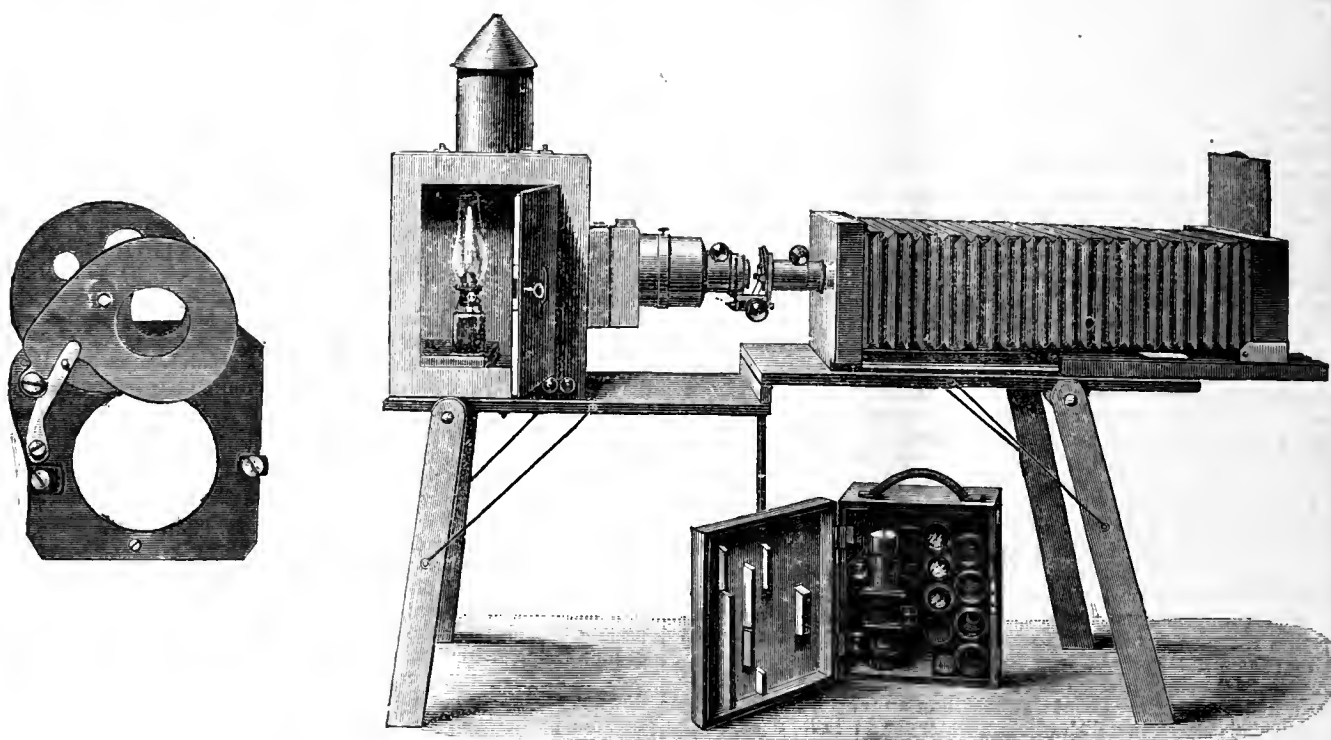
When, as in using polarised light, it is not desired to be incommode with the wheel of diaphragms, the detachable plate carrying the compound wheel can be instantly detached and taken out of the stage, and when taken out can be as quickly put in again.

It should be noted that one stage serves for all classes of objects, whether ordinary microscope slides or polariscope crystals, shown with narrow angle rays or the convergent system of lenses. The tube for polarising prism is fitted for entire rotation, and all the phenomena of polarised light can be demonstrated by the instrument.

It is also equally useful for photo-micrography, as the optical principle is based upon the system introduced by the late Rev. T. W. Kingsley in the days of calotype photography, but greatly improved in both optical and mechanical details.

The large engraving will give an idea of the way in which the arrangement is used, a paraffin lamp with half an inch wick being the source of illumination for this purpose.

The instrument having been constructed by a working man (an operative photographer), who has devoted to it all his leisure hours for a period of over ten years, it has been deemed only fair that he



holder, with its four arms and the springs coiled round, offered both to the changing of the sub-condensers through the stage and to the attachment of a rotating tube for polarising prism. To get rid of these obstacles, a new arrangement of object-holder has been devised and placed underneath the stage, the arms passing through slots in the bottom, so as to hold the objects against the inside surface of the front of the stage. The new object-holder is thus placed out of the way of all the mechanism, and all the material used in the stage. In changing the sub-condensers, all which it is now necessary to do is to take out the one in use and put the other in its place, neither object, objective, nor wheel of diaphragms being disturbed in doing so.

The compound wheel of diaphragms is peculiar in its construction. One part of it has a large single aperture, and moves by means of an arm upon a pivot, so that it can be lifted up out of the field, or dropped into it, just as it is or is not wanted. A spring catch holds it up in its place, so that it cannot fall by its own weight. To the armed wheel is attached a second wheel with five concentric apertures, any of which can be turned into the centre of the field at pleasure. When the compound wheel is lifted up, as shown in the engraving, the whole field of the microscope can be utilised for showing objects up to one and a half inch in diameter. Thus the compound wheel, two and a half inches in diameter, yields just as large a field as

should seek some remuneration for his labour, and he has therefore secured his improvements to himself by patent.

ON A SIMPLE SUBSTAGE CONDENSER FOR THE MICROSCOPE.

ON the supposition that the following remarks may be of interest, I beg to offer them to your notice. They are founded on the application of a rather novel kind of substage condenser for the microscope, which has furnished me with some rather unexpected results, both visually and photographically. Whatever may be its real value, it has one claim which cannot be questioned, and that is its cost can be placed at zero. No doubt many of your readers have perused Professor Lowne's interesting article on *Interference Phenomena in Relation to True and False Images in Microscopy*, reported in the Journal of the Quekett Microscopical Club for April of this year. Professor Lowne suggests also a new theory for the formation of the diatom image when it is brighter than the field, and that "the cause of the positive image is that the diatom is illuminated from above, not from below. It is illuminated by reflected light from the upper surface of the front lens of the objective;" and the professor cites an experiment showing the "great illuminating power of the back of the

front lens of an objective." This surface of emergence of the front lens is a concave mirror, which condenses the reflected pencil upon the object. That such is the case to a certain extent is correct; but the following experiment will, I think, show it does not entirely suffice to form a bright image of the object in the case of diatoms. Having suggested to an eminent microscopist and photo-micrographer the use of a cylindrical lens of short focus for a certain purpose, and even hinting at a trial with a small piece of thermometer tube retaining the mercury column, under the supposition of the correctness of the argument used by Professor Lowne, thinking it might be possible that the bright, reflecting, flat surface of the mercury within the tube would aid the object in view by producing the desired image, I determined to test the same. At the time I was too unwell to carry out my suggestions, but I did so at the earliest moment, and my object in this article is to state the results.

The only properly constructed cylindrical lens I possessed was of too long a focus for the purpose, which was to try and render evident some doubtful markings, dots, lines, or areas on the diatom *amphipleura pellucida*. To construct a short-focus cylindrical lens means more time and trouble than I could give, so I cut off a piece of a thermometer tube half an inch long and from one-sixth to one-fifth of an inch in diameter, and having sealed in the small column of mercury, I mounted it centrally in a thin, flat piece of ebonite, as the first thing to hand. It was let into a slot diametrically, cut exactly to fit the tube lengthwise, keeping its surface parallel to the surface of the ebonite. The tube was thus held longitudinally at its widest diameter, the flat face of the little mercury column showing above and beneath. It was in this extemporised setting fitted on the top of the brass tube of a substage condenser without its lenses, but having its own rackwork, and being capable of rotation in the centring of the substage of the microscope. Here I had a kind of cylindrical lens formed round one axis of revolution, the central portion being blocked out by the small column of mercury. No time was lost to now test its value as a simple substage condenser for use on lined objects, and also as it appeared to me useful to test Professor Lowne's theory. After duly centring the mercury column, I placed on the stage a slide with *pleurosigma Balticum*, and by aid of the plain mirror and daylight, using the one-fifth objective and No. 1 eyepiece, I noticed that the bright reflecting surface of the mercury in the little tube did not suffice to give by its own light, reflected from the back of the front lens, more than a very faint image of the diatom; but the moment the small tube was decanted, so as to place the mercury column to one side, or just out of focus, I had a very beautiful image of the object, and could by rotation of the tube round the central axis of illumination easily bring out, separately, either the short horizontal lines or the longitudinal ones by alteration of this substage adaptation, or both, showing the markings or areas in squares. Another objective was tried, as Zeiss' E, equal to about one-ninth. Here the image was more perfect, only from its larger numerical aperture there was more difficulty to separate the striation. The next trial was to go over the same ground again, using simply the divergent rays of the microscope lamp, and with the same result. The divergent rays were next made parallel by a bull's-eye condenser, also by a crossed lens before reaching the small tube, which rendered this image very bright.

Having thus far satisfied myself, I next cut a small piece from a solid glass rod of about the same diameter. This was mounted more carefully, and upon testing its use in the same manner, I was greatly surprised at its efficiency when used to illuminate the same object, and also other diatoms. The extreme brightness of the images with a one-twelfth water immersion made by Gundlach, and selected for me years since by Mr. Winespeare, optician, Hull, for photo-micrography, when focused on *pleurosigma formosum*, led me to test its value photographically. Unfortunately, I had to fall back on some old slow quarter-plates, and being without any guide as to exposure, I simply made use of my small camera arrangement, described in one of your Almanacs, and attached it to the draw tube of the microscope, using for illumination a large paraffin lamp, and a crossed lens as a condenser. At the first trial a very fair image was obtained, using the developing solution described in the present BRITISH JOURNAL OF PHOTOGRAPHY ALMANAC, 1890. It seemed evidently worth while to try another more magnified image, so I managed to centre a quarter-plate camera by means of a blackened card with a central dark-lined paper tube fitted to the draw tube of the microscope, and made to fill up the lens aperture in the camera. As soon as ready, I took a photo-micrograph of *pleurosigma formosum*, using the one-twelfth of an inch bull's-eye condenser and lamp, the little rod being set parallel to one set of lines on the diatom. The result I enclose for your notice, as it possibly may be one of the first negatives you may have seen produced under such conditions.* Unfortunately it is a

[* The result is excellent.—Ed.]

trifle over-developed, but with the naked eye, or better with a lens, you will see the effect that can be obtained by such a simple piece of apparatus. The value of the little rod as a condenser appears to me to rest chiefly in giving linear illumination of a convergent character, which can be directed in any position as regards the striation of lined objects. Some very curious effects can be brought out by keeping the eyes fixed on the object at the same time that the rod is gently rotated round the axis of the microscope, and it is just possible some of the peculiarities in the structure of striated diatoms may be better brought out than with an all-round convergent illumination. There is one point that must be carefully observed to obtain the best result, which is to be careful to use it at its own focus, otherwise the image is pale or fogged. It is not pretended to offer this plan for anything more than a *costless* substitute for a *costly* piece of apparatus. It possesses a certain value, but is not intended to compete in general excellence with a first-rate achromatic substage condenser. You will be able to judge for yourself. I should have liked to have tested rods of coloured glass, but could not put my hand on any suitable; and there remains yet to try the rod with a right-angle prism, instead of the plain mirror or parallel light by means of the bull's-eye condenser. To find the best position of the rod requires a little trouble.

It was intended to have made these remarks more complete, but as I may not immediately be able to follow up the subject, it was deemed best to furnish it, though incomplete, trusting you may be able to find room for it in your valuable columns, and the suggestion useful to your numerous readers, for I have only played the part of Captain Cuttle, and "made a note on't."

R. L. MADDOX, M.D., Hon. Fell. R.M.S.

CELLULOID FILMS FOR THE LANTERN.

AMONG the published references to that new and beautiful material, celluloid, which is being used as a support for gelatine emulsion in lieu of glass (and with every prospect of largely supplanting that heavy and brittle substance), I have not seen any mention of its possible use for lantern slides. Having used the lantern during the past twenty years to illustrate lectures given in many parts of the United Kingdom, I think that fellow-workers will agree with me, that if we can substitute the light, unbreakable celluloid for the heavy and brittle glass it will be a very great advantage indeed.

The lot of the travelling lecturer with the lantern is not a very "happy one." In addition to the case or cases containing his lanterns, bags, &c., he has to carry a number of slides on glass (each slide requiring two plates of glass), which can seldom be fewer than sixty, and which may be several hundreds, in number, if his absence from home extend over several days and include the delivery of several lectures.

The wooden cases or parcels containing these precious glass slides the lecturer fears to let out of his own hands. He has seen them dropped or carelessly used by porters and assistants, and perhaps has bitter remembrances of lectures previously marred by the breakage of some of his best slides.

How pleasant to be able to replace the glass by a film not one-twelfth the weight of glass, and parcels of which may be dropped or even thrown about with little fear of injury. One envelope will suffice to contain the film-bearing slides for one lecture, and with two or three holders for the films the equipment in this respect will be complete.

The questions of course arise: Is it possible to get pictures of sufficiently good quality for use in the lantern upon celluloid? Will they be transparent enough, will they lie flat, and can they be used safely in such a "hot place?"

I have lately obtained from Mr. Fitch, of 34, Angell-road, S.W., some stout films of celluloid (thickness about one-fiftieth of an inch) cut to lantern size (three and a quarter inches square) with both sides smooth, and coated with excellent gelatine emulsion. The celluloid films for ordinary work have one side finely ground ("matt") in order to enable the emulsion to adhere more firmly. But I think its use must be mainly to lessen halation, for on these smooth films which I have been using for lantern slides the film adheres perfectly without a trace of frilling, &c., although I have not even used an alum bath for them.

The exposure for the celluloid films which I have given when printing by contact has been seven seconds for an average negative at a distance of three feet from an ordinary gas burner. This indicates that the emulsion is more rapid than that ordinarily used for coating glass lantern slides, and there will be a considerable gain of time in using the celluloid films for copying in the camera. Although the emulsion is rather rapid, yet it has great latitude.

For development, use saturated solution of potash oxalate and ferrous sulphate (each being made just acid to litmus paper by the addition of a few drops of acetic acid), adding one part of the latter to

light of the former, with the addition of three or four drops of a ten per cent. solution of potassium bromide for each ounce of developer. If hydroquinone is preferred, use five grains of that substance with twenty grains of sulphite of soda, fifteen grains of carbonate of potash (anhydrous), and three drops of a ten per cent. solution of potassium bromide to each ounce of distilled water. Don't soak the film before developing, but put in the dish, pour the developing solution over it, and then brush the film well with a flat camel-hair brush, or pass a small pad of cotton wool over it a few times to prevent the formation of air bubbles.

The image must be judged not by reflected but by transmitted light. When the picture begins to look dark and somewhat sunken in (as viewed when looking down upon it), take it out of the dish and hold it quite close to your lamp. If it then looks (by transmitted light) a little too dark, the development is complete. Now rinse well, and immerse in fresh clear hypo of ordinary strength. Fixing is, if anything, more rapid than with emulsion upon glass.

The celluloid films, though thin, are so rigid, that in this small size they will stand vertically to wash in the grooves of an ordinary washing tank; or they may be laid on their backs at the bottom of a large flat dish through which a current of water is kept flowing.

When sufficiently washed, I lightly rub the film with a pad of clean cotton wool to remove the minute impurities which ordinary water deposits on the surface. They are then blotted between two or three thicknesses of blotting paper (to remove the surface moisture), and laid (film upward) on a piece of blotting paper to dry. If placed on the mantelpiece of a warm room the films will dry in an hour or even less, and will be quite flat and ready for use.

The film surface may then be varnished, if desired, with crystalline varnish, laid on cold with a brush. To say that these celluloid lantern films are at present quite equal to glass in transparency would not be correct; but there is so little difference in this respect that their other advantages far out-balance it.

For exposure in the lantern, the films might be held together by small steel clips at the four corners, so as to form a band, which could then be drawn through the instrument. The ideal lantern band, however, would be a series of pictures printed in their proper order on one long sheet of celluloid. This could be placed on a roller slide adapted to the lantern, and the pictures would continuously off one roller on to the other. Perhaps printing matters might be so contrived that the new Eastman negative "rollable" film which we are promised could be developed, &c., in one piece without cutting up, and then printing on by pressing a second positive "rollable" film into contact with it on a cylinder.

In the meantime it will probably be best to use our celluloid lantern films just like glass plates. As they are so thin, and to ensure their flatness, it may be necessary to put them in some sort of holder before inserting them in the lantern; but this need be a matter of little difficulty, and two or three holders would suffice (by changing) for any number of films. Hinged wooden or metal holders, between which the film might be placed and then clipped: a plain wooden or metal case with a rabbet on which the film would lie, being then held down by a second light frame pressed into the rabbet, answers well. Any number of such contrivances will suggest themselves, and it is to be hoped that no attempts will be made to patent them.

Celluloid is inflammable, and it is just possible that in a badly ventilated lantern, if a celluloid film were kept "on the screen" for half an hour, it might ignite. I have not applied such a severe test, but it might be thought necessary the heat rays can be almost entirely eliminated by interposing a glass cell containing alum water between the light and the film.

With this note I enclose for the Editor's inspection a lantern slide on celluloid (one of a batch of twelve) just made by contact printing. It was simply developed, fixed, washed, and dried—no aluming or clearing solutions being used—and the whole was completed in less than an hour. Of course, a longer washing would have been better, but to be able to make slides at this rate is often a great convenience to a lecturer.

I simply slip the celluloid film between the pages of my note, and I feel tolerably sure of its safe carriage. What would be the fate of a glass slide sent through the post in like manner?

W. JEROME HARRISON.

DARKENED SILVER CHLORIDE NOT AN OXYCHLORIDE.

About two years ago I published a series of papers in *The American Journal of Science*, the main object of which may be briefly stated as follows:—To prove that the substances which I described as "photo-salts" and obtained by purely chemical means were identical with those produced by light, with both the visibly darkened substances, and the

material of the latent image. Further, that all these substances consisted of a silver haloid (normal chloride, bromide, or iodide) combined with the corresponding subsalt, not in equivalent proportions, but after the manner of a "lake." The subsalts, being unstable substances when isolated, acquiring much greater stability by the union.

The only objections I have seen to these views were based on investigations made in England by Dr. Hodgkinson; his conclusions were that an oxy-salt and not a sub-salt was formed. Although several years have elapsed since these conclusions were made public, the means by which they were reached, and the necessary experimental proof, do not seem to have been published. Mr. Meldola, in his interesting *Chemistry of Photography*, in treating of this part of the subject, seems disposed to accept Dr. Hodgkinson's theory and his formula, Ag_4OCl_2 , for darkened silver chloride. Mr. Meldola adopts my views that the photo-salts which I described, and which were obtained by purely chemical means, are identical with the products resulting from the action of light on the silver haloid, but expresses the opinion that I have not proved my theory of their constitution.

It has always seemed to me that the whole mass of observation on the action of light on silver chloride tended so thoroughly to indicate the formation of subchloride, that we might reasonably accept that view, at least, until something in the way of proof were offered for the oxychloride theory. But, waiving this objection, I will endeavour to show that subchloride and not oxychloride is the product of the action of light on silver chloride.

The question as to the presence or absence of oxygen in coloured silver chloride is one that cannot be determined satisfactorily by quantitative analysis. Taking, for example, the formula just mentioned, Ag_4OCl_2 , it would involve the presence of about three per cent. of oxygen if the entire mass of silver chloride were converted into this substance. But we know that even by the longest exposure the proportion of AgCl acted upon is very small. It would probably be a liberal estimate if we were to fix five per cent. of the whole mass as the proportion changed by light, so that the amount of oxygen that would—according to the oxychloride theory—be introduced into a given quantity of chloride by prolonged exposure would not exceed three-twentieths, or 0.15 of one per cent., of the material under examination—a dangerously small quantity on which to attempt to decide an important question, especially where the estimation is indirect. If even a very careful determination of the silver and the chloride present should bring the sum of these to a quantity represented by figures amounting to from 99.80 to 99.90, would it be allowable to assume that the difference between this and 100 consisted of oxygen, and so to take the presence of an oxychloride as proved? Such reasoning could not be accepted; the errors, incident to the most careful analysis, would too largely affect the point vitally at issue, not to speak of the entire absence of proof that the deficient quantity was oxygen.

These considerations convinced me that it was not in that direction that one should seek for proof of the presence or absence of oxygen in the substance in question. I therefore looked for what may be called *proof by exclusion*.

Coal naphtha (refined petroleum) is a substance absolutely free from suspicion of containing oxygen or moisture as impurities, so much so as to be universally used for the preservation of sodium. I have sodium that has been preserved in this way for over thirty years. Silver chloride was precipitated with excess of hydrochloric acid, was washed in a darkened room, and dried in a desiccator. From this it was transferred to a porcelain crucible, covered, and fused over a lamp. When thoroughly fused (in this condition it is as fluid as water) it was poured directly into naphtha. This naphtha had been placed to the depth of an inch or more in a dry porcelain vessel which was first well wiped out with naphtha to remove the film of atmospheric moisture which condenses on surfaces.

The chloride congealed into a pale grey lump, which, whilst it remained under the petroleum, was absolutely free from all possibility of contact with oxygen, free or combined. Without removing it, the vessel was moved into the sunshine; when touched by sunlight, the chloride instantly became as black as ink.

This experiment seems decisive as to the oxychloride theory.

It seemed desirable not to stop here, but to find a means of applying an equally decisive proof by exclusion to the converse case. In the above instance, a photo-salt was formed by reduction, starting with normal chloride. The converse case would be the formation of a photo-salt by chlorination, starting with metallic silver, and excluding oxygen, free or combined, thus demonstrating that that element is not needed, and plays no necessary part in the formation of silver photo-chloride.

Anhydrous cupric chloride, which I at first thought of employing, proved to be insoluble in naphtha. In rendering ferric chloride anhydrous, there-

is a possibility of forming oxychloride; it could therefore not be employed. As it is not in the least important which halogen is used I concluded to take iodine, which proved to be slightly soluble in naphtha, with a beautiful violet colouration. The mode of operation was as follows:—Pure silver reduced by cadmium from the chloride was heated nearly to redness in a porcelain capsule, and at the instant of removal from the flame was dropped into naphtha. Some fragments of iodine were added. Owing to the very small amount of iodine soluble in naphtha the action was slow, but continuous and regular. As fast as the iodine was dissolved it was taken up by the silver. At the end of some hours the iodine had disappeared wholly, and the naphtha was colourless. Fresh naphtha replacing it failed to dissolve any iodine; the whole of it had combined with the silver to a black compound. This experiment may be varied by using a piece of clean silver foil, or even a silver coin that has been boiled a few moments with nitric acid, washed, and heated by a blast lamp; immersed in the naphtha with iodine its surface soon becomes perfectly black.

This reaction forms the complement of the other, and the two show that whether we start from silver chloride and proceed by reduction, or from metallic silver and proceed by iodisation, in either case we can obtain a photo-salt under conditions which rigorously exclude all possibility of the presence of moisture or of oxygen in any shape.

Therefore the photo-salt is not an oxy-salt, but, as I endeavoured to prove two years ago, a compound of normal salt with subsalt.

The action of light upon silver chloride appears to take place in the following manner:—If any substance is present with which chloride can combine, either directly or by substitution,* the AgCl is decomposed with formation of subchloride. As the product is subchloride and not oxychloride, it is not necessary that the substances present should contain oxygen, as has just been shown. The subchloride thus formed instantly combines with a portion of the silver chloride as yet unacted upon by light, forming a photo-chloride of great stability, capable, for a time, of resisting the action of nitric acid. (I have shown that the photo-chloride made by purely chemical means also shows this stability.)

This combination is not by equivalents, but it is of the nature of a lake, and the affinity of silver chloride for the subsalt is of a progressively diminishing character. Small quantities of subchloride are held with great tenacity; as the proportion of subchloride increases the affinity diminishes. This is no assumption; it is easy to form chemical photo-chloride containing a large proportion of subchloride. Much of this latter is instantly decomposed by old nitric acid; with heat an additional quantity disappears, and so on, until the last portions may require hours of boiling with strong acid for decomposition.

This stable combination of the chloride and subchloride constitutes alike the material of darkened chloride, of the latent image, and of the photo-chloride.

An excellent mode of testing the value of a chemical theory is to observe its ability to explain, not only the general result of a reaction, but also the secondary facts observable. In the present matter—the action of light on silver chloride—there are two such secondary facts of a quite remarkable nature, for which, though long familiarly known, no explanation has hitherto been found, but which, I think, will be found to be readily and satisfactorily explained by the photo-chloride theory.

1. When silver chloride is exposed to light, there is a certain pause, an interval, during which very little action takes place. After this the darkening acts in rapidly; this fact is so conspicuous as to attract the attention of every one who exposes chloride paper.

The explanation is:—Light pink or violet photo-chloride is vastly more sensitive to light than white chloride, a fact easily proved by preparing light-coloured photo-chloride by any of the chemical means I have elsewhere described, brushing it and white chloride, each in a pasty condition, over respective strips of paper and exposing side by side; the difference in the darkening is very striking. Now, the first action of light on white chloride is to form this light-coloured photo-chloride, and whilst that is going on but little visible effect is produced. As soon as the photo-chloride is once formed the darkening becomes rapid. The time required for the first formation of the photo-chloride gives rise to the pause which is observable.

2. When pure, moist, silver chloride is exposed to light, the darkening goes on steadily to a certain point, and then virtually ceases. Although

* As to the action of light on silver chloride perfectly isolated, i.e., in a perfect vacuum, it would appear, from an interesting experiment of Abney's, that no decomposition takes place. It was found that AgCl in vacuo did not darken, even by prolonged exposure.

This experiment does not indicate that the presence of moisture is essential for decomposition; it simply proves that some substance (by no means necessarily water) must be present upon which chlorine can act. Accordingly, when the vacuum tube contained mercury, the AgCl was decomposed by exposure to light. It may be remarked that this last-mentioned fact, properly considered, would have been found to be fatal to the oxychloride theory, inasmuch as darkened chloride was formed in the total absence of oxygen.

the mass may be constantly agitated so as to expose fresh portions whilst it is kept moist, or, better, kept under water, the action of light after a few days' exposure ends almost wholly, and though the chloride now seems perfectly black, analysis shows that the amount of chloride altered has been very small—perhaps a twentieth. For this well-known and most remarkable fact I believe no explanation has ever been offered.

It is to be explained, I think, as follows:—When light acts on moist silver chloride, acid products are formed the nature of which has not been fully made out, but whose presence is certain. (If the exposure is made under water, the water reddens litmus; it does not bleach it.) These acid products would instantly destroy silver subchloride isolated. As long as the quantity of subchloride present, and combined with normal chloride, is small, the protecting power of the normal chloride saves the subchloride from decomposition. The ability of normal chloride to protect the subsalt rapidly diminishes, as already mentioned, as the proportion of the latter increases. These forces in time find an equilibrium (as in the case of many other chemical reactions) in which the quantity of subchloride becomes constant, and any excess that is formed by light beyond the quantity which the chloride can protect is instantly destroyed; consequently, even the most protracted exposure fails to increase the proportion of subchloride beyond its limit.

The complete cessation of the reducing action of light, after a certain very small fraction of the chloride present has been attacked, cannot be explained by the oxy-salt theory; for, if a small portion of the chloride has been converted into Ag_2OCl_2 , there is no conceivable reason why a continuance of the same agencies at work should not affect the residue, and so go on until the whole of the silver chloride passes into the new condition. No theory deserves serious consideration that does not offer a satisfactory explanation of these two conspicuous facts: the pause at the outset, and the cessation of action as soon as a certain small proportion of chloride is reduced.

A confirmation of the explanation here offered is to be found in the fact that black forms of photo-chloride, chemically formed, are almost wholly unacted on by light. By treating metallic silver in a state of fine division* with sodium hypo-chlorite, black photo-chloride is easily formed, which, after two or three treatments with hypo-chlorite solution, gives up nothing to cold nitric acid. It is almost wholly insensitive to light, because as fast as normal chloride is decomposed by light it is reconstituted by the conversion of a corresponding quantity of subchloride present to normal chloride. The chloride and subchloride are in an equilibrium, which the action of light does not alter.

M. CAREY LEA.

Foreign Notes and News.

THE German Emperor, on his recent voyage in the Mediterranean to Athens and Constantinople, took especial pleasure in causing from time to time a number of views of the deck of his vessel to be taken, presumably by that favoured individual known as "Hof Photograph." It is possible that his Imperial Majesty may have attempted to beguile the tedium of his voyage with a perusal of some of those *critiques* that have recently appeared in various English photographic publications, the tendency of which has been to show that the principal merit of the old masters lay in their successful grouping—the technical execution of their works being a comparatively insignificant matter from the artistic point of view. Whether or not his Majesty has become a convert to this "higher criticism," he, on one occasion, when the above-mentioned Court photographer was getting things ready for an exposure, undertook to act as poser in chief to that functionary himself. He thereupon ordered his crew about—the one man to lie down, the other to stand up, some to swarm the shrouds, others, doubtless, to haul home cables, weigh anchor, and tug at running gear, halyards, and brail, and when their situations were sufficiently varied and picturesque to please the Imperial artistic sense, the Imperial voice exclaimed in sonorous tones "Ready," and the Imperial Court photographer let fly and registered the result. The resulting negative will probably be as valuable an "historic *souvenir*" as the pen-knife which his Majesty borrowed at a banquet to cut a cigar, and perhaps will have the invaluable effect of strengthening the higher art criticism alluded to above by exhibiting an Emperor as one of its disciples.

HERR JACOB JUNK has recently invented and introduced in Germany a new bromide of silver printing paper without gelatine. A number of specimens of prints obtained with it were exhibited at the last meeting of the Photographischer Verein, in Berlin. Among these an enlargement of an architectural view was conspicuous for its excellent tone obtained without any retouching. An excellently executed portrait enlargement gave

* For such purposes, metallic silver is best obtained by precipitating the nitrate with sodium hydroxide in excess, and, without washing, adding a solution of milk sugar. In a few hours the reaction is complete (Levol's method). If the presence of any undecomposed oxide is feared, the product may be washed with ammonia.

evidence of the fact that this material is one which can be worked upon both with pencil and crayons perfectly satisfactorily. All the difficulties previously experienced in attempting to colour bromide of silver paper, on account of the impermeable film, are obviated by the use of this material; and the meeting was unanimous in regard to the high value of the new invention, Dr. Meyderbauer being especially enthusiastic in his encomiums.

APPROF of an acid fixing bath, it is pointed out by A. Lainer, in the *Photographische Correspondenz*, that it hardens and contracts the gelatine. To prove this he softened two sheets of gelatine of fifty-five millimetres length in water, which caused an elongation of two millimetres. One of these leaves, when placed in an acid fixing bath, in ten minutes contracted to its original length, becoming, at the same time, harder and thinner; the other, being placed in the ordinary fixing bath, became somewhat longer and thicker—facts which speak considerably in favour of the acid bath.

GASTINE, in the *Moniteur de la Photographie*, gives the following receipt for platinum toning. Dissolve, not above 55° C., 20 parts chloride of sodium and 10 parts double tartrate of sodium in 300 parts water; add, while stirring, 5 to 7 parts of a solution of platinum chloride 1 to 10, and dilute the lot to 1000 parts.

MR. T. H. DUFFIELD will probably be pleased to hear that his excellent article on detective cameras is being translated or summarised in nearly all the principal photographic journals of the Continent.

DR. MIETHE has recently published a treatise, entitled *Zur Actinometrie Astronomisch-Photographischer Fixstern Aufnahmen*, which will be received with considerable attention by all who are interested in the application of photography to astronomical purposes. The principle which formed the starting-point of the researches of which the book in question contains an account, is that enunciated some time ago by Janssen, that the density of the developed image of a star is directly proportional to its light intensity when the period of exposure is the same for the stars compared. Against this position practical astronomers had maintained that experience showed that the difference of density in the images of stars of different brightness could not be equalised by merely lengthening the exposure, and that the image of the less bright stars, no matter how long the exposure, always appeared fainter. The result of Dr. Miethe's researches, which have been extended to include all the different coloured stars, goes to show that, within certain very wide limits, the facts correspond very nearly with Janssen's law, but that when ordinary non-orthochromatic plates are used density increases much more slowly in proportion to the time of exposure in the case of red and yellow stars than in the case of blue or violet stars—a fact which explains the discrepancy hitherto observed between Janssen's principle and actual fact in a variety of instances—faint stars being usually yellowish rather than blue.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,319.—"Improvements in Reducing Cameras for Lantern Slides." A. PEARSON.—*Dated December 2, 1889.*

No. 19,349.—"Improvements in Photographic Cameras." Communicated by Brandt & Wilde. H. E. NEWTON.—*Dated December 2, 1889.*

No. 19,508.—"Improvements in Producing Magnesium Flash Light." W. E. DEBENHAM.—*Dated December 5, 1889.*

No. 19,618.—"Improvements in Boxes for Containing and Changing Photographic Dry Plates." G. BRAMLEY and G. BUTTERWORTH.—*Dated December 6, 1889.*

No. 19,691.—"Improvements in Photographic Cameras." Complete specification. O. FREEWORTH.—*Dated December 7, 1889.*

SPECIFICATION PUBLISHED.

1889.

No. 9198.—"Photograph, &c. Albums." MARCUS and FUCHS. Price 6d.

PATENTS COMPLETED.

IMPROVEMENTS IN OR RELATING TO MIXTURES OR SOLUTIONS FOR DEVELOPING OR FIXING THE LATENT IMAGES ON PHOTOGRAPHIC PLATES OR SHEETS.

(A communication from abroad by CHARLES SPIRO, of the City, County, and State of New York, in the United States of America, Gentleman.)

No. 13,523. WILLIAM PHILLIPS THOMPSON, F.C.S., M.I.M.E., of the Agency for Foreign Patent Solicitors, 6, Lord-street, Liverpool, and 6, Bank-street, Manchester, both in the County of Lancaster, and 323, High Holborn, in the County of Middlesex.—*November 9, 1889.*

This invention relates partly to means for developing the latent images of photographic plates or sheets without a dark room, and has partly for its object to provide a developing mixture whereby a complete isolation of actinic rays of light from the developing photographic plate or sheet will be secured, while a clear view of the developing image may be obtained.

In developing a photographic plate or sheet in a dark room, as heretofore, in which the only light was the dim light admitted through ruby or orange-coloured glass used to exclude the actinic rays, it was possible for the operator to watch the progress of, and control, the development only by removing the plate or sheet from the developing bath from time to time and holding it up to the light for inspection, which process was wearisome and, in many instances,

destructive to the plate, owing to the incomplete exclusion of the actinic rays and the, perhaps, extreme sensitiveness of the plate.

To avoid these inconveniences and attain the objects of the invention, a mixture is provided consisting of any of the ordinary and well-known developers, such as pyrogallie acid and soda, or hydroquinone, in combination with a non-actinic, transparent colouring matter, preferably orange aniline, or a mixture of the same and carmine aniline, where the plate or sheet to be developed is very sensitive.

In preparing this non-actinic developing mixture, at present, the inventor takes, preferably, hydroquinone for the developer, and to one pint thereof adds a solution composed of equal parts of alcohol and water (to energise the solution) to make one ounce, and two parts of orange aniline and one part of carmine to make half an ounce, thoroughly mixed so as to form a completely saturated and dark orange-coloured solution of diluted alcohol.

This solution is first well strained to remove all extraneous matter, and then combined with the developer, as before stated.

This mixture is poured into a developing tray, and the photographic plate or sheet to be developed transferred from the plate holder into the non-actinic bath thus prepared, either in the dark room, afterwards admitting the light thereto, or removing the bath with the contained plate into the light, or by any well known or approved means for effecting this transfer in the light without exposing the plate or sheet thereto.

The non-actinic bath will completely exclude the actinic rays from the immersed plate or sheet, and, the developing mixture being perfectly clear, the development will proceed in full view of the operator, who may thus easily note the progress of the development.

When the image is found to be fully developed, the plate or sheet may be transferred in the light to a bath of any of the usual fixing agents, such as hyposulphite of soda, and the bath quickly covered with a dark cloth; or the fixing bath may be likewise rendered non-actinic by the addition thereto of the same non-actinic colouring matter.

The transfer of the developed plate or sheet from the non-actinic developing bath into the fixing bath in the light may be thus effected without clouding the image, inasmuch as the aniline colouring matter forms a perfect solution and fills the pores of the gelatine film, so as to form a perfectly non-actinic envelope over the film, lasting until the plate is immersed in the fixing bath. The fixing action then immediately commencing, light has no further effect on the film.

The proportions of the developer and coloured solutions above given will yield a safe and efficient developer, if the tray is no larger than necessary to be half filled by the mixture. But the circumstances of the case and the experience of the operator will determine the depth of colour in the mixture.

The right is hereby reserved to make future application for the non-actinic fixing mixture hereinbefore referred to.

Claims:—1. The combination, with a photographic developer, of a non-actinic transparent colouring matter, substantially as and for the purpose specified. 2. The combination, with a photographic developer, of a non-actinic solution of aniline colouring matter, substantially as and for the purpose specified. 3. The combination, with a photographic developer, of orange aniline, substantially as and for the purpose specified.

IMPROVEMENTS IN PHOTOGRAPHERS' PRINTING FRAMES.

No. 16,827. ALBERT TOWERS, 1, Victoria-terrace, Egerton-street, New Brighton, Cheshire.—*November 9, 1889.*

A SPRING attached to photographers' printing frames for printing from negatives. I place my spring at the back of the frame as is usual in these frames, but secured so as to have no sliding action. The springs heretofore in use are usually secured to the frames by a pin, rivet, or screw, and move upon it as a centre in applying or removing the pressure of the spring to the pressure board or back, the sliding action of the spring, so worked, acting upon the pressure board or back causes it to move, thereby causing a corresponding movement in the negative or sensitised paper, damaging or destroying the copy.

My improvement is a bow spring hinged to the side of the frame at the back, so that direct pressure only is applied to the pressure board when applying or removing its pressure, all sliding action being avoided, and the securing of the spring when pressed down, by an arrangement similar in action to an ordinary bolt for doors.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 17.....	North London	Myddelton Hall, Upper-st., Islington
" 17.....	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
" 17.....	Bolton Club	The Studio, Chancery-lane, Bolton.
" 18.....	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
" 18.....	Bury	
" 18.....	Hyde	
" 18.....	Manchester Camera Club	Victoria Hotel.
" 18.....	Edinburgh Photo. Club.	5, St. Andrew-square.
" 18.....	Photographic Club	Anderson's Hotel, Fleet-street, E.C.
" 19.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting of this Society was held on Tuesday last,—Mr. James Glashier (President) in the chair.

The formal business was soon transacted, when Mr. G. H. WHIPPLE, the Superintendent of the Kew Observatory, discoursed upon *The Applications of Photography to Meteorological Purposes*, Mr. Debenham's paper on *The Estimation of the Efficiency of Plate Backings* having been postponed in consequence of a death in that gentleman's family.

Mr. Whipple introduced his subject by referring to his early applications of photography to the registration of meteorological phenomena, more notably the early barograph, described by Mr. Jordan in the *Transactions of the Polytechnic Society* in 1833. In this case light shining across the vacuum space over the mercury column acted on a band of sensitive material which was wound on a clock-driven drum. The speaker also referred to the early labours of Ronaldi in photographically recording electric and other atmospheric changes. After thus introducing the subject, he described in detail the Kew recording instruments as used at present, not only at Kew but at the numerous other meteorological stations where the Kew system has been adopted. Mr. Whipple's plan of demonstrating was, in the case of instruments too complex or too large to be actually shown, to first project on the screen photographs of the apparatus and then schematic diagrams of the essential parts. In the case of the barograph he made very clear how the barometric column was photographed every alternate hour, a small gas jet serving to illuminate the empty part of the tube, and a portrait was used to project the image of the top of the mercury column on to the sensitive paper which clothes the revolving drum. Afterwards the magnetographs were described, and the arrangement of the second mirror, the reflection from which gives the datum line, was explained. In the case of the thermograph two thermometers are used, one dry bulb and the other wet bulb, and the recording ray shines through a break in the mercury column. The various sunshine recorders were afterwards described, after which some account was given of the various photographic methods employed, which ranged from the old Talbotype and the Daguerreotype to gelatino-bromide paper, which is now exclusively used; but until quite recently waxed paper was made use of.

Mr. Slingby exhibited some flash-light groups.

A number of new members were elected, and it was announced that the next meeting (technical meeting) would be held on the 31st inst.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 5.—Mr. G. W. Atkins in the chair.

Mr. A. COWAN showed the results of some experiments in the use of carbonate of ammonia in connexion with hydroquinone and eikonogen developers. The effect of the addition of carbonate of ammonia to either of these developers when already containing carbonate of soda was to cause the action to be slower by about five times; at the same time the image acquired a more sunk-in appearance, not important except if required for positives by reflected light; there was also a certain amount of stain or green fog on the film.

Mr. J. B. R. WELLINGTON had noticed the same effect, but had overcome the green fog by the use of bromide. The development was very much slowed unless a very long exposure was given.

Mr. J. J. LIZELL then gave a demonstration of the use of the air pencil, an instrument very similar to the air brush, but lighter and more compact in form. Drawings representing portions of the human face and figure were shown, and similar ones were rapidly produced by the operator. It was pointed out that negatives as well as prints might be readily improved by skilful retouching with the aid of this instrument. For putting in a background to a photograph, a duplicate print of the head was laid so as to shield the face from the spray played on to the background. By keeping this mask print a little distance away from the one below it, the edge was softened. A piece of wire gauze laid on the print caused the spray to assume something like a stippled appearance.

Mr. A. HADDON suggested that a very useful application of the instrument would be to make vignetting forms by playing the spray on to tissue paper.

Mr. ARCHER CLARKE showed a positive printed on celluloid, and complained of the yellowness of the whites, inquiring whether better examples of the process could not be found.

Mr. COWAN raised a corner of the gelatine film and found that the yellowness was not in the celluloid underneath, but only in the film.

Mr. WELLINGTON noticed that Mr. Cembrano had stated that washing soda gives yellow negatives, but that pure carbonate of soda did not. He (Mr. Wellington) had not found the difference in his own experience.

Other members spoke to having used the ordinary washing soda without noticing any yellowness, or any difference between the action of that and of the pure carbonate.

CAMERA CLUB.

On Thursday, December 5, Mr. A. HORSLEY HIXTON read a paper entitled *The Standard of Excellence in our Art*.—Major J. F. Nott in the chair.

Previous to the reading of the paper the Secretary placed on the table a handy vignetting arrangement sent by Messrs. Marion & Co. for exhibition; also a convenient lecturer's reading desk and shaded lamp for use in optical lantern lectures, which had been devised by Mr. H. A. Arnaud, of Ryde. In this a battery is provided for communication between the lecturer and the lantern operator, and the whole is arranged for fixing to an ordinary tripod if desired. The apparatus, which is called the "Perfect lecturer's desk," is being brought out by Messrs. Negretti & Zambra.

Mr. Hixton's lecture was a carefully thought-out treatise dealing with the present aspect of photography as a fine art, and referring to questions just now of special interest in photographic circles. He maintained that good art is never reached by chance, but is intellectual; and he drew a marked distinction between the scientific and artistic way of looking at natural scenes and objects.

In the discussion which followed remarks were made by Mr. Davison, Rev. A. B. Whiston, Dr. Patterson, and the Chairman.

The subject on Thursday, December 19, will be *Sitting and Erecting Ordinary Drawing Papers*, when Mr. Lyonel Clark will read a paper and give a demonstration. Meeting at eight p.m.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 3.—Mr. A. Mackie in the chair.

The President (Mr. J. Traill Taylor) presented a bound volume of *THE BRITISH JOURNAL OF PHOTOGRAPHY ALMANAC* for 1890.

The Hon. SECRETARY exhibited and explained a Thornton-Pickard instantaneous and time shutter, which was considered a very good instrument.

Mr. T. Lawday showed a print on albumenised paper with several streaky marks across.

Mr. MACKIE explained that the albumen had cracked before printing, through the paper becoming too dry.

Mr. W. BISHOP then gave a demonstration of *Lantern Slide Making*. After referring to the history of photographic lantern slides from the days of wet collodion, through the gelatino-chloride plates of Edwards, Cowan, and Warnerke, to the bromide plates of the present day, he said that lantern slides were of two classes—those made in the camera and those printed by contact with the negative. Dealing with the first class, a simple form of apparatus was illustrated on the blackboard, after which the production of slides by contact was demonstrated by the exposure, development, and fixing of a number of plates, both hydroquinone and eikonogen being used as developers. Cleaning emulsion from the backs (by means of Sapolio), varnishing, masking, and finishing were successively dealt with; the adoption of distinctive colours for binding being recommended, and the proper marking of the top of the face of the completed slide being insisted on. Mr. Bishop further said that, although the actual demonstration had been confined to Thomas's plates, he wished to acknowledge the courtesy he had received from the Britannia Works Company in answer to inquiries, and he exhibited a frame of twelve slides, which he had printed on that Company's new "Alpha" plates, showing the richness and gradation of tone obtainable with them by various modifications of exposure and development. These excited much interest.

Mr. MACKIE then exposed and successfully developed a collodio-bromide emulsion slide, the rapidity of the operation attracting considerable attention.

Referring to marking slides, Mr. TAYLOR said that the Birmingham Society had adapted a white line along the top with particulars of the subjects written on.

Mr. L. MEDLAND stated that he had used a baking dish with hot water under for quickly drying collodio-bromide plates; he also found it desirable to gum the binding slips about three times, to prevent their coming off with heat.

Mr. BISHOP found that paste was better for binding slides than gum, as it did not crack off, and that the hydroquinone developer could be used many times and yet develop well, only requiring rather longer time.

Mr. NEWMAN then showed and explained an ingenious hand camera. On December 17 the Platinotype Company will give a demonstration.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

DECEMBER 6.—The President (Mr. F. W. Edwards) in the chair.

Mr. JOHN HOWSON (Britannia Works Company) attended and read a paper on *Enlarging and Contact Printing on Bromide Paper*.

Messrs. Thomas Cadett and Kirby were elected members, and two other gentlemen proposed.

Friday, the 20th inst., being a lantern night, the meeting will be held at Shawbury Hall, Lordship-lane, S.E.

LEWES PHOTOGRAPHIC SOCIETY.

DECEMBER 3.—The President in the chair.

Mr. A. R. DRESSER read a paper on *Hand Cameras*. He brought several hand cameras for inspection, including the one he used himself. Mr. J. Fallowfield sent a specimen of the "Facile," and Messrs. Harlestone & Co. the "Hawkeye," sold by Messrs. S. Fry & Co. On the walls were exhibited a fine collection of enlargements from hand-camera negatives by Mr. Dresser, and at the conclusion of the paper he exhibited about one hundred slides by the lantern.

BOLTON PHOTOGRAPHIC SOCIETY.

DECEMBER 5.—Mr. E. N. Ashworth presiding.

Mr. C. K. Dalton showed Hughes's metal lantern slide binders, and Mr. W. Banks a 15 x 12 enlarging camera.

Mr. CHARLES J. P. FULLER then read a paper on *The Attainment of Permanence in Silver Albumenised Prints*. He considered more prints faded from insufficient fixing than from anything else. He advocated the use of two hypo baths, as he found that hypo and silver in certain proportions formed an insoluble compound of hyposulphite of silver, which could not be washed out, but which if it had been placed in a second bath would have been dissolved.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

DECEMBER 4.—Mr. President Andrews in the chair, and a fair attendance of members.

After the transaction of routine business, Mr. H. STURMEY proceeded to give his demonstration of *The Cold Bath Platinotype Process*. Commencing by describing the printing operations, he remarked that he was in some doubt as to the success of his exposition that evening, as the paper on which his prints were prepared had been purchased over six months ago, and some of the prepared prints had been done over a month; and, further, that they had not been stored, as directed in the instructions, in a calcium tube, but merely in that in which the paper is sent out, which had been kept in his dark room without any special effort to prevent access of damp. However, after a full description of the process, development was proceeded with, and all the prints (with one exception, which was over-printed) came up remarkably well, a fact which speaks highly for the keeping qualities of the paper.

In the discussion that followed, in reply to a question as to permanence, Mr. JONES, F.C.S., stated that he had subjected a print by the process to some tests, such as boiling in dilute hydrochloric acid, without the image being affected, although the paper support suffered total destruction.

Many members expressed it as their opinion that the instructions sent out with the paper were such as would deter many from availing themselves of the many advantages of the paper, but after having seen the process demonstrated they would no longer be afraid to take it up.

Prints developed by the brush method were shown by Mr. F. W. DEW, who also detailed some experiences in working.

A hearty vote of thanks was accorded to Mr. Sturmev for his instructive paper.

The President handed round a negative and also a print from an enlarged negative of the same, showing how an original which might be too thin to be of use (as this one was) could be reproduced in a satisfactory manner.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

DECEMBER 5.

A practical demonstration by the SECRETARY (Mr. E. Beck) of *How to Use an Optical Lantern, with special reference to the Oxyhydrogen Limelight*, was given. He said that members and the public generally had got a notion that the use of the steel cylinder was highly dangerous and difficult to manage, whereas it was really as safe, if not safer, than the old-fashioned gas bag; mere portable, and, if anything, easier to manage.

Thereafter a number of slides were exhibited by the lantern, and fully appreciated.

HUDDERSFIELD PHOTOGRAPHIC SOCIETY.

DECEMBER 4.—Mr. W. H. Charlesworth in the chair.

Mr. H. M. SMITH, of the Eastman Dry Plate Company, gave a lecture on *The Method of Making Enlargements on Bromide Paper*. He remarked that the permanency of a bromide print had many times been questioned, but he was of opinion that if the paper and the gelatine used were pure, and the various operations properly carried out, the bromide print would be as unfading as carbon or platinotype. After describing the care exercised by the Eastman Company in the selection and preparation of their papers, Mr. Smith proceeded to make an enlargement from a quarter-plate to 15×12 by means of one of Eastman's enlarging lanterns, using paraffin as the illuminant; but he explained that lime or electric light was preferable, though not so much within the reach of all. Having successfully developed and fixed the print, the new Kodak camera was shown and explained—the principal advantages over the old one being a larger picture, better lens, and improved shutter.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

DECEMBER 9.—Mr. S. Wells (Vice-President) in the chair.

Mr. F. G. PIERPOINT, of the Leicester Society, gave his lecture entitled *A Trip up the Thames from London to Oxford*, profusely illustrated by slides shown by the limelight. The negatives, 12×16, were taken by him on a pleasure trip, and the slides were reductions from these. All points of interest were noted, viz., Henley, Mortlake, Chillingworth, Reading, Windsor, &c., the lecture being both humorous and instructive.

DARLINGTON PHOTOGRAPHIC SOCIETY.

DECEMBER 9.—Mr. E. Ensor presided.

Mr. P. J. COOPER gave a demonstration of *Making Lantern Slides from Large Negatives*. The apparatus used was Marion's new lantern-slide camera. The slides made were afterwards thrown on the screen by the optical lantern.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

DECEMBER 3.—Mr. R. A. Scott in the chair.

Regarding a proposed Photographic Institute, the Society, in the main, was favourable to the proposal.

Dr. ANDERSON gave a short paper and demonstration of *The Platinotype Hot Bath Process*. Some of the members, however, upheld the claims of bromide of silver paper in preference to platinotype.

Correspondence.

Correspondents should never write on both sides of the paper.

DECEMBER MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—A PORTRAIT OF DAGUERRE.—A FACSIMILE BUST OF THE INVENTOR OF PHOTOGRAPHY OFFERED TO FOREIGN SOCIETIES.—PLATINUM TONING.—A NEW CAMERA.—A SUGGESTION OF THE PRESIDENT.—EIKONOGEN: FORMULA, &c.—M. BALAGNY ON CONTRETYPE.—THE SAME ON THE YELLOW STAIN ON NEGATIVES DEVELOPED WITH HYDROQUINONE.—PUBLICATIONS BY MESSRS. GAUTHIER-VILLARS.—A BANQUET, &c.

The Photographic Society of France held their monthly meeting on Friday evening last, the 6th instant, M. Davanne in the chair.

The President informed the Society that the Directeur des Beaux-Arts had kindly presented to the Society a portrait of Daguerre painted by Carpentier. A vote of acknowledgment was passed.

The Chairman furthermore informed the members that many applications from foreign societies had been received, requesting a copy of the bust of Daguerre in the possession of the Society. He (the Chairman) wished to inform the members that in committee it had been resolved to offer a cast from said bust gratis to any foreign Society making an application for the same. This resolution of the committee was immediately ratified by the Society.

M. Mercier made a very lengthy communication on toning with platinum salts. I find nothing superior than is proposed by Lyonel Clark and others in England. M. Gartine also forwarded a letter upon the same subject.

Messrs. Marillier & Robelet presented a very ingenious little secret camera, which they have christened "Passe-partout." It consists of a

lens placed upon a cone, which serves as the camera, and with the lens is only about three inches high. This cone slides along the double dark slide. Two exposures can be made on each plate, which give four negatives for each slide. The size of negative obtained is about two and a half inches square. It is a very compact little apparatus, and were a roller slide and film adapted it would be the best I have seen.

The President in replying to some member as to formula, made this very wise remark, "That it would be well if every formula proposed to the Society were presented in this wise:—Let the liquid, either water, alcohol, or such-like, be represented by 100, and not as is sometimes written by 30 (the ancient French ounce), which causes confusion."

Several communications were made on eikonogen. M. Vidal submitted to the Society the results of his experiments on this developer *à la mode*. During the discussion he was not of the opinion of M. Andra as regards the solubility of the product. It is proved that its solubility is increased by being dissolved with the carbonate and sulphate of soda or potash, and still increased by being boiled together. M. Vidal then gave a formula compiled by M. de Laniers, with which he (M. Vidal) had obtained excellent negatives:—

Boiling water	600 parts.
Soda sulphite.....	100 "
Potash carbonate	40 "
Eikonogen	20 "

As this formula contains a greater quantity of eikonogen in solution than any other that has been published, M. Vidal calls it "bain intensif," and said that he preferred to develop by the formula given by M. Andra, and to employ the other if he saw that the image did not come up rapidly enough or did not attain sufficient intensity. In answer to some questions, M. Vidal replied that with eikonogen alone an image could be developed by the addition of a little glycerine to the developing solution. M. Vidal continued by saying that it was absolutely necessary to wash the negatives for at least five minutes before fixing or the yellow fog would appear. The fixing solution employed by M. Vidal is composed thus:—

Water	1000 parts.
Hyposulphite of soda	260 "
Bisulphite of soda.....	50 "

From all that was said on eikonogen, it is proved that this developer has a decided advantage over all others. It does not stain the hands, is easy to carry about, does not decompose, makes pure negatives easy to print, &c.

M. Balagny gave last Friday evening a very interesting lecture on how to obtain a negative from a negative. This is how he operates to obtain the desired results:—Plunge, said he, gelatino-bromide of silver, upon whatever surface it may be coated, into a bath of bichromate of potash (three per cent.), and that for five minutes. Drive off the excess of the bichromate solution with a squeegee, and wash, if a glass plate, its back with a sponge. Leave the prepared surface to dry in the dark. Place the negative to be reproduced in the printing frame, and the dried bichromised plate or film just prepared upon it, in the same manner as you would lay sensitised albumenised paper upon a negative. Expose five minutes in sunlight, and from thirty minutes to one hour in the shade. I prefer films because more pressure can be applied in the printing frame than with glass. Take the exposed surface out of the printing frame and wash it until all the bichromate has disappeared. Now place it on the bottom of a tray, the sensitised surface uppermost. Expose it to the light of a gas jet about three feet distant, and for thirty seconds of time. Plunge it into the developing solution, which may be either an old bath of hydroquinone or iron. An old weak bath is preferable. It ought to be completely developed in ten minutes. Wash well, and plunge it into a citric acid solution (four per cent.). Allow it to remain about two minutes. Wash well and fix in

Hyposulphite of soda	200 parts.
Water	1000 "

M. Balagny made a communication on the yellow stain sometimes observed on negatives developed with hydroquinone. His opinion is that it is to be put to the charge of the operator in not washing the negative sufficiently before plunging it into the fixing bath. The best means to avoid such stain is to acidulate the hyposulphite bath with citric acid. Two per cent. of citric acid is sufficient. The cause is that insufficient washing of the plate renders the hyposulphite alkaline, and thus the stain.

The Government has just awarded to M. Balagny the "Palme Académiques." We felicitate M. Balagny on receiving such well-merited honours.

Messrs. Gauthier-Villars & Son, the celebrated photographic publishers, have just turned out of their presses the "sixième fascicule" of M. Ch. Fabre's *encyclopédique Treatise on Photography*. This number bears the title *Phototypes Negatifs* instead of clichés or negatives, thus carrying out the wishes of the late Photographic Congress of Paris.

Another banquet is to take place on the 16th of this month, in honour of the fiftieth anniversary of the discovery of photography, under the auspices of the Chambre Syndicale de la Photographie, and I hope the photographic community and their friends will respond to this invitation, as great progress has been attained, in that a reunion of friends can now be got together, and a banquet got up at a cheap rate, twelve

francs, when formerly the subscription amounted to thirty francs each person, so that only the richer members of each corporation could afford such a sum, and the poorer were prevented, much to their dissatisfaction. They do much better in London, so a gentleman told me from England. He said, "They get up a very nice dinner party for five shillings per head, and all joining makes it very jovial." This ought to be tried in France, as even twelve francs is too high a price for many of the profession.

PROF. E. STREBINO.

196, Rue Legendre, Paris.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—During the past few weeks a considerable number of columns in your JOURNAL have been taken up by a discussion in letters which you are pleased to head "Amateur versus Professional." Why there should be any "versus" in the matter is a thing which I, in common with many others, fail to see. We hear nothing of "amateur versus professional" in the literary world, nor do we in journalism, and probably some of the most pronounced advocates of "separatism" would be the first to see the absurdity of the situation if you were to take it into your head to distinguish between those of your contributors who write because it is their business to write, and those who write simply because they have something which they think of value to communicate. I am happy to think that the possibility is not likely to occur of such a foot-note to an article as:—"We are quite aware that the views expressed by the writer of this article will not bear investigation; but as he is obliged to earn his living by writing, we are compelled to give his communication precedence over several valuable papers from amateurs."—ED. B. J. or P.

What would some of your correspondents think, too, of a Royal Academy Exhibition with the works divided into amateur and professional classes?

I am a professional photographer; but I am not blind to the fact that it is just that my work should be judged, not by what I profess, but by what I perform, and if others, be they professionals or amateurs, can do my work in a more satisfactory manner, either with regard to quality or terms, than I can, it is my duty to seek another occupation where my services will be of more benefit to the community, and not to waste my energy in a vain attempt to establish a system of "protection" which would be as immoral as it is impolitic.

There is another phase of the question, bearing upon the attitude of some amateurs towards professionals, upon which I should like to say a few words; but as I have already extended my letter to some length, I will ask your indulgence at a future time,—I am, yours, &c.,

B. K. BEXCHINO.

To the Editor.

SIR,—The discussion anent the question of amateurs dabbling in professionalism does not seem to me to have advanced the subject much: one suggestion, viz., the introduction of the term "gentleman amateur," ought to be at once vetoed as being decidedly objectionable—we are all gentlemen, or, at any rate, ought to be. My own experience points to the fact that the encroachments of the amateur on the preserves of the professional are nearly all due to the ignorance (in many cases) and shortsightedness of the latter. There is no doubt whatever that this large body of amateurs means increased trade all round, and the sensible professional should have been "in the swim," ready to avail himself of the many requirements of amateurs, such as retouching, enlarging, &c.

I have heard very strong expressions, in my part of the country, used by professionals as against their amateur brethren, every one of whom with common sense might have benefited himself by cultivating their acquaintance.

In my capacity of photographic chemical dealer I have mixed with "all sorts and conditions of amateurs," and have become acquainted with their peculiarities, their wants, and their idiosyncrasies. Some of them, I must admit, are very objectionable: bad manners, total apparent ignorance of the value of one's time, &c., have all been my experience; but it's an "ill wind that blows no good," and I have generally contrived to get the best of it. Early in my experience I found it necessary to undertake work for amateurs, such as printing, developing, toning, enlarging, and the like; and I was able to put a considerable amount of business in the way of the profession, or rather two young members of it, one of whom is now firmly established and independent of any assistance from me; the other, who was very glad of my work at one time, is now also getting rather independent, consequently I am obliged to look further afield; and this brings me to what I was wishful to say as to amateurs dabbling in professionalism.

My little experience related above refers to the demand for certain work and the difficulty of supply; and I confess at once that I have availed myself lately of the assistance of one or two competent amateurs with time at their disposal, who have, by doing work for me, enlarged and improved their stock of apparatus, and kept themselves well supplied with plates and chemicals. An instance will suffice: A gentleman about to give a lecture requires a set of slides made from drawings or book illustrations; he comes to me and gets a price, which, by the way, he thinks "high;" he tries the local photographers without avail, as they evidently will not, or more likely, cannot undertake the work. He eventually returns to me, and is prepared to pay the price asked. I call

in the aid of my amateur acquaintance, the result being that in rather less than the stipulated time I am able to hand over the slides carefully and neatly copied and mounted, with satisfaction to all concerned. My amateur friend likes the work, for which he receives fair—in fact, liberal value. Another result follows, which is frequent applications of the same nature—all of which work, as I said before, might be done by the professional photographer.

At the present time I am acquainted with several amateurs who make fairly good business with their knowledge and skill, this business being, as a matter of fact, forced upon them on account of the shortsightedness of professionalism. One of them has the finest and largest collection of "lake views" I have ever seen; another has an almost unique collection of photographs of antiquarian interest; another is great on lantern slides; and yet one more (a labourer in a factory at a pound a-week) makes enough out of bromide enlargements, done principally on Saturday afternoons, to keep himself and family during the rest of the week. I may say that I should not employ the amateur in this manner if I could see my way elsewhere; but the demand exists, and there's no alternative. I consider these gentlemen, all getting their livelihood at the desk or in other ways, clearly entitled to the designation of amateur; and I come to the conclusion that in their dealings with amateurs, as a rule, the large body of professionals have acted unwisely—they have missed a great deal of information for one thing, and for another the making of interesting and profitable acquaintance. Personally, I have always found the greatest pleasure and profit in the society of amateurs; I have on occasions lent them my dark room, and paid them other attentions, and am the recipient of numerous cordial invitations from various parts of England, Scotland, and Ireland, offering me the like facilities. Much more might be said on this point.

In conclusion, I must not forget to say that, although there are, I know, business firms who advertise and undertake professional enlarging, printing and the like, there is in every town a local element averse to entrusting their negatives to post or rail, to say nothing of the expense, and who prefer their work done on the spot, wherever possible, and it is of these I write and for whom I cater.—I am, yours, &c.,

A PHOTOGRAPHIC CHEMIST.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—It is a significant fact that of the many hundreds of persons who saw the collection of Mr. H. P. Robinson's photographs, lately on view at the Rooms of the Camera Club, only one person (and he had not the courage to sign his name to his letter) took exception to my letter, and he did not pretend to dispute the accuracy of my statements. Mr. William Durrant, it is true, has taken up the cudgels on his friend Mr. Robinson's behalf simply because they are friends of many years standing. He makes no attempt to disprove the justice of my criticism of his friend's work, but objects to it because I am unknown to fame, either as a photographer or an art critic. What has that to do with the question? Now that he knows the collection has been removed, and that therefore it is impossible for me to do so, he asks me to "particularise." I think this answers his letter. If Mr. Durrant cannot see the fault of his friend's works when they are pointed out to him, it may be as well to let him continue to admire them. I had, and have, no intention of carrying on a discussion, or of attempting to educate a professional photographer. My object was simply to express my views for the benefit and guidance of such amateurs, who, though liable to be misled by Mr. Robinson's clever photography, had yet common sense enough to recognise, when it was pointed out to them, the lack of art qualities in the patchwork photographs (clever as they are) for which he claims that they are works of art. I can imagine a combination printer deriving from his work the same kind of satisfaction that a boy might do who cleverly pieced together the parts of a puzzle map; but I cannot conceive it possible that he could experience in it any of the pleasure that an artist feels in the painting of a picture. Medals have been awarded to Mr. Robinson (and justly) for his clever photography; but I have yet to learn that they were awarded to his photographs as works of art.—I am, yours, &c.,

BART. ROUS.

The Arts Club.

To the Editor.

SIR,—I think it will throw some light on the fuzzy and sharp controversy if we consider for what purpose the photograph is taken. It may be either descriptive or artistic. Most are descriptive, and as a describer the camera has no equal. For this end sharpness is a benefit—indeed, there cannot be too much of it.

Description is so much the stronger side that a doubt crosses one's mind whether pictures had not better be left to the hand. You don't see a dozen photographs in a year that please you to look at as works of art. One great reason for this is that you can leave out nothing on the plate. You have no power of selection; you can hardly find a subject that is not spoiled by a lamp-post, a cast-iron railing, a corrugated iron roof, or a brand new dissenting chapel in the Gothic style. But if you persist in picture making it is best not to be too defined. You must, to be successful, have "atmosphere." People have looked at so many paintings that are not sharp that they have got to associate fuzziness with artistic work. The

foreground should be rather better focus than the back, but I think the difference should not be too great. Shun f-64.—I am, yours, &c., Q.

FLASH-LIGHT PHOTOGRAPHY.

To the Editor.

Sir,—Just a caution to those about to use the above. If using a pneumatic arrangement be careful to have plenty of tube; I have lately escaped a bad accident through not taking proper care. I had arranged to fire three lamps to photograph a stage group, and not having enough tube the first lamp was too near; without thinking, I was almost over it when firing, and had part of my eyebrows singed off, a scorched nose, &c. The light is a good thing but requires care.—I am, yours, &c.,

110, High-street, Watford, December 10, 1889.

FRED. DOWNEN.

A TRADE UNION.

To the Editor.

Sir,—In your last week's issue is a letter from Mr. A. G. Field, in which he refers to an article in your valuable ALMANAC just published. This is an elaborate scheme for a photographers' trade union, the Council of which is to say who is and who is not to work for whom, to fix the rate of wages, hours of employment, conditions for strikes, &c. In fact, it is to regulate the photographer's business, and to taboo it and him, as I read it, unless he complies with its demands.

It seems to me considerate of Mr. Field to postpone the actual realisation of this scheme until next summer, as it will give time for many traders to meet the conditions intended to be imposed upon them. It may, in fact, by that time appear to some of them that they can altogether dispense with male assistants, for I, in my simplicity as an amateur, have an impression that with one good head of a master to direct, photographic work might, at a pinch, be well done by women only, with six months' notice to train efficient retouchers. I hope provision may be made for the effects of what many will look upon as a project for a trade tyranny, and amongst them—I am, yours, &c.,

Melton, December 7, 1889.

AN AMATEUR.

Answers to Correspondents.

J. F. BLACKWOOD (Taunton).—1. Apply to the Platinotype Company, Southampton-row. 2. The address is 50, Gray's Inn-road, London.

PHOTO (Norwich).—When a superficial layer of iodide or bromide of silver is formed on the surface of a collodionised plate, and such can be wiped off, it indicates that the bath is too weak.

J. WILLIAMS.—Make the prints by contact on bromide paper. By this method brilliant prints may be obtained from a negative which is too feeble to yield anything presentable on albumen paper.

W. W.—The Art Union picture, *Stolen by Gipsies*, is copyright. A penalty would be incurred by making lantern slides from it—10s. for each copy. The same applies to the pictures, *The Ruling Passion* and *For the Safety of the Public*.

A. FARLEY.—If the back combination of the portrait lens consists only of a single glass the instrument is certainly imperfect. As, from the description, it is only a common form of French lens, it would, in all probability, cost more to replace the missing lens than to purchase a complete combination.

W. P. ADAMS.—1. For information on these subjects you had better write to the Secretary of the Royal Astronomical Society.—2. Messrs. Frith & Son, Reigate, or Messrs. Poulton, Lee, may probably be able to supply the views required. If they cannot they will possibly say where they are to be obtained.

W. WIER.—Beyond what has been published and what appears in the specification of the patent we know nothing of the process. We are not in the secrets of the Company—and we know they have some—so cannot say whether or not they work strictly according to the specification. May not your failures be due to want of experience?

W. G. (Stralbrooke).—The front, or back, combination of your lens will work quite well as a landscape lens. For such small plates as you employ you may turn the convex surface of the lens next to the view, by which a larger diaphragm may be employed than when the concave surface is outside. But make a few trials for yourself, and then determine upon which alteration will prove most serviceable.

S. G. BIGGS.—The negatives are all under-exposed, and very much so, too. Although you may be working exactly the same as you have been doing for months past, it must be remembered the light is not the same as it was two or three months back. To take instantaneous pictures in December, a large stop must be used and the shutter must not work very rapidly, otherwise under-exposed pictures will be the result.

MORE LIGHT.—As the Corporation are prepared to supply the electric light, you cannot do better than consult their engineer. He will advise you as to the best method of applying it in the studio. One light, but it must be a good one, will be sufficient, and it can be arranged to be used at each end of the studio, also for enlarging with. In this case the lamp must be what is known as a "focus-keeping" one, so that the arc is always retained in the axis of the condensers. But there will be no difficulty about this. The necessary lamps will, doubtless, be supplied by the Corporation. No work is published on the subject, but several articles upon it have appeared in back volumes.

A. Z.—Clearly you do not realise what is essential in a lantern slide. It is no wonder that the pictures look "dark and muddy" on the screen, if the two sent are a fair sample of your work. In a good slide the highest lights are represented by bare glass, in yours they are fogged and stained. Instead of using ordinary plates, we advise you to get some specially sold for transparencies, and then to use the developer recommended for them by the makers.

BETA asks the following question: "If I put up a studio in my garden, and have it in use for seven years, can my next-door neighbour extend his premises in such a way as to obstruct the light to my studio without recompensing me for the injury?"—The neighbour can put up anything he likes on his own ground without let or hindrance under the present circumstances. Had the studio been in existence twenty years the case would then be different, as then Beta could claim "ancient lights." Twenty years' uninterrupted use is necessary in order to claim this privilege.

AQUA PURA writes: "Taxing chemicals would, I think, injure the professional as well as the amateur. In our town (Blackpool) a professional photographer has to pay a special water rate of 1s. per year; if this is the same in every town, I am sure if they who call themselves amateurs (but are really not, because they sell their work) were charged a special water rate, it would be one way of clearing off what a well-known weekly paper has rightly named as mongrels, and so give the professional a chance to make a living, and the amateur a chance to dabble in the art for amusement, or to make a study for the advancement of it."

WEAK NEGATIVE asks how a negative which has been varnished can have the varnish removed so that it can be intensified. He says he has poured methylated spirit over the plate, "but the varnish does not wash off."—Supposing the menstruum of the varnish was alcohol, methylated spirit will redissolve it; but it will be necessary to soak the plate in the spirit for some time, and in some cases to make the spirit warm when it is applied. Gentle friction with a pledget of cotton-wool will also assist in the removal. When the varnish has dissolved it is necessary to rinse the plates with two or three lots of fresh spirit before proceeding with the intensification.

SPOTS writes as follows: "Some time back I sent for your opinion of the spots as on the enclosed prints. You said you should think it was dust or some of the kind settling on the paper after sensitising, but I cannot trace it to this, as I have taken every possible means of avoiding anything of the kind settling on it. The method I treat the paper is as follows:—After taking it off the bath it is laid between two sheets of blotting paper, the paper being rubbed over to avoid the albumen paper drying in tears, and it remains there generally till nearly dry, and then is finished off by heat. I have used the same mode of working for a long time, and have not had these spots appear till a recent date. I tried clean blotting paper, but without any good result. Perhaps you could form some other opinion as to what they are, and let me know at an early date, for I am anxious to find out what they are, as I have to destroy a number of prints daily through it. A slight trace of them can be seen in the printing, but they seem to come out much more distinct when the paper gets wet. I have wondered if anything connected with the platinotype printing would cause it, as they are both done, filled in, and printed in the same place."—From what our correspondent now says we cannot well see how the spots can be due to floating particles settling on the paper while drying. We can now only suggest that the blotting paper may be at fault. Our correspondent says he has tried using some clean sheets, but we would suggest changing the sample altogether. It is clear that if the blotting paper contains deleterious matters—and many kinds do—the spots may easily be accounted for. As the spots show in the printing they must either be due to the paper itself or something in connexion with the sensitising or drying.

THE business of Messrs. Horace C. Lewis & Co., of 29, Ranelagh-street, Liverpool, has been formed into a Limited Liability Company.

PHOTOGRAPHIC CLUB.—The annual dinner will be held on Wednesday, the 18th instant, at Anderson's Hotel. On this occasion a testimonial will be presented to Mr. E. Dunmore, the retiring Hon. Secretary and Treasurer.

THE new Catalogue of Mr. John J. Atkinson, Liverpool, contains a copious list of the lenses by most of the eminent opticians, together with cameras, stands, head rests, printing frames and material; in short, everything a photographer can desire. It is well illustrated and contains 180 pages.

MR. W. KAY, Science School, Kidderminster, writes that the arrangements for the Exhibition are progressing favourably, and from the number of entries made there is every probability of a good collection of pictures being got together. Any information required by intending exhibitors will be promptly attended to by writing to the Hon. Secretary.

MR. F. A. BRIDGE sends us a cabinet group of the four eminent violinists who form the quartette at the Monday Popular Concerts, St. James's Hall. The group was taken on a dark, foggy November afternoon, by the agency of four of Hart's magnesium flash lamps with a lens working at f-6. The likenesses are unmistakable. The party are taken *in situ* on the platform.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1546. VOL. XXXVI.—DECEMBER 20, 1889.

TESTING DEVELOPERS.

THERE is ample room at the present time for a full and accurate comparison of the different rival developers now in use or competing for patronage. It cannot strictly be said that we are entirely without published information of the nature alluded to; the trouble is rather that there have been so many utterly antagonistic views expressed of one and another developer that any reader not versed in photographic matters might well be excused for doubting the combined capability of the writers as accurate experimentalists.

The fact is, however, that we have no recognised standard of comparison either for developers or for sensitive films, and that, consequently, every individual who may lend himself to the somewhat thankless task of conducting a series of comparative trials between different developing solutions must not only establish his own standard of efficiency, but must trust almost entirely to his own judgment in matters of detail. This being so, it is almost a matter of necessity that given, say, half a dozen fully competent and equally accurate workers, the results of their individual trials would be as many totally conflicting reports. But when the published accounts come chiefly from those who recognise no standard beyond their own convenience and fancy, it is inevitable that some considerable variety should appear.

We can scarcely particularise, but instances are not wanting; indeed, scarcely a week's issue of the JOURNAL passes without the report of some discussion in which the most opposite opinions are expressed by different speakers with regard, say, to the comparative merits of hydroquinone and pyro, or of eikonogen and everything else. But, as a rule, no very definite data are supplied as to how the conclusions were arrived at, so that one can but regret, too frequently, that space has been occupied in the reporting.

How matters are to be improved it is not easy to say in an off-hand manner. The every-day photographer will, no doubt, be inclined to think and to assert that the practical experience of every-day workers is all that he cares about, and that merely scientific results are altogether beyond his requirements. Well and good, so far as it goes, if the "practical results" are based on a solid foundation so far as theory is concerned; but there is just where the scientific photographer will differ. The "practical" conditions are not stated with sufficient definiteness to render them of much value from his point of view.

There are, in fact, two entirely distinct phases of the question, each of which deserves very close consideration, and it is extremely difficult to say which is really the more important. We have, first of all, the purely chemical or scientific side, under which we consider developing agents simply

in relation to their comparative reducing power. But the strongest reducing agent is not necessarily the best developer. The mere reducing power of the solution upon bromide or other haloids of silver in the absence of foreign matter can easily be estimated with mathematical accuracy, but the case is entirely altered when the numerous complications of a sensitive photographic film are drawn into consideration.

It is easy for the chemist to pronounce that pyro, hydroquinone, or eikonogen, as the case may be, is the most energetic developer; but the photographer is interested only in which is the *best*, that is to say, which is the best under the greatest variety of circumstances. How is the problem to be solved? and upon what lines ought we to proceed in attempting to establish a standard system of comparison?

Some years ago Captain Abney published the results of a series of experiments conducted with a view of determining the reducing power of pyrogallie acid upon bromide of silver. In these, weighed quantities of silver bromide were submitted to the action of pyro in solutions of definite strength in combination with definite quantities of alkali; and by quantitative analysis of both the reduced and unreduced silver the power of each grain of pyro was accurately gauged. But even here we have not all we should like to know. How much, for instance, does the reducing power increase with increase of alkali? How does time affect the operation? and temperature? How, in fact, do the conditions which chiefly rule the development of a sensitive film affect the plain bromide? Here alone there is a large field for investigation.

But when we turn to the photographic film in which the character of the silver salt is altogether altered or masked by its organic surroundings, whether gelatine or collodion, as well as by action of light, it is not difficult to imagine an entirely new class of circumstances, in which the first valuation of the mere reducing agent is of comparatively little use.

Whatever results may be arrived at in connexion with pyro, they can scarcely be accepted as having much bearing upon the possible behaviour of either hydroquinone or eikonogen, except so far as regards mere reducing power. These latter newer developers are known to be far more powerfully modified in their action by foreign matter than pyro, and, consequently, cannot be judged under the same trials. In fact, it seems almost impossible to establish any universal system of comparison except as mere reducing agents.

Something may, at least, be done to clear the way in this direction by arriving at a definite knowledge of the absolute reducing power of each of the substances named upon silver bromide. For instance, having found what weight of silver bromide one grain of pyro *plus* a given quantity of alkali will

reduce, it will be comparatively easy to follow on by ascertaining what strength of hydroquinone or eikonogen, or what combination of these agents with alkali, will produce a like result. So much being gained, it will be possible to compare them as *reducing agents*.

Next, it will be desirable to compare the retarding or restraining effect, if any, of soluble bromides, sulphites, and similar additions to the developer when used with the three agents respectively upon plain bromide of silver in the absence of any surrounding film of gelatine or collodion; and, finally, to test the relative effect of such organic complications on the reducing action of the developer.

The mere quantitative analysis of the results of such experiments is simple enough to any one with a comparatively slight acquaintance with chemical manipulations, but to arrive at any useful result must necessarily involve a very extended series of trials: and then the verge of the real question of the "best developer" is barely reached, for from a practical point of view the difficulties and complications are so wonderfully multiplied that we are compelled to repeat, it seems almost impossible to arrive at a definite and useful comparison.

Meanwhile, until some such work has been gone through it would be well to refrain from speaking of any developer as being "the best" under all or even under any circumstances.

NEGLECTED PROCESSES.—WHY ARE THEY NEGLECTED?

In a number of articles which have appeared in these columns of late, we have directed attention to several disused processes which are capable of yielding excellent results, in some, such as are not to be equalled by other methods. In this series no allusion has been made to some which have become obsolete on account of being superseded by others, by which the same or similar results may be obtained by better or simpler means; nor has it been intended to include every means by which excellent photographs can be produced, though not at present used.

There are many systems—and useful ones, too—which come under the title of the iron processes, as well as other interesting ones of Herschel, Hunt, and other workers. These, by which a great variety of colours may be obtained, are well worth the attention of experimentalists, though they have seldom been alluded to of late years, with the exception of the ferro-prussiate and the platinotype, both of which are iron processes. An ardent experimentalist in these very early methods was Mr. Michael Hannaford, who, over a quarter of a century ago, produced excellent prints by several of them, and described the methods he adopted before the late South London Photographic Society, to whom he presented his examples. These are, we presume, now in the possession of the Photographic Club, as at its demise the Society's archives were presented to the Club. These pictures are now exceedingly valuable as proving the permanence, or otherwise, of the processes themselves, or of the modifications of Mr. Hannaford. A description of most of these interesting, if not really valuable, processes will be found in many of the older works of photography—for instance, Hunt's *Researches on Light* and the various editions of his *Treatise on Photography*, from 1841 onwards—under the heads of cyanotype, chrysotype, amphitype, chromatype, ferrotype, catalysotype, &c. An article on the iron printing processes, with modern modifications, also appears in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1889.

Many who have read the articles on neglected processes have, not unnaturally, speculated as to why, if they really possessed the advantages claimed for them, they have become neglected ones. The question is not an easy one to answer, for there may be, and probably are, several reasons why some, at least, of them are not at present in use. One reason undoubtedly is that photographers are somewhat conservative, and slow to leave old methods with which they are familiar for new ones which they will have to learn, even if the new ones would prove advantageous in the end, particularly when the new departure is a wide one. Notably is this the case with some processes, such as the chromotype of Lambert, the powder, and the stannotype process. In all these the whole system of photographic printing is altered. The materials are unlike those in daily use, and the systems are based upon an entirely different principle from that of silver printing. Hence, comparatively few photographers could, or did, devote sufficient time and attention to the subject to acquire the necessary proficiency to work the processes with uniformity and certainty—so essential for working on a commercial scale.

In some processes there was but a slight departure from the ordinary methods with which operators were perfectly familiar. The eburneum and the photo-crayon were essentially wet collodion processes, and why they were not more generally practised, considering the excellence of the results, it is certainly difficult to imagine. The albumen process, again; this is very similar in principle to the wet collodion, yet in England it has been but little practised, though, until the introduction of specially prepared gelatine plates, it was, without doubt, far and away the best method of making transparencies, either for the stereoscope or the lantern. It is true here, too, that considerable skill, which could only be acquired by practice, was requisite to obtain pictures such as those produced by Ferrier and others on the Continent, and few here gave sufficient attention to the matter to acquire that necessary proficiency.

A reason why processes which were undoubtedly good ones and exceedingly valuable were not at once adopted, is that they were introduced at the wrong period, *i.e.*, before their time. Notably was this the case with some of the photo-mechanical processes. For example: The late Mr. Fox Talbot more than thirty years ago produced engraved copper (intaglio) plates by an etching method analogous to, if not identical with, those now so largely employed commercially, and, what is more, Talbot's work was in no way inferior to that now produced. Paul Preterre again, he about the same period produced intaglio plates and relief blocks in half-tone by methods very similar to those now employed; but these processes, like that of Talbot, did not succeed commercially, as the time was not then ripe for them. The same remark may be applied to photolithography. As far back as 1865 Messrs. Bullock Brothers produced photo-lithographs in half-tone which were quite as good as most of the commercial work issued at the present time, yet the process, good as it undoubtedly was, remained in abeyance as a neglected one for many years.

The chief object of the recent articles has been to direct attention to good and useful processes which are not being employed, and some of which might possibly meet with better practical success if they were reintroduced at another time or under different conditions, as witness the instances just quoted.

Already our articles would appear to be bearing fruit. It will be remembered that in our number for the 22nd ultimo we, when referring to methods of making negatives direct

From negatives, gave a brief outline of Mr. Thomas Bolas's method, published in 1880. As will be seen by our last issue, this system was introduced and described as a novelty at the last meeting of the Photographic Society of France. The process, and the method of working it, is precisely the same as that published nine years ago by Mr. Bolas, since which time it has remained in abeyance, now to be resuscitated.

SOME years ago considerable interest was caused by the exhibition of photographs of frosted window panes, subjects which for fairy-like delicacy and beautiful variety of form it would be difficult to surpass. These pictures—for such name, indeed, they deserve—are most easy of production, and can be made to subserve a variety of useful and ornamental purposes. We have seen them used in Christmas cards, and we know of an instance where a very pretty example was utilised by a pattern designer as the basis of ornamentation for a damask table cloth. We have not seen panes of glass specially arranged for the purpose of receiving the fairy tracery, though it would be easy to fit up a box with glass cover for the purpose; usually the negative has been taken when an unusually pretty frost picture has arrested the attention. The advantage of a method extemporised for the purpose would be that a dark-coloured glass could be used, or even a sheet of ordinary colourless glass backed with a piece of black cloth, which would avoid the only difficulty attending the photographing of such subjects—that of obtaining a dark background where the window pane is awkwardly situated.

FROST pictures are, however, by no means the only beautiful figures drawn in nature's own laboratory, and in the Arts and Crafts Exhibition were exhibited some most singular and beautiful pictures obtained by the vibrations of the human voice upon a semi-fluid paste, spread on an elastic membrane stretched over the mouth of a receiver. A single note, sung steadily and accurately, throws the membrane into waves and curves, which are then immediately photographed. Mrs. Watts, the exhibitor, terms these pictures waves, lines, flowers, trees, ferns, and the effect in transparencies is singularly beautiful. In the "daisy" forms it is stated that the number of petals can be made greater or less by altering the pitch of the note; the higher the note the greater the number of petals. To the practical photographer numerous modes of varying these effects will readily present themselves.

ONE of the most effective cloud scenes we remember to have seen is engraved in *La Nature* of a fortnight ago. It is copied from a photograph taken by M. Jules Jarden in July last, the time chosen being a quarter of an hour after the ascent of a balloon, which occupies the middle of the picture, backed by beautiful examples of cumulus clouds. The writer quotes the description given in *Annales de Science, &c., de Genere* for obtaining successful cloud views. "The blue light of the sky exercising a photographic action almost equal to that of the white reflected from the clouds, it is very difficult to obtain a sharp image of the latter. It can, however, be managed by interposing a Nicol prism in the path of the rays, which is very easy, where they enter the camera after reflection from a black glass mirror suitably placed. The polarised light of the blue can thus be almost completely extinguished, while the natural light of the cloud becomes much more intense. The same result can be obtained by reflecting the image from a sheet of water, as Dr. Burckhardt has observed."

IN an article in *Nature*, over the signature A. M. Clarke, the advantage of photography over eye observations is briefly and succinctly described. She is writing about double stars, and, after showing how, owing to no want of skill in the observers, but simply to the deficiencies both in quantity and quality of the materials at their command, existing data lack a desirable precision, she says:—"This at least is abolished by photography; which has, however, as yet proved applicable only to a limited class of coupled stars. With the

extension of its powers to all, a new era in the knowledge of stellar revolutions may be expected to open.

To speak of revolutions naturally causes the mind to turn in the direction of Brazil, and, according to a leading London paper, the last documents signed by the deposed sovereign Dom Pedro were the diplomas raising to the grade of officers of the Order of the Rose of Brazil several European astronomers, the fame of whose photographic work in particular is spread over the whole civilised world:—Admiral Monchez, M. Janssen, M. Perrotin; while diplomas of knighthood in the Order were given to Mons. Paul and Prosper Henry, and M. Frassenet.

News as late as December the seventh has arrived from Loanda, whither the American and European astronomers are converging, with the purpose of observing and photographing the eclipse of the sun. The Europeans are quickly arriving, Mr. Taylor, of the Royal Astronomical Society, London, being among the first arrivals. Cape Ledo turns out to be a very desirable spot, as the meteorological conditions are likely to be better, and their vessel, the *Pinsacola*, can be used as a dwelling-place; the health of the parties is thus ensured. The eclipse is several seconds longer there than at Maxima, and the chances of clear afternoon skies seem to be rather better. The account very grimly concludes:—"If nothing is heard from the expedition the next few days, it may either be taken that the eclipse expedition is finally located at Cape Ledo, or that the semi-cannibal Quicimas have cleared out the whole expedition."

ON THINGS IN GENERAL.

NO one can doubt the immense impetus given to lantern work by the introduction of dry plates, and during the present season it seems to have arrived at a most exalted pitch,—lantern plates, lantern exhibitions, slide competitions, novelties in mounting, and a multitude of other lantern details taking us by storm. And the truth is, a really good lantern slide is *sui generis*; it is the nearest approach to the days of stereoscopic transparencies. Ah! who that can date back so far does not remember the exquisite productions with the label "Ferrier et Soulier" beneath, the perfection of photography on glass, of mounting, and of backing, the translucency of which, whether of surfaced glass or of matt varnish, surpassed everything of the kind. He must be a good worker who nowadays, with every convenience at hand ready-made, can equal, not to say surpass, those beautiful productions. It is surprising that the ease with which a transparency is now produced has not led to a resuscitation of stereoscopic work, if only to enable this kind of slide to be made; but it is to be feared that stereoscopic photography is dead—really dead. Among other causes, retouching has helped, if not to kill, at any rate, to keep it in its grave; for no retouched photographic portrait would be presentable in a stereoscope, the inevitable difference in the retouching of the two sides of the slide would destroy the effect aimed at. But for lantern work there is still a good future, and interesting, fascinating work for the photographer who takes it up. All the readers of this JOURNAL would be interested in the remarks of Mr. Lewis Wright and Mr. G. R. Baker on the use of electric light in optical lanterns; and, it may be said, referring to the point raised, that where a suitable current is obtainable, the adoption of electric illumination may fairly be looked upon as a question of time only since the introduction of the lamp described by Mr. Lewis Wright. On a large scale, and for large projections, the arc light is naturally the most brilliant; but where, by simply turning on the current, with a suitable resistance, light can be obtained in a lamp and fixtures costing under a sovereign, and requiring no adjusting, and it being constantly in the right position as regards centring when once "set," the cumbersome of bag, and the possible danger of cylinders, will be things of the past at no distant period. It is well for attention to have been drawn to the fact that the electric light is by no means so devoid of heat as is commonly assumed; but Mr. Wright very properly points out that the heat it gives is derived from radiation, and not from heated gases, the product of combustion. Now, I am perfectly certain that the amount of heat radiated from the thread of carbon, elongated, it

is true, but of a most trivial superficial area, is decidedly below that emitted from the illuminated spot of lime of larger area in an oxygen-hydrogen light, and when it is remembered that with lime we have, in popular phraseology, the convected heat from the products of combustion added to its radiated heat, it needs no conjurer to determine where the greatest difficulty in keeping the apparatus cool will lie.

It was interesting to note the remarks of an expert when Mr. Dawson, of the Typographic Etching Company, stated that for their kind of work the use of a yellow screen did not seriously injure definition. It can be readily imagined that any possible injurious action from the use of a screen would depend upon two factors—the characteristics of the subject to be photographed, and the nature of the screen itself. Naturally, the use of an optically worked sheet of plane glass would not distort the image, but the reflections caused by the two surfaces of the glass might become very injurious under some easily imagined conditions. The extent, however, to which a carefully prepared selected film of gelatine will interfere with definition is surprisingly slight, and any one desiring to experiment with orthochromatic plates need not hesitate to use such screens for the most delicate class of work; few instances would occur in which he would be able to make any impairment of the finest detail.

I do not think that the usual practical character of Mr. Warnerke's suggestions was seen in his recommendation to use a lamp with coloured screen for illuminating the subject rather than daylight and a lens screen. If the picture were of any large dimensions, equality of illumination from a single lamp or a pair would be impossible, except with greatly protracted exposure, owing to the distance at which the light would need to be placed.

Mr. Cowan's suggestion at the London and Provincial Photographic Association, that the gum used in working in colours upon a carbon print on opal might be the cause of a portion of a certain film having come away when washed under a tap, is no figment, for I have seen a picture in which large portions of the film had, without any interposition of water, peeled entirely away from the support, owing to the action of the gum, though in this case it was in the darkest tones of the picture that the effect had occurred. It is well to draw the attention of the inexperienced to this possibility, for it is so easy to get effects with gum that are more legitimately obtained by other means.

In "Foreign Notes and News" (November 22) I observe a suggestion for the use of rhodium in combination with gold (in the proportion, about, of four to one) as a toning ingredient. I see no reason why it should not be useful, and as it is only about fifty per cent. dearer than gold, no great additional cost would accompany the experiment. Platinum has its advocates, and it may be that rhodium will exhibit some point of excellence: at present gold "holds the field."

When a professional photographer of the eminence of Mr. Groves writes on the subject of a real grievance, his words deserve attention. There cannot be two opinions upon the fact that his letter points to a crying evil—an evil, unfortunately, that it is far more easy to indicate than to describe a cause for. That there are jealousies in all trades and professions goes without saying; but photographers experience its effects with the greatest force, and to such an extent as to make any one despair of concerted action. Again, no line can be drawn to separate the first class from the second, the second from the third, and so on, down to the hundredth degree; and those jackals who thrive upon profits obtained only by cutting prices are the very men who would cut in and announce unlimited re-sittings, or even no pay unless proofs please. Notwithstanding the pessimistic view I express, I should be heartily pleased to see some action started to put an end to a system that is at once costly, wasteful of time, and vexatious in the highest degree. FREE LANCE.

COLOURED PHOTOGRAPHS.

XVI.

In our last paper we completed, I hope successfully, our *first painting* of a portrait. I think also that, sensibly thought out, it may be conceded that what we did in the case of a *legitimate sketch* we could also do if set to work upon a *photographic base*. Thus far then we

may be considered to have produced a work of art. We can now take up our sketch or photograph and proceed with our second painting.

We may commence our second painting by working in the shadow on the forehead with Indian red, being careful at same time to adhere strictly to the natural form. Then we must put in the dark shadow formed by the socket of the eye with a suitable shadow tint, such as may be made by a judicious mixture or blending of Indian red and cobalt. On the extreme edges of all these shadows we will find it advisable to work with a little pure cobalt, being most careful to accurately preserve the strict form of the shadows. The edge of the upper eyelid we may mark in with Indian red.

We may regard it as a general rule, that we must represent the edges of all shadows with a grey. It is not a fancy that dictates this rule, but nature herself. If we have any doubts on this point we can very easily put our minds at rest. Let us place a pencil or other article on a sheet of white paper and I am certain you will have no difficulty in remarking the grey edge which will bound the dark shadow. By artificial light this peculiar grey edge is not quite so perceptible, but by daylight it is palpable to a degree.

The next point in our work is to paint in the colour on the cheeks, this we do with a tint composed of pink madder and a little vermillion. We must be careful in doing this to preserve with truthfulness the various gradations of colour, and light as well, on the cheek bones. Stipple the edges of this colour as you approach the nose, and also spread the colour well up to the temple. Diffuse the colour well over the cheek towards the ear, and put a little on the chin as well. It will be found now that many of the shadows will not appear as deep as they did before we started this work; we must now deepen these extreme shadows until they have regained their natural and necessary depth and power.

It will be found advisable now to hatch over the shaded portion of the forehead with blue or a bluish grey. This grey must become bluer as it approaches the extreme or retiring edge. Sometimes it will be found necessary to carry this bluish grey down the nose, and where it appears so, do not hesitate to do it. The mere fact that the shading of the forehead was carried out by placing the red shades first, and the blue or grey second, may not have struck the reader as a matter of any importance. But it is, on the contrary, a most important fact, and necessary to the production of a really good work. It may seem a matter of indifference whether we start with red and finish with blue, or start with blue and finish with red; but such is not the case, and the reasons are obvious if we only think for a moment over it. It will be found in practice, if we place the red shadows *first*, the application of the blue afterwards will result in a bright and clean effect; whereas, if we reverse the application of the tints, that is, place the blues first and then the reds in the second place, the result will be dirty and thoroughly unworthy of being classed as artistic work. If you desire to study a glorious example, look up the works of Rubens, and you will see that he works in accordance with these principles.

We can next work a cool green over the socket of the eye, the best method of applying the colour being to *stipple* it on rather than to hatch it. A good tint for this purpose may be made from a judicious mixture of cobalt and Indian yellow. The shadow at the edge of the lower jaw should have blue worked over it, and care should be taken to observe the true form and depth of tint. It will be found necessary to paint in the bluish shadows on the temples. Make it a rule to soften the edges of all shadows, no matter where found, by stippling upon them.

It will be found, as we progress with our work, that some, if not a number, of white spots seem to have been left. Need I say these must be filled, and with their proper colour? If we do not pay attention as we go along, these white spots will appear in anything but pleasant numbers. We should therefore look out for them from time to time as our work goes ahead, and then fill them up. It sometimes happens that the hatching has a rather unpleasant appearance, looking, if I may so put it, somewhat wiry. This is an unfortunate effect, but we can remedy it by washing it several times with a clean brush dipped in water. This treatment will tend to blend the colours and produce softness. Another effect is that our work may turn out too heavy and dark. To cure this, take a clean brush dipped in water *only* (without colour), and proceed to hatch the work generally, then, with an old, soft handkerchief, remove the loosened colour by rubbing gently.

Of course this latter portion will not very easily apply to a photographic base, but it can be made to do so if necessary. It must, however, be borne in mind that the *white spots* in question will seldom or never appear on a photographic base.

Having got this far, it will be time we thought about our backgrounds.

This is necessary because the depth and colour to be given to the face and hair is, to a very considerable extent, influenced, if not absolutely determined, by it. The effect of the white paper round the head is very misleading, and prevents us from forming a just and true estimate of the colours already laid on. For example, the white must necessarily make all the colours appear much darker than they really are, by contrast. This being so, let us work in a dark background; and what will be the result? why, these very flesh tints which before, by contrast with the white, appeared dark enough, if not too dark, will now seem pale in comparison with the background. As I intend taking the treatment of backgrounds a little later, I will not say much more about them now. I only wish it to be understood that now is the time to indicate our background, as we cannot really go on without doing so. I may, however, suggest that a very agreeable greenish background may be painted in by using either indigo and burnt sienna, indigo and sepia, or indigo and Vandyke brown. The best way to start a background is to apply the colour in washes indicating the various gradations of light and shade by a lighter or deeper shade of colour. It will be found advisable, as a rule, to keep the surface as flat as possible, and this effect is secured by a series of touches which are a kind of "cross" between hatching and washing. This portion of the work should be broad, generally becoming somewhat finer as it approaches the face. We may now, also, wash over the dress, and if there be any linen about the picture we should put in the shadows with a tint composed of cobalt and sepia.

We can now, with advantage, hatch in a light tint of blue over the lower and retiring portion of the cheek, indicate the bluish shadow below and at the corner of the lower lip, but do not fail to keep its form perfectly defined. We can proceed with this until we have gradually united it with the bluish shade of the jaw. Under the nose we must work a bluish tint, and also a little of our shadow colour on the wing of the nostril. Then soften as much as possible the edge of the chin, and make it round with the shadow colour.

There is generally a reflected light under the chin, which must be represented by a warm colour, such as a tint of Venetian red and Indian yellow would produce. Many look upon this as the flesh colour. A little of this colour should be worked into the dark shadows in the sockets of the eyes. The shadow side of the eye should be softened with shadow colour; then finish the lips by stippling them with pink madder and vermilion, observing that the brightest point should be that nearest to us. Indeed, the principal portion of the work at this stage of our painting may be said to consist of softening the tints by working upon their edges.

This may be said to represent the second painting, as far as the flesh is concerned. We can now proceed with the hair, strengthening the deepest shades with sepia. Painting hair is anything but easy. Its chief difficulty lies more in the *drawing* than in the *colouring*, for I do not think I am wrong in so designating the series of touches which represent the form and flow of the hair. To paint hair successfully will require much care and practice on the part of the art student.

To paint brown hair, use Vandyke brown and sepia for the local tint, and with a firm touch work in the deepest shadows. The really deepest shadows we have already marked in when securing the outline, but we must keep on repeating our touches with this tint until we have secured every gradation from high light to deepest shadow. Even the highest lights must be tinted with a series of light touches which will more or less truthfully represent hair, regardless for the present of the bluish tint always perceptible on or near the lights. Whatever high lights may be deemed necessary must be afterwards taken out. Should the local colour not be sufficiently warm, apply the flesh tint composed as before laid down.

Should we have to paint dark or black hair, the mode of working is the same, but the colour used is sepia by itself, and for the extreme shadows add a little warm black, such as would result from mixing sepia, lake, and indigo. Bear in mind that in black hair the lights are cold and bluish, and that there is a warm tint always between the extremes of light and shade.

For flaxen hair the treatment is the same, beginning as before with sepia, but of a proper degree of strength. The next darkest tints paint with Vandyke brown with or without sepia, then use the flesh colour. For the local colour use yellow ochre, or a tint formed of Indian yellow and Venetian red. The latter is naturally preferable, owing to its greater transparency, but the former has its *solidity* to recommend it. The high lights of flaxen hair are yellow, and between the lights and shadows there is a cool, grey tint. It is usual to take out the high lights of hair afterwards, the various tints being quite dry after being applied as described.

It is advisable to always introduce shadows or grey tints between the hair and the flesh, with the object of avoiding that hardness which would otherwise exist, also to soften the hair where it meets

the background, as, failing this, the head would look as though it were inland.

On the shaded side of the neck the colour to be used is a tint composed of Indian red and blue, on the light side blue alone will suffice. The greenish tint on the neck is obtained by hatching the flesh colour over the blue. In like manner treat the arms and hands, using, however, Indian red alone for the first tints, and applied in the same manner as we did to the forehead. We can then work over them with blue when necessary, but taking care not to miss the reflected lights, which are always of a warm tone.

To paint the divisions between the fingers use pink madder and brown madder. Observation will show that the tips of the fingers, the knuckles, and outside of the hands, are more rosy than other parts, and must be hatched with the carnation tint composed of madder and vermilion.

Now if we give a general wash over the *white linen*, if any, with a middle tint, regardless of any high lights, which we can take out afterwards, we will have completed our second painting. If we wash a local colour over the drapery, leaving the high lights for after treatment, we may consider our labours done, and look confidently to our third painting to complete our work of art.

If we thoroughly consider the foregoing we will find but little difficulty in applying all the directions for the production of a portrait in legitimate water colour to the treatment of a photograph. We have only to use our sense as we go along. The image on the photographic base, naturally, has a full and detailed outline, strongly marked in a more or less forcible tint; therefore, it would be foolish on our part to put in the shadows and other markings as we should upon a sketch. The reason for this is obvious; they are already provided by the photograph, and only require our help in imparting the local and natural colours. As a fact, almost all the directions are applicable, only in a modified form, and in a slightly altered rotation. Then we must be prepared to further modify our treatment according to the surface of the photographic base upon which we work. On albumenised and kindred papers all washes should come first, as it would be very risky, if really possible, to give a wash after having stippled or otherwise worked upon it. The probabilities are it would "lick up" and preclude any chance of producing a good picture. In working backgrounds we should not depend upon *picking out* or washing out the lights afterwards, but secure them at first and proceed to deepen our shadows. We may wash out a light, in cases, but, as I suggest, it will be advisable not to depend upon this mode of working, as its complete success is doubtful. I do not think there is anything else I can say regarding the second painting; and we may now look forward to our finishing or third painting, and one or two details, to complete our present undertaking.

REDMOND BARRETT.

REDEVELOPMENT: AN EXPERIENCE.

EVERY one is aware that the conversion of the metallic image that forms the negative deposit of a gelatine plate into silver oxalate or chloride is sometimes desirable, and that it is to be accomplished without much trouble, thereby some scope for influencing both the quantitative and qualitative character of the picture is revealed; as, for example, in the reduction of excessive density, and in the removal, or at least the partial abatement, of various kinds of fog—local, superficial, physical.

The application of a solution of ferric oxalate, or of a body having in its combination several equivalents of chlorine are two of the more widely known means for effecting the conversion, or, in the phrase commonly employed, the bleaching of the image. Precisely proportionate to the extent to which the reaction is allowed to proceed will be the dissolution of the silver salt by the hyposulphite. It is consequently to be perceived that by the play of a little caution and intelligence we hold the means of dispensing with whatever thickness of metallic layer—whether it take the form of general coloured fog, local fog splashes, or too great density of image—which it appears to us advisable to get rid of so that the negative shall have its maximum printing value, or be otherwise improved.

Within the field just indicated are gathered several other methods of reduction possessing features of general similarity. The main principle of nearly all the best known and effective of them does not depart from that already sketched. A particular exception, however, furnishes an opportunity for modifying that principle so as virtually to set up an alternative system of reduction. This consists of converting not merely the surface of the deposit, but, as far as is practicable, the whole of it into chloride or other soluble salt, and then carefully redeveloping up to the required degree of intensity.

While to some minds this last plan will have a resemblance to the Chinese formula for roasting pork, due reflection will, no doubt, suffice to bring home to the generality that where universal reduction of density is sought the operation has to be well watched, and that this *desideratum* is completely met by slow redevelopment.

It is not my present design further to dilate upon reducing formulae and their uses: the subject is one upon which a very great amount of valuable knowledge prevails, of which an increase is beyond my achievement. I propose briefly and tentatively to deal with the principles of redevelopment from a standpoint at the true antipodes of that from which they are usually regarded. It is, of course, almost unnecessary to remark that the photographic image, negative and positive, may be "converted" for a variety of ultimate purposes with which we are not on the present occasion concerned.

In the course of some recent endeavours to reduce by the method last detailed several negatives which erred not largely on the side of excessive density, a paradoxical phenomenon, or what was regarded as such, manifested itself. The "bleaching" solution used was cupric chloride. Upon the completion of redevelopment, the deposit, in contradistinction to what was expected, appeared to have made a sensible, but of course not great, gain upon its original opacity.

In attempting to trace this remarkable failure to its source, it occurred to me to try and ascertain if the seeming enhancement of opacity was or was not illusory, and, if not, whether the effect was obtainable deliberately. In pursuance of this determination the halves of a number of negatives were bleached and redeveloped. At first the results by no means appeared to confirm the "intensifying" property of redevelopment; but by repeated efforts, together with certain modifications in the developing solution, some show of success was at length had, and an apparent increase of density obtained, as was evidenced by a comparison of the redeveloped halves with the halves that had not been so treated. The developer successfully employed consisted of, in each ounce, hydroquinone, five grains; potassium meta-bisulphite, five grains; sodium carbonate, ten grains. My inference was that if to a bleached image there is applied a developer strong in reducing agent, poor in alkali, and relatively free of restraining substances, there is produced the equivalent of a serviceable increase of printing density.

It is reasonable that to an unqualified use of the word "density" in this regard, demur may be made without scruple, inasmuch as it would appear to imply that by redevelopment an additional layer of negative deposit is to be had. That, of course, could not be. If I were asked to suggest an explanation of the increased opacity, I should seek refuge in some such opinion as this: The physical consistence of the deposit undergoes alteration, inasmuch as the conversion into chloride being (presumably) not quite thorough, an exceedingly thin layer of unconverted metal remains beneath, upon which fresh metal is thrown in a state of coarse division caused by the vigorous action of the developing solution. Juxtaposition of the thin homogeneous layer with the rougher "top dressing" produces an apparent thickening and an appreciable diminution of translucency.

To suggest that if a thin image be converted to soluble silver chloride and treated with a developer an increase of printing density is to be secured at will involves a serious proposition, of which I am not yet eager to accept the responsibility. Moreover, at the first blush redevelopment in pursuit of opacity looks, I must own, uncommonly like the exercise known as progression in a circle—a perpetual return to the original starting-point, in fact. But if we agree that the action of the developing solution, in all its variations, upon (1) the invisible impression in gelatino-bromide, and (2) upon the "converted" negative, is of practical equality and similarity, a small counter argument is at once supplied to us. In case (1), with an exposure approximately correct, it is easy to construct an "image" of any density in the scale, varying from absolute opacity to almost perfect transparency, simply by the use, or misuse, of the developing agents; in the other (2) the image is rebuilt in absolute sympathy with the restrained constructive force contained in the developer. The parallel is obviously not complete at either end; and, although not indifferent to the mass of theory and practice opposed to it, in an attempt to bring the latter points opposite to each other I would choose to revert to a former speculation, and ascribe to the developing solution, when composed in the manner mentioned, or some such similar, the "roughening" action referred to, as the equivalent of the extremity of opacity produced in cases (1) and (2) alike.

But, to step on to more substantial ground than that of pure theory, I was unable always to get an increase of opacity, even with what I considered and found to be the best plan of redevelopment. The failures far outnumbered the successes; in fact, the latter were comparatively few, and were obtained under conditions that best favour intensification, namely, where, although the negative is ob-

viously lacking in printing density, there is yet a deposit sufficient to afford a "foothold" for the combining or displacing bodies. Radically thin negatives that would have been useless for intensification were no good for redevelopment purposes.

Could we establish the certainty that by any method of redevelopment a graduated scale of printing density was to be imparted to the negative at will, the far from satisfactory operation of intensification would stand a fair chance of being materially simplified.

I have sought in the preceding sentences to avoid the dogmatic manner, inasmuch as I should find it difficult to maintain the proposition that the "intensifying" property of redevelopment is anything but a curious and isolated phenomenon. Perhaps, however, others may be in a position to exhibit confidence in its constancy, and can refer it to definite and intelligible causes? THOMAS BEDDING.

MUYBRIDGE AT THE LONDON INSTITUTION.

On entering the hall, the first thing that attracted attention was the apparatus which was to illustrate the lecture. There was an ordinary biunial lantern, and a lantern of rather novel construction. The body was elevated on brass pillars about eight inches high, and a lens was supported about three inches from the front by a single pillar fixed in the top left-hand corner. A box sliding in runners containing gear wheels, and provided with a boss to which the various discs were to be fixed, was in front of the camera, and the top of the discs, when in position, were between the lens and condenser.

Professor Muybridge was punctual, and during a few preliminary remarks the lanterns were lit, one giving a little pop in the process, which disconcerted a few good people close by, who had been previously regarding the cylinders, the bright red one in particular, with a little uneasiness; but the pop not developing to anything greater, confidence was restored on the first picture being projected on to the screen. This was a sketch of reindeer, made by primitive man. Professor Muybridge explained that this was remarkable for its correctness in showing the walk of the deer, and he referred to it again later after he had shown a number of his own results.

Following on this, a description of the apparatus used in the investigations on animal motion was entered into. The battery of cameras consists of a long box divided into twelve or twenty-four parts, with a lens to each division. Plate holders are arranged at the back, and in front of the lenses in the exposing apparatus.

Each lens has its own shutter, an endless curtain on rollers. The shutters are liberated in turn by electricity. A commutator divided into twenty-four segments, with a brush bearing upon it, is used to send a current to the cameras in turn by wires connecting the different segments with the shutters. The brush is rotated by clockwork, regulated by a fan similar to that used in musical boxes. The rate at which the brush moves determines the interval between the exposures of the different cameras. The speed of the shutters is altered independently of this arrangement, electricity being used merely to release the shutters.

A track is specially arranged for the animals to traverse, and parallel to this a long battery of twenty-four cameras is arranged, so as to take the animal broadside on. Of these, twelve are found to be a sufficient number for most purposes. A second battery of twelve is placed at right angles to the first, to take a back view of the animal, and a third battery at 45° to the first takes the animal on the right shoulder. The shutters on these cameras work simultaneously, the corresponding camera, say No. 1 of each battery, is exposing at the same moment; it is found that the difference in working between the same cameras in the three batteries does not exceed $\frac{1}{17}$ part of a second. A chronograph is provided to register accurately the intervals of exposure, and the period of one phase in the animal's progression.

After describing the apparatus, Professor Muybridge showed a series of results obtained with it. The first slide showed twelve positions taken in each of the three batteries simultaneously, illustrating a horse walking; then followed a number of pictures of different animals walking—horses, a camel, mastiff, cat, lion, tiger, coon (which, by-the-by, was walking along a pole as a fly does on the ceiling), buffalo, cow, goat, hog, sloth, and, lastly, a child crawling. These all follow the same law, as does every other animal but the ape—according to Professor Muybridge's observations—in the placing of the feet in walking. The universal law is this: the laterals on one side will be close together, while the others are extended in front and behind. Now the ape, walking on all fours, has the *diagonals* together, and the other diagonals extended in front and behind.

Now, the explanation of this is fairly simple, and struck me as being possible at the time; but this morning I have been crawling round the room, and find that I am quite correct. The child was crawling on

hands and knees, and in thus crawling it follows the universal law; but the ape was walking on hands and feet. Now, if the child was to walk on hands and feet it will be found to progress as does the ape. The ape cannot, on account of its build, walk on hands and feet conveniently without transgressing the universal law, neither can the man for the same reason, namely, the arms being shorter than the legs; but if any one will take two short sticks in hand, so as to make the arms equal in length to the legs, he will at once, walking on all fours, follow the law as he did when shortening his legs to bring them to about the same length as his arms. I have no doubt but that the ape would walk in precisely the same manner under the same conditions. So the ape can hardly be said to be an exception to the law in walking, as under the same conditions—*i.e.*, with four legs of approximately the same length—he walks in the same manner.

After the explanation of this law the reindeer of primitive man again appeared, and be it said to the honour of our ancient forefathers that they were perfectly correct in representing a quadruped's walk, while many artists of the present day, who certainly should have had greater facilities of observation, have left works of art c' with glaring incorrectnesses.

There is one picture in the Louvre, a famous one, of a team of six oxen ploughing. In this picture six different ways of walking are portrayed, one of which, however, is correct.

Miss Thompson's picture, the *Roll-call*, shows a horse walking in the correct attitude. Miss Thompson was laughed at by both artists and critics alike, as also was Meissonnier for committing a similar crime.

Horses trotting have all the feet off the ground at one period; this Professor Muybridge has proved to the edification of certain great lights of the turf, who maintained that a trotting horse had always one foot on the ground.

The most absurd error that has been perpetrated in the history of art is the common representation of a horse galloping. The impression usually given by observing a horse galloping is that it has all its feet drawn up under the body, but in paintings it is almost always depicted as having all four legs fully extended in such a manner as to offer no support to the body, and to preclude any possibility of its drawing up its feet in time to prevent its crashing to the ground. One picture of the Derby, which is well known, shows ten horses all with legs fully, nay, more than fully, extended. This picture is, perhaps, the most supremely absurd effort of the imagination ever committed to canvas. Fancy the remarkable coincidence of ten horses racing together, and being at the same moment all in the same position, and that position an impossible one! At one period of the gallop the feet are all drawn together, so one wonders how the popular error has come about. When the back legs are flung out behind, the fore legs are close to, if not touching, the ground, and form, with the ground, an almost equilateral triangle. A sketch, most crude, by North American Indians, on horn, representing horses galloping, shows the legs correctly drawn together under the body.

A dog galloping exhibits the fully extended position imputed to the horse. Professor Muybridge thinks that all animals which can outstrip the horse for speed assume this position, but it is only possible with animals having great strength in the back.

A horse galloping—this is a curious fact—always has the nose vertically above the centre of the pastern joint of the foremost leg, and this is the case no matter what point of view the observer sees it from. Several famous paintings show how this point was unobserved by the artists.

With one picture on the screen, of a horse galloping, Professor Muybridge offered an apology for the indistinctness of a forefoot passing through the air; but in place of receiving his apology with grim silence, we greeted it with applause when he told us that the horse was travelling at the rate of one mile in one minute forty-two seconds, and that the forefoot must have been moving 150 feet per second; and calculating from the extent of the blur, the exposure given to the plate comes out at $\frac{1}{1000}$ second. The lenses used, it may be well to mention here, were specially made for these experiments, and have an aperture, if I remember right, of $f/2.5$.

Representations of a horse jumping are usually correct, as there is a hesitation or slackening of speed just as the jump is accomplished, thus rendering observation fairly easy; but in landing the horse always brings his forefeet to the ground first: this would seem only natural, but there have been various opinions even on this point. The pictures of the horse jumping shown on the screen were, I think, some of the clearest results from the rapidly exposed negatives. They were excellent.

Some of the most amusing pictures were of a mule. Professor Muybridge said that this mule was the best kicker he could get hold of, and called attention to the barometer which a mule always carries

with him, and which gives certain indications when calms might be expected and when squalls are imminent. This infallible barometer is the animal's caudal appendage, but, unlike our weather barometers, it rises when storms approach. It certainly was a very fine kicker, and might have left an impression of his hoofs on the face of the Russian giant, if that being had been in the vicinity.

There is one conventional method of representing birds flying which is adopted by most artists, viz., with the wings extended upwards. Why this should be is strange; of course, it is the most artistic way to us now that we are accustomed to it, and any other position would look strange and unreal, but I, for one, greatly admire the variety and artistic taste of the Japanese, whose efforts in the representation of birds flying are now proved to be almost entirely correct. In this point, as well as in others, we are decidedly behind the Japanese in art. The pictures of a white cockatoo shown by Professor Muybridge were most remarkable; the most striking position of the wings is when they are just finishing the downward stroke, a position the Japanese are very fond of, and in which the Egyptians always represented the sacred hawk. Just as the downward stroke is finished, it is an interesting fact that the feathers rotate simultaneously, and present only the edge to the resisting air until the upward stroke is finished, when they overlap again to give the fullest effect to the downward stroke.

A number of pictures of *humans* were shown performing all kinds of actions. A woman emptying a pail of water was splendid, the water being clear and distinct in its different positions on its way from the pail to the ground.

A girl walking down steps carrying a breakfast cup and saucer was very good, and if it had been the work of an artist would have called forth loud praises from critics. But the prettiest of all was a series of pictures of a little girl picking up a doll which she had been told she might keep if she fetched it from the track, and carrying it off in triumph. The expressions of the face were splendid: the uncertainty of the youngster as she approached the doll, the pleasure with which she picked it up, the glance round to see if all was right, and the happiest smile as she prepared to run back to her mother.

I have not said much at present about the "zoopraxiscope," as a connected description is better than a remark here and there. I have described the lantern and the general arrangements.

A glass disc, about fifteen inches in diameter, fixed to the boss, has the pictures arranged in order near the edge. These are reduced from the negatives, and in most cases painted black, so as to give simple silhouettes. By this means the effect of the change of position in each picture is more marked. In front of this is placed a zinc disc with radial slots—one slot in excess of the number of pictures on the glass disc. The extra slot gives a forward motion to the animals across the screen. The discs are rotated at the same speed in opposite directions, and the figures rapidly following each other appear on the screen as a continued movement of the animal. It is not merely a picture of one animal that careers across the screen, but a number following close behind one another, and all performing the same action. So, to get the full effect of the different phases of the motion, it is necessary to "fix" one as it comes on the screen and follow it across; the effect is very fine and of course perfectly natural. We had horses walking, trotting, cantering, galloping, and jumping, with long flowing tails waving behind in the most lively manner, while the rider of the galloping horse flourished his whip with every sign of urging the animal to its utmost. A dog tore across the screen at full speed, and we could see how much the back helped in the work. Then an acrobat turned summersaults on the back of a galloping horse, his arms swinging backwards and forwards as he got up steam just before his leap. And finally a hawk flew over the screen, showing the whole of the most interesting motion of flight, even to the turning of the feathers when the discs moved slowly.

W. P. ADAMS.

CONCURRENT DEVELOPMENT AND FIXATION.

[A Communication to the Photographic Club.]

You will remember that at our last meeting Mr. Davis stated that a friend of his had witnessed the development and fixation of a bromide of silver gelatine plate in one single solution. There seemed to be no one present who had any knowledge of this matter, and to be left as a question needing investigation.

I have no doubt that most of us then present were of the opinion that if such concurrent development and fixation were possible, that it would possess very little practical value, and to that opinion I still hold, though I have subsequently proved that it may easily be done.

Last Friday evening I was thinking over the problem, and it

occurred to me that I had the means at hand by which it could be accomplished. It was our friend Mr. Wellington's redeveloper that seemed to promise to be the very solution to answer the purpose, for it contains *two* fixing agents and a pyro developer.

I have already spoken here of a slight modification of mine of this method of intensification, which somewhat simplifies the operation. I take first a solution of nitrate of silver, 100 grains to five ounces of water; second, 240 grains of ammonium sulphocyanide to five ounces of water; and, third, 240 grains of hyposulphite of soda to five ounces of water. These can be kept separately any length of time, so far as my experience during the present year allows me to judge. To re-develop an already developed and fixed plate, either gelatine or collodion, take a drachm of each solution and place into one measure in the above order, and add thereto twenty minims of a ten per cent. solution of pyro (say sulpho-pyrogallol), and twenty minims of a twenty per cent. solution of ammonia. This may be poured on and off the plate as in the old days, a little glycerine making the adhesion to the plate more complete.

Now, in regard to the concurrent developing and fixing, I thought I should attain the object more certainly if I added a larger proportion of ammonia pyro in the first instance, so as to start the development before the fixing agents could have time to act, so as to reduce the part which had received the image. I therefore took a drachm of each of the five solutions, and added enough water to make it cover a quarter-plate. Taking the first negative which came to hand, a weak one as you may judge by the positive, I exposed it thirty seconds and put it into the solution. It did not develop as rapidly as usual, and the fixation was somewhat prolonged on account of the weakness of the fixing portion of the solution. There was an appearance of fog, which was due in some measure to the thinness of the negative, and a considerable amount of non-adherent silver was thrown down on the plate and the dish, which I sponged away. To test if the image was really fixed, the plate was partially immersed for some time in hypo, which had no further effect. This plate is marked No. 1.

The next experiment was to see if the development would take place when the pyro ammonia was added to the fixing agents without the presence of the silver nitrate. The silver was omitted, and the plate soon became quite clear glass without the trace of an image. It thus seems that this method of development demands silver in the developer, in a manner analogous to that known to all collodion workers in all processes where the alkaline system was not used. It will be seen also that by the dissolution of the bromide of silver by the fixing agents, the solution becomes somewhat like Mr. Howard Farmer's intensifier, and development goes on after the fixation has been effected, as, indeed, might have been anticipated from the known use of the solution as a redeveloper.

The second example was treated in the same manner as the first, except that it was exposed half the time, and was not developed so long, and is therefore thinner, though it is probable that a longer immersion would have given greater density.

I regard this as simply a photographic curiosity, for I cannot detect anything in the process that promises improvement upon previous methods; indeed, it seems to point the other way, for the time of developing is considerably increased, and I should say that the separate solutions would do the work in a shorter time. Those who have time and taste for experimenting will doubtless find the matter interesting, and we may yet hear more of it. W. D. RICHMOND.

CAMERA CLUB.—REJLANDER'S PICTURES.

On Monday last, December 16, the Camera Club opened the fifth of its series of "One Man" Exhibitions, the pictures shown being a collection of the work of the late Mr. O. G. Rejlander.

Mr. Francis Cobb opened the Exhibition, drawing attention to the distinctive feature of Rejlander's career, that he was the first in photography to see and prove some of the higher possibilities of the camera as applied with an artistic aim to portraiture and figure subjects. He also alluded to the amiable personal character of the artist, his training as a painter, his devotion to, and faith in, photography, and at the same time his readiness to admit its limitations. In referring to the pictures in the room, Mr. Cobb mentioned specially *The Two Ways of Life*, an elaborate attempt to illustrate pictorially the opposite courses of virtue and vice. In this photograph, he stated, over fifty negatives were said to be combined.

Of the other work, perhaps the most notable are the clever humorous subjects which are well known to photographers and the public. *Gin's Baby*; *She is looking at me, the dear Creature! Catching—Caught! Cats caught by Rejlander*; *Did She? I don't know*; and others. Amongst other

interesting photographs are *Dr Brown and his Dog* (Rab and his friends), and portraits of Tennyson and Doré.

Also the strange attempt to depict by photography such subjects as *John the Baptist's Head in a Charger*, and *A Vision from Aspromonte*. (Rejlander posed himself as Garibaldi in several photographs.) Perhaps the most completely satisfactory of the pictures are those in which Rejlander devoted himself to representing incidents of street-arab life. In these bits of humorous characterisation, he showed himself a master as regards infusing his idea into his models and securing natural and spirited expression of the subject. *Adding Insult to Injury*; *Is it a good 'un, Jem?* and the pathetic figure of the little waif huddled up on the steps, are especially effective.

After the opening of the Exhibition (which will continue for about six weeks, and is open to visitors on presentation of card), an exhibition of very fine lantern slides was given upon the Club screen.

NOTES FROM NEWCASTLE.

The Cycling Club in connexion with Messrs. Armstrong, Mitchell, & Co.'s works at Elswick, purpose, I hear, going in heavily for photography next season. The majority will be provided with small, specially made cameras, and runs are to be organized for the purpose of photographing bits here and there. As the Club numbers some 350 members, this should mean a considerable influx of amateurs to the present well-filled ranks.

I strolled through our well-known Dene at Jesmond the other day; the sun was shining, and the trees, though destitute of leaf, looked very charming. I passed altogether six cameramen, which proves that our enthusiasm does not cool with the time of year.

I don't hear much of the doings of the Y.M.C.A. Photographic Club, but I hope they are pegging away. The removal of Mr. Weeks, the late Secretary, was a less no doubt, but should not be quite irreparable.

The premier local Society held their usual monthly meeting on Tuesday, the 10th instant. I hear that the President, Vice-Presidents, Hon. Secretary and Treasurer, and most of the members of Committee were re-elected, or rather, to be more exact, no new blood was nominated. A change of Executive is not necessary nor desirable, but I must confess I would like to see some more ambitious members put on the Council. A very large collection of "snap-shot" pictures were distributed over the tables, the results of various competitions get up by one or other of the newer photographic journals; and, generally speaking, the pictures were very good. An assortment of lantern slides was then shown on the screen, to the satisfaction and enjoyment of all present. Mr. Hedley Robinson, a past master in these matters, manipulated the lantern with his usual success. Mr. Robinson is also an expert slide maker by the collodion method—he succeeds in getting admirable density and colour.

The Society has at last screwed up its courage to the necessary pitch, and it is decided to hold an exhibition of photographs in April of 1890. A good working Committee has been appointed to carry out the arrangements. I hope to have further details shortly, but it is, I am assured, definitely settled that the exhibition will be opened on April 18 with a *conversazione*. This date will allow ample time for the removal of frames from the Crystal Palace Exhibition, from which it is hoped the Newcastle show will be largely supplied. The *locale* of the exhibition will be the Central Exchange Art Gallery, which is a handsome structure (to quote Tomlinson) at the upper part of Grainger and Grey Street, "built after a model of the Corinthian Temple of Vesta, at Tivoli; the interior is a noble semi-circular area of 11,000 feet, and is used as an art gallery and reading room." This is one of the most central and popular resorts in Newcastle, the entertainments being of a high-class character. The Committee are fortunate in coming so soon to terms with the lessees, Messrs. Barkas & Son. There will be ample space here, and I hear that arrangements will be made so that an exhibitor may, if he chooses, have a screen to himself; this will, in a great measure, prevent the "scattering" so annoying at most exhibitions. D. D.

NOTES UPON A PROPOSED PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.

[A Communication to the Birmingham Photographic Society.]

My subject may be considered as an extension of a paper which I read before the Birmingham Photographic Society in June, 1885, on *The Work of a Local Photographic Society*. Permit me to quote two paragraphs from that paper:—

"Within the last few years photography has made a new departure. The introduction of gelatine dry plates and films has made the process so clear, and—by comparison—so easy, that photographers have multiplied a hundredfold. Oh! that we could bring back Daguerre with his costly silver plates which required such tremendous polishing, Fox Talbot with his calotypes, and Scott Archer with his wet collodion plates, silver bath, and travelling tent, which made the landscape photographer's life a burden to him, and show them our light and complete equipment, with which a man may travel round the world and leave if he pleases, his pictures to be developed by his grandchildren, with

be derived from the Celtic *Gaur*, a fortified place, and *Wicci*, the tribe by which that high mound, which at Warwick overlooks the Avon, was raised and defended.

W. JEROME HARRISON.

(To be continued.)

PHOTOGRAPHIC FANCIES IN NEW YORK.

A NEW YORK correspondent of the *Boston Sunday Herald* writes:—It shall no longer be said that woman's brain is not inventive. I hereby provide the disproof, and my original devices are in the line of amateur photography. There is hardly a fashionable house in New York where we fail to meet the young man who, without a word of warning, helps himself to an instantaneous portrait of us; and we cannot spend an evening with a friend but that the mistress announces to us, in the tone of a Lucretia Borgia, "Ladies and gentlemen, you have all been photographed." Resistance would be useless, and whatever may be our disinclination to see ourselves reproduced with a sincerity too often unflattering, the best thing to be done is to let it pass with a smile, for a grimace might only aggravate the condition of the victims. The progress of amateur photography has been rapid, and my inventions seek to utilise it. I have planned a photographic revolver—an instantaneous apparatus whose name indicates its form. It suffices to press the trigger on sighting a person in order to obtain an instantaneous portrait. I consider it useless to enumerate the advantages which this weapon has for a revival of duelling. Very soon we may read such items as this: "In consequence of a difference of opinion between Mr. X. and Mr. Z., a meeting was agreed upon. The weapon chosen was the photographic revolver. Two portraits were exchanged without fatal results." I also propose a photographic shot-gun, which will bring the sport of hunting within reach of the members of the Society for the Prevention of Cruelty to Animals. Naturally, the mere existence of the beast's portrait on the plate will show that the shot has reached the mark, and the sportsman's vanity—which is the real source of the love of hunting—will be satisfied without the shedding of blood. In case of the fish-line, one can simply replace the flies or angle-worms by a tiny camera, which the jerking of the fish will bring into action. The portraits thus obtained will have the advantage of preserving their freshness much longer than the original, even in the hottest weather.

Undoubtedly the instantaneous camera will show equally important adaptations to the needs of city life. The photographic piano, which takes a picture every five minutes of the guests surrounding it, will cause a *furor* in society this winter. In the supper room a photographic register, usually concealed at the base of an *epergne*, will permit the host to see if thirsty guests abuse their privileges. It is always a good idea for the mistress of the house to have some information on this subject. People of celebrity are always a prey to the amateur photographer, and in the hope of abridging their sufferings I project an ingenious apparatus which, while photographing the subject, writes at the foot of the card a flattering inscription. I should also mention the millinery camera, which takes the picture of every person to whom the wearer of a hat or bonnet bows. On going home it is sufficient to compare with one's album the proofs there obtained in order to recall the people whom one has met. This is very valuable to those who have many acquaintances and a short memory.

MISS LOOKABOUT.

Foreign Notes and News.

THE American laes, "zapon" and "brassoline," have been recently subjected to a good deal of experiment by Max Jaffé (*Photographische Correspondenz*). In order to test the capacity of resistance to the action of water, he coated a collodion and a gelatine negative with ordinary negative varnish (shellac and alcohol), and two of each sort with "zapon" and "brassoline." After drying each negative it was placed under several layers of damp blotting paper and weighted. After twenty-four hours the water had penetrated everywhere through the coating of the gelatine negatives, and softened the gelatine in the case of the "zapon" to such an extent that the film could be easily removed from the glass. In the case of the collodion negatives coated with shellac and "zapon," the films become moistened through to the glass after a few days; with "brassoline F.F.," a few cloudy spots showed themselves after fourteen days; with "brassoline H.H.," no alteration was observable even after forty-five days, from which it appears that this material is very superior to shellac. M. Jaffé is now proceeding to test these varnishes in regard to their tendency to crack, and will, doubtless, soon publish his results.

ALEXANDER LAINER, in the *Photographische Correspondenz*, gives his experience of the compound alum fixing bath. "The great advantage of the mixed alum bath," he says, "is that it causes immediate induration of the gelatine, and that the film is hardened at the same time as the fixing is accomplished, and counterbalanced by the constantly recurring clouding which the alum bath occasions. This is not prevented by neutralising the alum. Sodium sulphite, however, produces a different effect. On adding a saturated solution of sodium sulphite to a saturated alum solution a precipitate is formed, which on shaking disappears, accom-

panied by the evolution of sulphurous acid. On mixing the solution with an equal volume of the fixing bath it remains clear. The following receipt acts well:—

Saturated solution of alum	1000 parts.
Saturated sodium sulphite solution	200-300 "
Fixing bath	1000 "

This bath remains clear for fourteen days even in open vessels. If one takes only 100 parts of sodium sulphite solution the bath will keep longer. With different kinds of alum, different amounts of sodium sulphite will be found sufficient; sometimes only forty parts of this latter solution will suffice to make the bath keep for eight days."

THE following bath, says Liesegang's *Archiv*, originally recommended for plates developed with eikonogen, is very well adapted for gelatine plates and bromide of silver paper, however they may be developed, one of its advantages being that it always keeps clear and prevents yellow colouring of the negatives from taking place when alkaline pyro is employed. This is the receipt:—

Fixing soda	200 grammes.
Double sulphite of soda (otherwise known as acid sulphite).....	50 "
Water	1000 "

This fixing bath has the following advantages: 1. It gives the negatives an excellent tone which permits of very rapid printing. 2. The bath remains clear even after frequent use. 3. The alum bath previous to the fixing is dispensed with, and consequently the possibility of a precipitate of alumina forming in the films through insufficient washing is removed. If the nature of the plates used render the hardening of the film a necessity, an alum bath may be employed; but the alum solution must not be stronger than fifty grammes to the litre, as otherwise it easily produces bubbles in the gelatine.

A RECENT number of the *Photographische Rundschau* contains an article by Alfred Stieglitz on the *Influence of Temperature in Development*—a subject generally rather neglected, both by professionals and amateurs. At a temperature of thirteen degrees, he points out, development requires five times the time necessary at a temperature of fifteen degrees, and negatives that develop harmoniously at the latter temperature become at the former extremely hard. At seventeen degrees the same developer is nearly sure to overdo the negative. It follows that the temperature of the developer is therefore of quite as much importance as length of exposure and concentration of solution. In order to develop with regularity, one ought to warm the developer in winter, and in summer cool it. Over-exposed plates ought to be treated with coldness, and instantaneous views with warmth. We should say that the exasperated amateur is under the circumstances likely to treat them both with warmth, especially if the too long exposure in the former case has robbed him of a fine landscape. This, however, is probably not the kind of warmth intended, as it leads more frequently to fracture of the unsatisfactory plate rather than the clouding the learned but phlegmatic German appears alone to dread. The whole series of observations seems rather to savour of hair-splitting—as if there were no such element in controlling development as time!

DR. STOLZE seems to take the same view of the matter, as he devotes a good deal of criticism to the article. "How are you going to cool the developing bath," he asks, "in summer, with the thermometer at 25° C. or 30° C. in the shade?" It is all very well to try and cool it with ice, but if you take it out of the ice the temperature at once begins to rise, and if you keep it in it gets too cold. Even in a regular studio you cannot get a temperature of 15° with regularity. And what is the unfortunate photographer to do when on the jog? He cannot find ice in any pond in summer, and if he is going to carry nitrate of ammonium with him for every operation, his burden will be as big as that of Christian in the *Pilgrim's Progress*, and his own progress probably not much faster. Dr. Stolze very sensibly continues that the best thing to do in summer—in winter one can warm up easily—is to alter the composition of the developer in accordance with the general temperature, so that it may not act too quickly. This may, of course, be done by the use of restrainers. Where, for instance, in winter one works without bromide of potassium, one may employ it in larger or smaller quantities, according to the prevailing temperature.

Our Editorial Table.

PHOTOGRAPHS OF SOUTHERN LIFE AND SCENERY.

By O. PIERRE HAVENS, of Jacksonville, Florida, U.S.A.

A CLEVER Northern artist who has settled in the commercial capital of the Flowery State, Mr. Havens has not been slow to perceive that in its varied scenery, and especially in its coloured population, lay much that might be made conducive to artistic subjects for his camera. Nor, to judge from a parcel of pictures received from him,

has he been slow to avail himself of such subjects. Some of these are exceedingly mirth-provoking, such as—"I 'specs I've born tired," representing a coloured boy leaning against the trunk of a tree in a pine forest, and enacting the sentiment expressed in the title; *Cherubs*, in which a couple of nude young "niggers" are seen leaning over a rocky wall, with the well-known palmetto fans so arranged behind them as to convey the idea of circular wings sprouting from their shoulders: a pose which may shock some of the naturalistic school who profess to admire the pictures of Mrs. Julia Cameron, but who forget, or may not be aware, that this lady when photographing a cherub attached a pair of the wings of a goose to the shoulders of the innocent model. Not having ourselves been privileged to behold a real live winged cherub we are unable to say which of the two, Mrs. Cameron or Mr. Havens, is nearest to the mark in this matter of wings. Perhaps both may be right, and it may be, after all, a difference depending upon degrees of latitude. A characteristic picture is the group of ten of a family all engaged in that occupation of all others the most congenial to the southern negro, *viz.*, eating water melons, or "milions" as the fruit is designated by them. Others of the series are—"I've a Dude;" *Ancient Seal* (a "darkie" fishing in a stream overshadowed by the Spanish moss depending from the branches of the live oak); "*All Mine*" (the sable father of a numerous progeny arranged under the shelter of a log cabin, and indicating his proprietary interest in them), with other subjects of like nature. The size of the pictures is 8x5, and as photographs they are unexceptionable.

VIEWS IN NORTH WALES.

By EIST ACRES.

THESE views are all in duplicate, one of each being taken on an ordinary plate and an isochromatic plate, both exposures in each case being made one immediately after the other, so as to ensure identity of lighting. The subjects are for the most part rivers or mountain torrents with steep tree-clad banks, *e.g.*, *The Fairy Glen*, *Below Swallow Falls on the Llugwy*, *The Lleder Valley*, *Beltwa-y-Cord*, and such-like. Those on the ordinary plates are very good indeed when we consider that they were taken on a dull afternoon in the end of October, and the detail in the foliage is well defined, although there is a monotonous sameness in it. On turning to the corresponding picture in the isochromatic series the difference is at once perceptible; the sombre uniformity which pervaded the wooded *entourage* gives way to a series of trees, some of which have colour values evidently widely apart from those of their fellows, and thus imparting an individuality to each tree quite absent in those on the ordinary plates. For testing the real advantages of colour-sensitive plates no subjects could possibly have been better selected than those in the prints before us, showing as they do nature with foliage which has put on its rich and varied autumnal tints. The negatives from which all the above prints were produced have also been sent for inspection. They bear evidence of careful, honest manipulation, and are untouched.

OUR HOME IN AVEYRON.

By G. CHRISTOPHER DAVIES and MRS. BROOKHALL. (Edinburgh and London: W. Blackwood & Sons.)

WE have often recommended, and it was safe enough to prophesy, that tourists and travellers would make the camera an adjunct to the pen when making notes for publication. *Our Home in Aveyron* shows in what an effective manner the two may be conjoined. Mr. G. C. Davies, when on a visit to his brother and sister in the South of France, had taken with him his camera, and we have as a result a most interesting volume, charmingly illustrated. But at this stage we allow the writer to speak for himself. We must previously, however, allude to a conversation with his sister (a resident in France), in the course of which she says that photographic apparatus is as well understood by the French Customs officers as in England, and more respected by the officials, and that curiously enough almost every Englishman who visits that part of the country on mining business is a photographer, the natives looking upon a camera as a necessary and usual appurtenance to an Englishman. Mr. Davies says: "Before proceeding further I pause to explain the *raison d'être* of this book. I took a great many photographs, of which I afterwards made lantern slides, and with the aid of my sister's notes and my own observations I retailed the information in the shape of lectures to rural audiences, with the view of aiding my clerical friends in their parish work and of benefiting institutions in which I took an interest, as every man should do who has the chance at little trouble and little expense to himself, and according to a laudable custom which is fast gaining ground among the army of amateur photographers—an army which sends skirmishers all over the world. I have, in doing this, found that much more interest was exhibited in the simple details of home

life, which might easily be compared with one's own modest experiences, than in more ambitious tales of travel, adventure, and discovery."

This amalgamating of description and illustration imparts a great charm to the book, for while as regards the former it is well written, the word-painting being all one could desire, the photographs are skilfully taken with respect to artistic selection of point of view and light and shade, while technically they are full of detail and plucky without. The subjects, too, are interesting. In a village scene, *Wine-shop and Auberge, Bouillac*, we see about a dozen pigskins full of the wine of the country suspended on the wall of a building; in the *Château Salgriac*, we have a near view of what was doubtless a strongly fortified place in the pre-Armstrong gun period: a *Religious Procession* at the fork of a country road—an instantaneous view and probably one of the finest in the book; *A Peasant's Cottage, Blanchissens, La Roque Torrac*, showing four merry washerwomen busily at work; with many others illustrative of life and character in an imperfectly known French country. The illustrations are printed on thick fine paper by one of the now numerous phototypic processes, and the book is got up in such a style as to reflect the highest credit on all concerned in its production, and to serve as a model for others of like nature.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,737.—"The Use of Photographs Applied to Glass suitably Lettered for the Purpose of Advertisements. Title, 'Photo. Opaline Show Card.'" R. BROWNIE and F. BROWNIE.—*Dated December 9, 1889.*

No. 19,770.—"Improvements in Carriers or Sheaths for Photographic Plates or Films." Complete specification. F. MALL.—*Dated December 9, 1889.*

No. 19,830.—"A Mount for Lenses of Different Sizes." W. C. CHIPPER.—*Dated December 10, 1889.*

No. 19,896-7.—"Improvements in Apparatus for the Manufacture of Photographic Films." Communicated by G. Eastman. Complete specification. A. J. BOULT.—*Dated December 10, 1889.*

No. 19,903.—"Improvements in the Preparation or Treatment of Paper for Producing Copies of Drawings or the like by Action of Light." Communicated by C. Rolland. W. P. THOMSON.—*Dated December 10, 1889.*

No. 19,975.—"Improvements in Oxyhydrogen or Limelight Jets." A. SUITER.—*Dated December 12, 1889.*

No. 20,009.—"Improvements relating to Photographic Cameras." Communicated by C. A. Steinheil Sohne. R. HADDAN.—*Dated December 12, 1889.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 21	North Middlesex Club	Jubilee Hall, Hornsey-road.
" 21	Bottom Club	The Studio, Chancery-lane, Bolton
" 26	Burton-on-Trent	The Institute, Union-street.
" 26	Halifax Photographic Club	Mechanics' Hall.
" 26	Liverpool Amateur	St. George's-squares North.
" 26	Oldham	The Lyceum, Union-st., Oldham.
" 26	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 12.—Mr. J. J. Moran in the chair.

Mr. P. Everett showed the two halves of a divided negative, one half of which had been treated with ferrieyanide of potassium and bromide, and afterwards redeveloped, as shown at a previous meeting. Prints from the two halves were also shown; the difference was very slight.

This being a lantern night, slides were exhibited—the work of Messrs. Atkin Kerr, J. H. Smith, Teape, Wellington, and Hastings. The exhibits of Mr. Atkins were considered to be remarkably good in gradation, and inquiries elicited that they had been produced upon commercial plates as used for negatives developed with eikonogen.

Mr. R. P. Drage was elected a member.

CAMERA CLUB.

DECEMBER 12.—Mr. A. Pringle in the chair.

Mr. E. FERRERO explained a focimeter he had made for enlarging purposes in which the actual distance of object and image from lens was given on the scale of the instrument.

Mr. SHURTON exhibited a collapsing American clothes drier which he had found eminently suited for drying prints or films upon. He also showed fish glue strips for binding lantern slides. These strips were made from gum sheets produced by Messrs. Dennison.

Mr. CHARLTON WOLLASTON then read a paper on *Timing Shutters*, in which he criticised the several well-known methods of timing shutters; and, after describing the process he wished to put forward, he produced the apparatus and gave a demonstration of its action. The instrument was devised to give

record of the exposure given by the different portions of the lens from centre to margin during the opening and shutting.

In the discussion the Rev. A. B. COTTON exhibited and explained a small camera he had made for the purpose of timing shutters.

Mr. H. STURMEY described Wilson's shutter chronograph, and exhibited plates showing tests made with a great variety of instruments.

Several shutters brought by Mr. Wollaston, and some lent by Messrs. Hulton & Co., were on view to illustrate the subject under discussion.

On Thursday, January 2, lantern slides will be shown on the screen.

WEST LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 13.—Mr. Bilton (President) in the chair.

The following question from the question box was read:—"What is the best means of blacking diaphragms when worn bright?"

Mr. E. W. FOXLEE said if clean brass was immersed in a weak solution of bichloride of platinum the metal would be darkened, but the colour was not very good.

Mr. BLACKMORE had used for other work, though not for diaphragms, a solution of eight parts hydrochloric acid and one part of white arsenic. After prolonged digestion the metal was immersed in the solution and then gently dried before a fire.

Mr. J. A. HODGES wished to know whether the colour so obtained was of a permanent nature, or merely superficial and liable to be easily rubbed off.

Mr. BLACKMORE said the solution seemed to affect the surface particles of the brass itself.

The PRESIDENT had tried the effect of a solution of forty grains of silver nitrate in one hundred minims of water added to another solution of forty grains of copper in one hundred minims of water. The stops were dipped in the solution and then subjected to heat; the result was disappointing, the colour produced being greyish-black, and producing strong deposit on the brass itself, which upon analysis proved to be nitrate of silver.

Mr. STEIN then read a paper on *Defective and Hand Cameras*, after which representatives from the firms of the Eastman Co., Rouch & Co., Mawson & Swan (Mr. Winter), Fry & Co., Abrahams, Shew, and Marion & Co., explained the working of the cameras made by their respective firms.

The PRESIDENT, in thanking Mr. Stein for his paper, and the gentlemen who had attended with cameras, said that the subject was of such importance that it could not be properly dealt with in the short time remaining at their disposal. He therefore suggested that the discussion should be adjourned to the next meeting, which would take place on Friday, the 27th instant. As the meeting was also a technical one, he requested members to bring with them any matter which might be of general interest.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

DECEMBER 11.—Mr. Dresser in the chair.

Two new members were elected.

Mr. Donkin showed a number of platinum prints on linen, and then read a paper entitled *The Motive Power of Photography*. After briefly sketching the progress of the art for the last fifty years, he proceeded to compare the standards of artists and photographers, and submitted that although photography was so young it had already taught several valuable lessons to artists. The motive power was "truth," and he held this was one of the great advantages of photography. In connexion with this he gave the following example:—Several artists and one photographer were appointed to represent a certain scene of nature; when results came to be compared, the verdict must be that the photographer's result was the most truthful. His perspective and the correctness of his drawing were indisputable, while the relation of the various lanes was nearly, if not quite, correct. The results shown by the artists differed in each case, and although each was a representation of the same scene, it must be admitted that the photograph was the true representation.

Next meeting, Wednesday, January 8.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

SPECIAL general meeting was held at the Society's Room, Grand Hotel, Moore Row, on December 11, to "consider the feasibility of making a photographic survey of Warwickshire, the object being to secure an accurate and unbiased record of the scenery, monuments, life, natural history facts, &c., of the county as they now exist." Mr. J. B. Stone, J.P., F.R.S., F.G.S., presided, and there was a good attendance, including representatives from most of the scientific, literary, and artistic societies in the county.

The circular convening the meeting having been read by one of the Hon. Secretaries (Mr. J. H. Pickard), Mr. STONE said that he took this opportunity of returning them thanks for the honour they had done him in electing him as their President in succession to a man so distinguished in science as Dr. Hillar. He called attention to the splendid work done photographically in connexion with the geological survey of the United States, and expressed the opinion that there was no branch of science in which it could not render most useful aid.

Mr. W. JEROME HARRISON, F.G.S., then read his paper, entitled *Some Notes on a Proposed Photographic Survey of Warwickshire* [see page 828].

The PRESIDENT proposed the following resolution from the chair:—"That a committee be appointed, consisting of the Council of the Birmingham Photographic Society, together with representatives from each local society (scientific, literary, or artistic) which is willing to co-operate, to consider the best means of making a photographic survey of Warwickshire, and to report to a future meeting." He urged the necessity for carrying out the scheme, describing the manner in which objects of the greatest interest were continually disappearing, on decay, accident, &c.; and giving as illustrations the "ducking stool" in the crypt of St. Mary's Church at Warwick; the old chair at Astley Castle used by the Duke of Suffolk when he hid in a tree to escape capture; and the traits of the conspirators in the Gunpowder Plot which are in Combe Hey.

Professor HILLHOUSE (Mason College) seconded the resolution, saying that he thoroughly believed in photographic surveys. At the Mason College the plan which he had urged, of each professor being photographed on joining the staff, had already given interesting results. Speaking as a botanist, he said that a photograph of *Osmunda regalis*, growing in boggy ground at Moseley, near Birmingham, would furnish a proof that could not be gainsaid that the plant really did once grow there, a fact which was now disputed. In attempts to acclimatise plants, photographs taken at frequent intervals would be of great service. He strongly emphasised the statement which had been made by the President, that there must be no "doctoring" or "retouching" of any of the work done in connexion with the survey.

Mr. JETHRO COSSINS (Archaeological Section of the Midland Institute) said that the charming village scenery of Warwickshire was changing with a rapidity which few imagined. Again, he quite lately found a farmer near Oldbury pulling down a small Norman chapel which formed part of an ancient castle. The churches of Warwickshire have already, for the most part, been "restored," so that such a scheme as this photographic survey was wanted long ago.

Councillor ANDREWS (President of the Coventry Photographic Society) sympathised with the scheme, but thought it was rather an enormous one. Of one ancient church in Coventry alone he had secured one hundred and twenty negatives before its restoration. He hoped, however, that the movement might be carried to a successful issue.

MESSRS. H. STURMEY and F. W. DEW (Coventry) agreed with Mr. Andrews; and Mr. SturmeY proposed that the Committee to be appointed should report to another meeting, to be held at an early date, as to the exact manner in which the survey should be carried out. This was agreed to, and words to that effect were incorporated in the resolution.

Mr. E. C. MIDDLETON said that the scheme had his entire sympathy and support. The pictures must be printed by a permanent process, and the use of wide-angle lenses must be avoided as much as possible.

The resolution was carried unanimously.

The PRESIDENT then proposed, "That the best thanks of this meeting be given to Mr. Jerome Harrison for his admirable paper, and that it be printed and distributed to the members of this Society, to the other photographic societies, and to the press."

This was seconded by Mr. W. B. GROVE, M.A. (late President of the Birmingham Natural History Society). He urged the importance of photo-micrography, especially of a tribe of plants in which he was much interested—the fungi.

The motion was carried and suitably acknowledged by Mr. Harrison.

The meeting concluded with a vote of thanks to the President, proposed by Mr. B. KARLESK and seconded by Councillor ANDREWS.

In addition to the names given, we noticed among those present Messrs. Jonathan Pratt (Royal Society of Artists), Councillor Wallis, Drs. Nicol and Donovan, Messrs. J. H. Stote, H. J. Whitlock, S. E. Baker, J. E. Bagnall (Microscopical Society), J. Landon, F.G.S., J. Udall, F.G.S., E. W. Badger, W. H. Vernon (Midland Arts Club), in addition to Messrs. E. H. Jacques (Vice-President), A. J. Leeson (Hon. Secretary), and many members of the Birmingham Photographic Society.

DERBY PHOTOGRAPHIC SOCIETY.

DECEMBER 9.—Mr. Richard Keene presided.

Mr. E. J. LOVEJOY, the retiring Hon. Secretary, presented the Committee's annual report and balance sheet, which were adopted.

It was decided to hold a *conversazione* in January, for which an attractive programme is in preparation.

This Society is now in a flourishing condition, having acquired a large lecture room, with a dark room attached, for the use of its members.

IPSWICH PHOTOGRAPHIC SOCIETY.

DECEMBER 10.—Mr. J. Dixon Piper (President) in the chair.

The subject of the evening was *Platinotype Printing and Development*, and Mr. W. VICK demonstrated the hot bath process, developing several prints from negatives made by him of the Society's excursion to Playford and Bealings.

The Platinotype Company lent several fine prints for the evening, and Mr. V. Blanchard sent several specimens of his new toning process, and the Hon. Secretary exhibited others toned by him by Mr. L. Clark's process.

The date of meeting was unanimously altered from the second Tuesday to the second Wednesday in the month.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

DECEMBER 10.—Mr. James Brown in the chair.

A series of over one hundred slides were shown by the limelight lantern.

A Committee of eight gentlemen was formed to carry out arrangements for an exhibition of photographs to be held in Newcastle next spring.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

DECEMBER 11.—Mr. Geo. Bankart (President) in the chair.

The election of officers for 1890 was fixed for the January meeting, and the lantern competition and exhibition for the commencement and end of February.

Mr. J. B. COOK then delivered an address on *Photographic Dodges*. He opened by saying how necessary it was to commence with accuracy in all manipulations, the "Dodges" being a useful adjunct. He called attention to the desirability of extreme cleanliness in dishes, measures, &c.; this he always found brought about in a most expeditious manner by the use of Brooke's Monkey Soap. Vaseline smeared on the stoppers of bottles and rubbed off again prevented sticking. For halation he found a rag dipped in methylated spirit, and the halated part rubbed with it, speedily removed to any degree. To those who found their negatives lose intensity on fixing he recommended the

addition of ten drops of ammonia to the pint of fixing bath, and he gave a practical illustration of the superiority of two buttons over the usual and conventional staples for securing the ends of the brass springs of printing frames, which prevented the shifting of the print after being examined.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

DECEMBER 5.—Mr. William Laing, jun., F.C.S. (President), in the chair.

The following were elected members:—John Foubly, L.D.S., Percy Rowden, David Bryce, W. C. Warden, W. N. Warnenke, John Pillans, George Bell, jun., William Kilstou, James Russell, and Andrew Stewart. Mr. John Mayer, F.C.S., was elected an honorary member.

After the reading of the Secretary's and Treasurer's reports, Mr. T. N. ARMSTRONG read a paper and gave a demonstration on *Transparency Making*, and this was followed by a series of slides illustrative of the various processes—albumen, Woodbury, gelatino-chloride, gelatino-bromide, collodion, carbon, Alpha, collodio bromide, &c., being shown by means of the Society's lantern.

Correspondence.

Correspondents should never write on both sides of the paper.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—I gather from Mr. Bart. Rous's last evasive reply to Mr. Durrant that he thinks it impossible for any one to reply successfully to his apparently intentionally offensive letter of November 8, in which he sweepingly condemns all my pictures lately exhibited at the Camera Club for the only qualities for which I claim any attention to them, and for which, I believe, they were borrowed by the Club. It was, of course, impossible for any one to reply to a general accusation; and when Mr. Rous is asked by Mr. Durrant to point out a few examples out of the seventy or eighty exhibited justifying his condemnations, he meanly beats a retreat by way of combination printing, on which he delivers himself of some cheap platitudes.

It is, however, not my purpose to criticise Mr. Bart. Rous; but, to prevent my motives being misunderstood, I ought to mention the other reasons, besides its offensiveness, why I refrained from replying to his letter.

In the first, but least important, place, I thought he had written it in unscrupulous, if mistaken, help to a naturalistic friend of his, with whom I had been having a little controversy in your pages, which, possibly, amused some of your readers, and did no harm. That correspondence was closed, and I did not care to reopen it. My chief reason (always excepting the intentional offensiveness) was that I happened to have heard of Mr. Bart. Rous—a distinction, I suppose, not enjoyed by many photographers; and one must draw the line somewhere, even if one does not mind drawing it very low down, and I draw it at Mr. Bart. Rous. The possession of a studio, and dating letters from the Arts Club, does not make an artist or a competent critic; and of all the shams of civilisation, the sham artist is about the most contemptible.

Mr. Rous concludes his last letter with this becoming attempt at sarcasm:—"Medals have been awarded to Mr. Robinson (and justly) for his clever photography; but I have yet to learn that they were awarded to his photographs as works of art." This may be the venial fault of ignorance, but it is more like a characteristic disregard of truth. It is, perhaps, scarcely necessary to point out to you, Sir, or to those who have followed the progress of photography, that of my one hundred medals I have never received one for mechanical photography; and that when, before medals fell in showers, Judges had time to give the reasons for their awards, they were almost always awarded to me for "Artistic Excellence," or words to that effect. I am ashamed to have to refer to this matter, but a direct untruth, even from Mr. Bart. Rous, demands contradiction.

Allow me to thank my friend Mr. Durrant for his letters on my behalf, and to gratefully acknowledge the friendship of many years at which Mr. Rous sneers.—I am, yours, &c., M. P. ROBINSON.

CELLULOID FILMS FOR LANTERN SLIDES.

To the Editor.

SIR,—With reference to Mr. W. Jerome Harrison's article in your issue of December 13, *re Celluloid Films for the Lantern*, it may perhaps interest that gentleman to know that at one of the Monday evenings at the late exhibition of the Photographic Society of Great Britain I had several lantern slides on celluloid films passed through the lantern.

The films were attached to a thick card, $3\frac{1}{2}$ inches square, with opening to serve as a mat. The result of the heat of the lantern was that, if left in over a minute, the film buckled considerably; and in one instance it broke the cardboard support, and no amount of persuasion would ever get that film flat again. Another drawback to celluloid is its slight yellow colour, which considerably mars the effect on the screen.

Your correspondent states that the films for ordinary work have one side finely ground (matt). This is not always the case, as I prefer, and have always used, in the manufacture of my films, the clear celluloid,

which gives quicker printing negatives; and the matt surface is unnecessary, as, even with clear films, there is no fear of halation.

There is no doubt that it would be a great boon if celluloid could be successfully substituted for glass for lantern slides, but I fear that that is at present impossible.—I am, yours, &c., J. DESIRÉ ENGLAND.

21, Charles-street, Royal-crescent, Notting Hill.

To the Editor.

SIR,—I would call the attention of Mr. W. J. Harrison to the fact that I have for the last year been working to produce a flexible film to be used as a substitute for glass in lantern slides, and have so far succeeded that I hope very shortly to be able to place upon the market, not only single pictures as he describes, but a series of pictures on long strips to be used in roller holders.

I have fully covered and protected the use of flexible films for lantern slides.—I am, yours, &c., WALTER P. ADAMS.

Springcell, Barnes, S.W., December 17, 1889.

A PATENTED IMPROVEMENT IN PRINTING FRAMES.

To the Editor.

SIR,—*Re* patent 16,827, published in your issue of to-day, the principle was given to the public by Mr. Z. H. Kingdon in your ALMANAC for 1887 (see p. 148), the only difference in the patented article being the substitution of hinges, which adds to the cost without affecting the result.—I am, yours, &c., KAKAREKKA.

Derby, December 13, 1889.

[We thank our correspondent for directing attention to this matter, as it enables us to say that printing frames having hinged bars and catches to fasten down the free end have been for many years in use. They are also described and figured in numerous treatises on photography.—ED.]

A LENS FOR DETECTIVE CAMERA.

To the Editor.

SIR,—In an article in your ALMANAC for 1890, entitled *How I made a Detective Camera for a Shilling*, the writer, Mr. Locke Macdonald, states:—"I obtained from Wray an excellent single uncorrected lens of five and a half inches focus for one shilling." Now the lens in question was a simple double convex of crown glass, and was intended to be used as a finder in conjunction with our 5×4 rapid rectilinear of similar focus—excellent, no doubt, as regards workmanship, but certainly not suited for use as a photographic objective.

Many, however, appear to have been misled by the term "excellent," and fancy that from us they can get a single uncorrected lens of five and a half inches focus, which, working at $f/11$ or even $f/10$, will cover quarter-plate as sharply and as well as any combination made; nay, some even have gone farther than this, and have expressed an opinion that it should give better results than an achromatic combination.

Whilst thanking those of your readers who seem to have such an exalted opinion of our optical skill, we beg to disclaim any pretensions to being able to do with one glass as much, or more, than others can do with two, three, or four.

Though the ALMANAC has only been issued a few days, we have already had numerous orders from all parts of the United Kingdom, with enclosures of from one to two shillings, for the wonderful lens; in many cases the request has been made, "Please pick me a good one;" "One that will work at $f/8$, and cover the plate sharply to the corners preferred;" and in nearly all cases what they are pleased to call a *fixed focus* is a desideratum.

This, of course, is very satisfactory in one way: it proves the enormous circulation of the ALMANAC, and we are quite looking forward to an inundation of shipping orders when it gets abroad; but in another way it is decidedly unsatisfactory, as we have to return the cash and explain that a single uncorrected lens with an aperture suited for a hand camera cannot give anything like sharp definition. A desire to prevent trouble and disappointment must be our excuse for intruding in this matter.—I am, yours, &c., W. WRAY.

Hilghate, December 18, 1889.

EMPLOYÉ'S SPECIMENS.—DRY PLATES IN SOUTH AUSTRALIA.

To the Editor.

SIR,—I should be glad to know something more about the correspondence *re* the difficulty experienced by operators in getting their specimens returned. I should like to know how they obtain them in the first place; and, considering the division of labour existing now, I cannot see how a man can say, "This is my work." If he is capable of turning out good work, his employer will naturally pay him his worth, and of course does not wish to part with a good man; but suppose the operator refuse to stay, I should like to know whether his "boss" will present him with specimens to enable him to obtain another situation; or perhaps he has already another place to go to, which he has obtained.

by or through the medium of specimens sent. It is not unnatural to suppose the operator has tried for another place before leaving the present one, but it is unnatural to suppose he has been presented with the choicest of specimens by his present employer. Now how does he get them? Is it usual for employers to present their *employés* with specimens when they are dismissed? In advertising for operators the "send specimen" is generally a part of the advertisement, and I cannot see how they are to comply with the conditions of the advertisement, seeing the difficulty of obtaining specimens honestly. I should like to hear this explained. While speaking of operators, I should like to know what is considered a good salary for a first-class operator (only)?

And, now I am writing, I should like to mention my experience with plates. I do not consider the plates sent out here equal to what they were some five years ago; either they are made too sensitive—and, as some one truly remarked, "Dry plates, like eggs, do not improve by keeping"—or owing to the reduction in prices they are now not so carefully made. Occasionally we have quite an epidemic of "pinholes," then "fog," and a very great deal of the glass is so badly scratched and full of "cats'-eyes" as to render it quite unfit for negatives. Then the "coating" is so economically done that there is nothing but a suspicion of emulsion on the plates. I have often used 300 cabinet plates in a week, and with the defects to contend with, the difficulty of doing work equal to when we had good plates (and we are expected to do this) is a task which causes us much anxiety and many thoughtful reflections on the makers.

CHARLES NEWLING.

Mount Gambier, South Australia, November 2, 1889.

A TRADE UNION.

To the Editor.

SIR,—The letter of your correspondent, "An Amateur," in your issue of the 13th instant, is certainly a most commendable production, and I am sure photographers will be most grateful for his amateurish advice. As a general rule there are two sides to every question, and I think it applies to the question at issue, and I for one, and many others that I know, consider that a Union of some description is becoming an absolute necessity; but what a disgrace to what was once a respectable profession, that such a thing should have to be mooted! Now just a few words to say why I consider it necessary. I have noticed this last few years that the wages paid to assistants seem to be worked on the sliding-scale principle—they are continually sliding down; but here the principle stops, for they never on any occasion slide up. Why is this? simply because many of the employers (I will not say all), knowing that the labour market is overstocked with photographic assistants, *meanly* take advantage of their poverty, and offer wages to first-class men hardly a trifle higher than what is paid to a bricklayer's labourer, and they, under pressure, accept the terms.

Take retouching four or five years ago, 3*l.* to 4*l.* per week was considered a fair wage for a good man, but now it is most amusing to study the muscular contortions of a photographer's face when you ask him 2*l.* 2*s.* I know a firm who get high prices, where I had the misfortune to be engaged for upwards of two years under an agreement, where 30*s.* to 35*s.* is the average wage paid, and for this was required first-class work and eight or nine large cabinet heads a-day, and treated into the bargain like so many dogs. This same firm are now paying 5*s.* for elaborately finishing 12 × 10 enlargements in monochrome, and charge their customers about 3*l.* Now is this common honesty, especially when you consider, under the present conditions of sweating, that in a very few years a man's eyesight is completely ruined?

In conclusion, I sincerely trust that Mr. Field will be successful, and that the photographic *employés* will rally round him and work together for their mutual benefit, and so upset Mr. Amateur's little scheme for tyrannising over them. Hoping some more able pen than mine will take this matter up—I am, yours, &c.,

FAIRPLAY.

Liverpool, December 16, 1889.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—I have read with much interest the letter signed "Kakabekka," hailing from Derby, in last week's JOURNAL. If he is serious in suggesting a tax and license in connexion with photography the idea is a brilliant one, and would work in several directions at once. It would elevate the "profession," by putting it on a somewhat similar footing to that occupied by the "licensed vintner."

At present it is no uncommon occurrence to find plate manufacturers and others engaged in the "trade" portion of the practice apologising for delay in forwarding goods ordered on the plea of "pressure of business." As the average amateur spoils probably a dozen plates for one used by the professional, the proposed check would cure the evil by leaving manufacturers plenty of time to attend to their customers.

The restricted demand would enable a large number of those engaged in the trade to shut up their establishments, and the labour thus set free might be diverted into other channels; for example, it might be utilised in enabling the Dock and Gas Companies to cope with the "strikes" so prevalent just now.

The demand for chemicals, &c., being greatly diminished, of course prices would go up—though we can hardly hope to go back to the "good

old times" when hypo was, I believe, sold by the ounce as a chemical curiosity—and the increased prices for materials would enable the professionals to keep up their prices, by stating truly that they had a very small margin of profit on the "finished article."

As most of the improvements in photography, say about ninety per cent., come from the amateur ranks, a wholesome check would be given to ingenuity in that direction, and the professional would be spared the necessity of keeping up with the times.

In landscape work we would be largely confined to special well-known places of interest, without having our attention distracted by admiring those out-of-the-way nooks and "beauty spots" so dear to the wandering amateur.

The amateur himself would benefit by such a tax, if sufficiently heavy to be nearly prohibitive, by being prevented from spending his money as freely as he now does on his hobby, his outlay, after the passing of the Act, being likely to be represented by shillings instead of pounds, as it stands at present.

But why confine such a "boon and blessing" to photography? There are other professions which such a law might apply to. Take music for instance. At present what house can we enter without being able to hear songs or tunes more or less ably rendered by amateurs? A heavy tax on pianos, and a severe penalty applicable to private singers who do not hold a Government license, would give professional musicians a "much-needed protection," and in time might possibly enable our prima-donnas to double the paltry sums at present demanded for their public services.

Really our Derby friend ought to give his name. In the event of such a law ever passing, it would be a pity it should remain in the list of unknown public benefactors.

JOSEPH H. WOODWORTH.

Boosterstown, Dublin, December 11, 1889.

To the Editor.

SIR,—When "An Amateur" opened the present discussion and I seconded his statements and views from a professional standpoint, I little imagined the lengths to which the matter would reach, or the innuendoes and embittered remarks that would appear. To my great regret, the majority of the writers on the subject have taken an entirely erroneous view of my opinion and statements; far be it from me to say one word against the true amateur—I am only too ready to admit the value of his services to the art science, both in the past and the present. The first paragraph of my last letter seems to have been utterly ignored by those who have attacked me tooth and nail, and to that paragraph I would now draw their attention. The views I there expressed are still unchanged, and so are those I then expressed with regard to the "amateur professional." With "M. W." I agree so far that "the harm and real injustice consists in the work being sold too cheaply." Any worker has a moral right to sell his work, but it is when he claims to work only for the love of the work itself, and under the title of "amateur" undersells the professional, that I object to him. "Anti-Monopoly" claims the title of amateur, but wherein lays the justice of that claim I leave to those who have read his letter; to those who have not I commend it as a real "tit-bit." Mr. Storey has apparently a full right to the coveted title, but, nevertheless, ranges himself on the side of the "amateur professional," and states that it is "presumption and impudence" for those who have made photography the business of their life to cry out when unfairly opposed, and advises them to "seek work of another kind," so that, after all, he is of opinion (although not expressed in so many words) that a monopoly would be all right if it were held by his side instead of the other. Mr. Victor Page's suggestion as to taxing chemicals would certainly be unworkable, while that of "Kakabekka" might be effective. As to Mr. Caldwell, I am certainly puzzled, and would merely ask if his letter is "writ sarcastic?"

The whole kernel of the matter lies in the question, Does the "amateur professional" injure the professional proper? Some of your correspondents say "Yes," and some "No." I know that if a canvass were made among the profession for their opinion that the answer would be an unmistakable "Yes." I do not intend to imply that the profession is being ruined, but better speak out when the thin end of the wedge is inserted than wait for it to be driven home, for we none of us know to what an extent the present craze might reach in a few years. If Messrs. Storey & Co. will carefully peruse the various articles bearing on this vexed subject in THE BRITISH JOURNAL OF PHOTOGRAPHY ALMANAC they may perhaps be edified. Personally, I have herein said my say and I have done with the matter, my only regret being that the leading members of the profession have not been induced to speak out on one side or the other; however, I learn that the matter will be discussed at the Camera Club on the 12th proximo, when, perhaps, we shall have some more light thrown upon it. My only object in writing at all was to induce discussion and obtain the opinions of others.—I am, yours, &c.,

Windsor, December 15, 1889.

C. BRANGWIN BARNES.

To the Editor.

SIR,—It seems to me that this controversy between amateurs and professionals is becoming a very one-sided affair. I have read on this matter very carefully your valuable ALMANAC for 1889, as well as all the letters referring to it in THE BRITISH JOURNAL OF PHOTOGRAPHY, and it seems an

admitted fact among the amateurs that the whole profession is composed of nothing but the most stupid fellows, knowing nothing, but using what amateurs find. It seems to me that professionals ought to get a little credit for some improvements, however few these may be, and it is not quite proven that inventions from amateurs and professionals are not about even. It remains to be seen, also, if the photographic art in general is only kept up by amateurs, and if it were not for said amateurs that the art would be a lost one long ago.

Amateurs are very kind, and, let us admit, also very useful, but there are two very distinct classes among these as well as among professionals. Both have their artists and gentlemen as well as their cheap Johns. And now, why the artists and gentlemen have espoused the cause of the cheap Johns with such an *ensemble* is rather a mystery to me. I have no doubt but that the defendants of this cause are perfectly right when they talk of themselves and their kind, but when they take the pen in favour of the parties calling themselves amateurs and are only peddling cheapness in all the sense of the word—that is, quality of work, quality of goods, and also in regard to payment asked—I think they go too far.

I have heard of the names of J. Wedgwood, Humphry Davy, Niépce de St. Victor, &c., as mentioned in "F.'s" letter in your last issue, but I must confess I have not yet heard mention of anything about their trading faculties, nor their generous offers to take any photograph for parties cheaper than the professional. It is quite a different thing from obliging a friend or only for pleasure to take a view or a portrait, from doing this because it can be done cheaper than Mr. So-and-so can do it, and get paid for it.

As I said before, there are two very distinct kinds of amateurs. The real one, that takes his work to heart and tries to improve, and may in time invent. This kind will probably admit with me that he does not peddle his work cheap or dear, asks no pay, and does it for the pleasure he derives from it. There is then the other kind that tries to find customers, holding out only cheapness, with quality in proportion, and, willingly or not, injures soon the professional. Now, let me tell you, *these do not, and have never, nor will they ever, invent anything except ruining or trying to ruin others.* To see such men as have written lately about this controversy in THE BRITISH JOURNAL OF PHOTOGRAPHY write in defence of this class of amateurs is certainly worthy of a better cause. Nobody attacks the gentleman amateur but only the pedler. Let him defend himself if he can.

I confess that I do not see any immediate remedy to this evil, and time alone can cure this. I think also that these amateurs peddling their work for money are much less numerous than one may imagine at first, and the wrong they do is really more in their talk than their work. If they only would refrain from saying right and left that photography does not cost anything, more than three-quarters of the wrong would be prevented.

Personally, I am an architectural photographer. I have travelled a great deal, have found amateurs doing some work, but have always found architects, whatever they may have heard about cheapness in the matter before, willing to pay my price for a good view of the subject, and probably the more willingly if they were amateurs themselves.

If only amateurs selling their work would add with the price of the plates, developer, paper, and gold, also the cost of travelling and hotel when out of town, or rent, meals, &c., when at home, as well as an allowance for when no work can be done on account of bad weather or no customers, it would change materially the cost price they imagine is correct, not talking of the instruments when first class.—I am, yours, &c.,

Amitree, December, 1889.

A. LEVY.

To the Editor.

SIR,—Your correspondent "Amateur" has trotted out the lame old blackleg arguments against the "tyranny" of Unionism. I hope it will be a long time before the workmen in the trade take their policy from an amateur, especially from one whose arguments so suspiciously resemble those of the professional sweater. The little homily on women competition is proof far more positive than anything that I could have adduced of the necessity for Union in our craft. But let me assure "Amateur" that there exists fortunately a slight obstacle to the realisation of his "sweater's paradise," and it is that photography cannot be acquired "in six months." Of course, I except such photography as is "got hold of out of a book" by the great majority of the fraternity to which your correspondent by his signature declares his allegiance. For myself, I have been an humble worshipper at the shrine of Apollo for six years, and am only beginning to know how great the mystery is and what a little I know. My brother has earned his living for ten years as a retoucher, and I have never yet heard him say that he considered himself master of the art. Perhaps "Amateur's" women black—(no, Mr. Editor; like Mrs. Partington, I will not use that word before ladies, even when I only refer to table legs)—perhaps these good people, after "Amateur's" own heart, will make up in assurance what they lack in efficiency? I have no fears for the qualified and guaranteed members of our Union if the only non-Unionists they have to contend with are those with a "six months' knowledge of developing, retouching, enlarging, carbon printing, microscopic work, mechanical reproductions (zinecos, by bismuth! &c. &c.), and other processes, like the last-mentioned ones, requiring a knowledge of collodion.

And the employer of such labour would not find his path an easy one. The influence of the Union, within the law, would be brought to bear to cripple him. If it had much cash in hand it could subsidise the Trade Union houses of his opponents to undersell him, or attract custom from him by bonuses. And if a federation of labour ever occurs (and the formation of a "British Photographic Union," with instructions to aid the establishment of such a federation, would be a good means of bringing such federation to pass), no Union carter would deliver his goods, no Unionist of any trade would deal at his shop, no Union plumber, carpenter, gasfitter, cabinet maker, &c. &c., would finish any work known to be going to his establishment, or set up anything on his establishment. Promenaders would be informed by handbills that he employed only female labour, which he was practically initiating into the art, while skilled men were at the very time applying for work and being turned away. The idea would gain with the public that somehow or other his establishment could not turn out good work, and patrons could not stand the suggestions of their friends that the establishment was not a proper one to patronise. In a fortnight, by a strange chromatic phenomenon, his blacklegs would have become white elephants; he would climb down, and the *fiasco* would be complete. Ah! Mr. Amateur, it is fortunate for society that all men are not so courageous as yourself.

[May I here thank "G. B." for his communication? I will make good use of the information.]

Thanking my correspondents, and asking all interested to send stamp for particulars—I am yours, &c.,

ARTHUR G. FIELD.

Maidstone, December 17, 1889.

To the Editor.

SIR,—In your JOURNAL of the 6th instant there is a letter from "F." which made me rub my eyes. He there states that all the improvements in photography were made by amateurs, and "given free to all men."

I really think such a statement ought not to be made without contradiction. Certainly, neither Daguerre nor Fox Talbot gave their discoveries free, as they both took out patents, and Beard, one of Daguerre's licensees, who was among the first professional photographers, made many improvements, which he also patented.

I am not quite sure whether Scott Archer was an amateur or professional, but when he introduced collodion Fox Talbot considered it an infringement of his process, and entered an action against some person for using it. The action was decided against Fox Talbot. I thought this decision was not quite just at the time, and think so still.

The use of gelatine for making dry plates, both with and without collodion, having been known so long, and the improvements made in it so gradual, may account for its never having been the subject of a patent before the orthochromatic patent.

All the other great improvements, whether discovered by amateurs or professionals, have been made the subject of patents. Mr. Pouncey, a professional photographer at Dorchester, made the first permanent photograph in carbon. The autotype, the Woodburytype, and the platinotype have all been protected by patents; and when we find that more than 200 patents have been taken out for improvements in photography and photographic apparatus during the last twelve months, it does not appear probable that any improvements will be given "free to all men" in the future, either by professionals or amateurs.—I am, yours, &c.,

Bath, December 16, 1889.

J. DUTTON.

Exchange Column.

* * No charge is made for inserting Exchanges of Apparatus in this column but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.

Will exchange exterior background, good as new, for interior or conservatory ditto.—Address, E. PENFOLD, 106, Union-street, Turku.

Will exchange quarter-plate Instantograph, 1889, and cash, for half-plate International or Instantograph.—Address, THOMAS MOILES, West-street, Midhurst.

Large-size tracing machine and a pocket pistol will be exchanged for half-plate camera, lens, and dark slide.—Address, W. G., 16, Bartholomew-house, Bartholomew-close, E.C.

I will exchange cabinet burnisher, also first-class C.D.V. portrait lens, for backgrounds or accessories. Address, W. WALKER, 156, Noel-street, Nottingham.

Will exchange photographic and mathematical instruments for English and American coins in good preservation.—Address, W. ETHELBERT HERR, 49, Melbourne-street, Derby.

I will exchange two plaques, decorated, fifteen inches diameter, Minton's manufacture, and two pieces of pottery, for a good second-hand half-plate or quarter-plate camera.—Address, H. SPILSBURY, 3, Berry-street, Stoke-on-Trent, Staffordshire.

Four thousand four hundred Gem and Victoria mounts, half of each, in exchange for whole-plate or 10x8 lens; whole-plate burnisher in exchange for head and body rest, or posing chair.—Address, H. T. AULT, Photographer, 19, George-street, Newcastle-under-Lyme, Staffordshire.

James's triple flash lamp (good as new), Guerry's shutter for studio, and Cowan changing box, for 10x12 plates; wanted, 12x10 and 8x6 printing frames, optic lantern, &c.—Address, JOAN DAVIS, 34, Cambridge-road, Barking, Essex.

I will exchange a mahogany dissolving-view lantern, four-inch condensers, gas bag, pressure boards, and about one hundred slides, sixteen-feet screen, &c., for a harmonium or tricycle to value.—Address, PHOTOGRAPHER, 27, Plinington-road, North Preston.

Answers to Correspondents.

* * Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHS REGISTERED:—

W. W. Stainthorpe, Kirkleatham.—*Photograph of thrush feeding its young in nest.*
J. Ashley, Liverpool.—*Two photographs of Mr. Parr Davies.*

PRINTS.—Apply to Goupil & Co.; they are the owners of the copyright of the works you require.

J. W. (Ipswich).—The trade methods employed for making bromide paper have not been divulged.

E. R. P.—The shutters are made of millboard. This may be obtained from any wholesale stationer or bookbinder.

J. FOSTER.—Order a guide to Jersey through any bookseller. You will not experience any trouble with your plates when passing the Customs.

JOYCE.—Not having had any experience similar to yours, we cannot indicate the cause. Try another formula for the developer; you will find plenty in the ALMANAC.

S. G. R. J.—We cannot tell the cause of the stains. It looks in one instance as if some of the colour of the mount had been dragged by the burnisher over the edge of the print.

LANTERN.—There is nothing better than ordinary flour paste as a cement in binding the edges of lantern slides. Gum and gelatine are liable to cause the paper to peel off when long subjected to heat.

W. RAY inquires whether the Ordnance maps are printed from "photo-zinc" blocks or by the zinc process, which is analogous to lithography.—The maps are printed by photo-zincography, and not from surface blocks.

C. WILSON.—To use a still a ten-shilling annual license is necessary; but this does not entitle any one to purify or deodorise methylated spirit. This is prohibited by law, and its infringement entails very heavy penalties.

BRONZE MEDAL.—To master Aristotype printing, it is only necessary to adhere to the directions given by those who sell it, and exercise common judgment. There is no greater difficulty in it than in printing on albumenised paper.

W. V.—Probably the carbon tissue is at fault, as it may be after some years' keeping. To test this, place some of it, before it is sensitised, in warm water, say at 100°. If the gelatine will not dissolve, the tissue is worthless.

A. B.—It is only when water contains chlorides or carbonates that a milky appearance is produced when washing prints prior to toning. The milkiness, or otherwise, of the water makes no difference as to the permanence of the prints.

G. CONSELL.—There is no paper made in England which is suitable for photographic purposes; that is, for ordinary silver printing on albumenised paper. This seems almost a reproach on British paper makers, but it is a fact, nevertheless.

A. MONTAGNA.—1. The Stannotype Company is not now in existence. The necessary materials may, no doubt, be obtained from M. Liesegang, Düsseldorf, Germany.—2. About twelve or fifteen inches.—3. The results by the two processes are very similar.

B. B. A.—The yellowness of the prints is due to imperfect fixation. Either the fixing bath was too weak, or the prints were allowed to stick together so that it could not act freely. From the yellowness being in patches there is little doubt but the latter was the cause.

W. J. C.—We are not at all surprised that you have been unable to obtain eikonogen at ordinary chemists. Had you applied to any other dealers in photographic materials you would have been more successful. Messrs. Marion & Co. are the wholesale agents.

CR. PRINT puts the following query: "After taking the prints out of the washing bath, how can I dry them so that they will lay nice and flat, as I do not want to mount them? They are the ordinary silver prints."—Place the prints between blotting paper and allow them to remain there until they are perfectly dry.

WILLOTT (Maldon).—It is very unlikely that the water contains nitrate of potash; even if it does that will not interfere with the removal of the silver. Hydrochloric acid would be very objectionable in the bath. The yellowness is due to imperfect fixation. The bath is too weak. Use four ounces of hyposulphite of soda to the pint of water.

C. LAWRENCE.—By all means avoid bronze-printed mounts if you value your reputation. There is no harm in gold lettering, but, of course, gold-printed mounts are much more expensive than those printed with bronze. If price be an object, why not be content with ordinary ink?

HERTS.—An ordinary lantern, with a good paraffin lamp, will answer very well for enlarging on bromide paper. Of course the exposure will be dependent upon the amount of light and the density of the negative. A few trials on small pieces of the paper will overcome the difficulty of exposure.

W. G. CLEMENTS.—The enclosure is magnesium ribbon. Place the ground glass about an inch behind the negative, and, having ignited the magnesium, move it across the surface from one side to the other. Experiment will enable you to determine the proper length of ribbon to employ.

C. R. R.—With a lens of seven inches equivalent focus you will not be able to take full-length carte portraits in a studio only fourteen feet long. Such a lens, however, will answer quite well for three-quarter and bust pictures. Cannot the length of the studio be extended with the proposed alterations?

HERBERT W.—1. Coat the plates with collodio-chloride of silver emulsion if you want to print by contact.—2. We believe both photometers are good. We should advise you, however, to learn to judge of the exposure without the aid of photometers. We should never think of using such things ourselves.

SARUM writes: "Having saved the old hypo fixing baths for several months past, I a few days ago added some potassium sulphide, as per instructions given in the article on residues in the JOURNAL of July 26, which I have read over several times. Now what I am uncertain about is whether enough sulphide has been added, for on dropping a few drops into a glassful of the turbid hypo solution I could not see that it became any clearer, but perhaps rather the reverse. The vat of solution has since the addition of the potassium settled and become quite clear. Is this any test that all the silver has been precipitated?"—The fact that the precipitate has subsided, and the supernatant liquor has become clear, is no proof that the whole of the silver has been thrown down. If the addition of more sulphide to a little of the clear liquid produces no further turbidity, the whole of the silver has been precipitated.

NORTH LONDON PHOTOGRAPHIC SOCIETY.—Mr. N. P. Fox having resigned the Secretaryship of this Society, Mr. G. J. Clarke, 52, Queen's-road, Brownswood Park, N., has been elected to the office.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—This Society has made arrangements to hold an international exhibition of photographs and apparatus in the Art Gallery, Newcastle-on-Tyne, from April 18 to May 3, 1890, when the Association intends offering a number of medals for competition in various classes.

THE TERRORS OF A THEODOLITE.—Pathans, as may be supposed, are not familiar with the theodolite and flag of the surveyor. But at Kilah Abdulla, beyond Quetta, the Madras governor's party found that a frontier surveyor busily at work was the victim of a terrible suspicion. The Pathans, he said, believed that the theodolite was a kind of photographic camera, and, like the camera, it took pictures upside down. More than this, they think a person using the theodolite can see through the walls of houses, with the appalling result that the ladies of their families are photographed by the infidel standing on their heads. It is not surprising, therefore, to hear that the surveyor is highly unpopular, and is apt to be shot at.

PHOTOGRAPHY IN COURT.—McKellan v. Jowett.—In this action Mr. Eastwood appeared for the plaintiff, Mr. Samuel Dunseith McKellan, of Hulme, Manchester, who is a dealer in photographic apparatus and the patentee of two improvements in the manufacture of photographic cameras, who sought to obtain an injunction to restrain the defendant, Mr. Arthur Jowett, who is also a dealer in photographic materials, carrying on business at Romiley, from manufacturing, exposing, or selling any cameras similar to those of the plaintiff, made under the specifications of his two patents, and, further, for an inquiry as to damages. The plaintiff also asked for an order for the delivery up of a particular camera, now in the possession of Mr. P. Harris, of Stretford-road, Manchester, which was alleged to have been sold by the defendant and to be an infringement of the plaintiff's letters patent, and for the costs of the action. The defendant, in order to save further expenses being incurred, did not appear, and there was no defence to the motion. The Vice-Chancellor, therefore, made the order as asked for in the notice of motion.

* * As we go to press much earlier next week than usual owing to Christmas, all communications to the Editor must be received not later than Monday morning.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1547. VOL. XXXVI.—DECEMBER 27, 1889.

A MYSTERIOUS LANTERN SLIDE.

STRICTLY speaking, it is not one but a series of slides which form the theme for these remarks.

A few weeks ago we received a parcel of French lantern slides from a correspondent, who informed us that they formed portion of some which he had taken with him to India, where they had been for two years. Observing that they had gradually been becoming somewhat obscured by a species of mistiness, he undid the binding of one of them with a view of wiping off the scum which seemed to have settled upon the covering glass, when he found that all the area not protected by the mat had become corroded. Only those slides of French manufacture were thus effected, those of English make suffered no change. Curious to know the cause of this erosion he sent them to us.

Upon removing the binding and opening up some of these, the covering glass, where unprotected by the mat, presented a finely dimmed appearance, not so coarse as even the finest ground glass, but as if breathed upon, or as if it had been exposed to the fumes of hydrofluoric acid. The extreme fineness of this elicited from friends to whom it was shown warm expressions of desire that such could be obtained in sheets for focussing screens for cameras. Indeed so fine was it, that some at first considered it was only a scum of the nature of a varnish, which could be removed by scraping with a knife, especially as such scraping did remove a dusty deposit from the surface, only, however, to reveal the fact, under the microscope, that the dust was disintegrated glass, and that the surface below was eroded. We had previously applied to the glass quite a variety of solvents of gums, including alcohol, ether, chloroform, and benzole, without any action being apparent. The image on the slide having been formed on albumen, we were quite at a loss to account for the liberation of any corrosive, such as hydrofluoric acid—the only one we could then think of as capable of having an action of this nature on glass.

As it was somewhat of a puzzle, we showed it to opticians, experts in glass burning, and others likely to throw light upon the subject, but without avail. Knowing that the singular beauty of many of the French slides depends upon their being toned with mercury, we casually mentioned this when bringing the subject before the meeting of the London and Provincial Association on Thursday last week, and a clue to the difficulty was suggested by Mr. Everett, one of the members. Mercury, he said, was well known to attack glass, presumably from its affinity for lead.

Following up this idea, we think a valid cause of the disintegration of the glass is to be found in the fact that mercurial vapour, liberated from that imbedded in the interstices of the image by the heat of India, operated upon the glass and decomposed it. We have obtained numerous formulæ employed by French glass makers in the manufacture of glass of a nature similar to that made use of in covering lantern slides, and we find that not only lead but arsenic and other metallic substances form component parts of the same. We here give as a specimen formula one of these employed in actual practice:—Sand, 110 lbs.; oxide of lead, $49\frac{1}{2}$ lbs.; potash, $39\frac{1}{2}$ lbs.; arsenious acid, 1 lb. Why slides of English manufacture should have enjoyed immunity from the erosion spoken of it is difficult to say, unless there is some difference in the composition of the glass, or perhaps there is no mercury employed in the toning. We have known innumerable instances in which the image on the slide has itself faded as a result of this toning, even when it was protected by a varnish possessing a good body, but in this case it was probably washed in an imperfect manner. Heat, at any rate, was not a factor in the destruction, as several of the slides in question had never even been subjected to even the heat of the lantern; but never before have we known of a corroding action on the cover glass such as that described. The action of moist air we all know exercises an action upon optical flint glass, especially that of French manufacture, as most persons who have taken opera or field glasses to India are but too well aware, the action showing itself in the form of a brown stain on the flat side of the object glass. This is sometimes, too, the case with photographic lenses, although, happily, it is of less frequent occurrence, owing perhaps to the fact that photographers in hot, humid climates probably keep the lenses of their photographic objectives cleaner than they do those of their binoculars. In every case we have seen, it is the flint glass of the achromatic lens that has suffered from atmospheric causes.

It is probable that some of our readers may possess knowledge of the erosive effect produced on glass by the vicinity of mercurial vapour—assuming such to have been the true cause in the case we have adduced—and, if this be so, we shall gladly welcome any hypotheses as to the nature of the action. Fortunately the remedy is not difficult, as it consists in supplanting the eroded cover by a new one. In the meantime the possessors of French transparencies, whether for the lantern or the stereoscope, which have seemingly become dimmer by the joint actions of time and a high degree of

temperature, should, before looking upon the images themselves as having succumbed, ascertain whether the fault does not really lie with the covering glass.

PHOTOGRAPHY AND THE SOLAR ECLIPSE OF DECEMBER 22.

On Sunday last, December 22, one of those comparatively rare events—a total eclipse of the sun—took place along a band extending from Western Africa to the West Indies. Two small expeditions have been sent from England to observe the phenomena, which, it was hoped, would be visible. The first of these is under the direction of the Rev. S. J. Perry (whose able address on "The Photographing of the Heavens" will long be remembered by those who had the good fortune to hear it at the Birmingham Convention of 1888), and has been stationed at Barbados in the West Indies; the second expedition is in charge of Mr. A. Taylor, and has been stationed at or near Loanda, in West Africa. Each observer took with him a reflecting telescope (silver-on-glass mirror) of twenty inches in diameter (these being the largest instruments ever used for such work), fully equipped for photographing the eclipse. These mirrors, with their mountings, have been made from designs specially prepared by Ainslie A. Common, Esq. Their focal length is only forty-five inches; so that, as a diaphragm fifteen inches in diameter is employed, we have a focal aperture of $f/3$.

The objects of the expeditions have been three in number, all depending mainly on photographic operations for a successful result.

1. To detect any possible changes in the corona during the two hours and a half that elapse between totality at Loanda and at Barbados.

2. To photograph the coronal extension as far as possible from the sun.

3. To determine the photometric intensity of the corona.

The eclipse remains total for 186 seconds at Loanda, and for 135 seconds at Barbados. Five plates were to be exposed with the mirrors during this brief period at each station, the exposures being 1, 5, 10, 20, and 40 seconds respectively.

The following developer has been suggested by Captain Abney for developing the plates:—

- | | |
|----------------------------|-----------------------|
| 1. Pyrogalllic acid | 2 grains. |
| Water | $\frac{1}{2}$ ounce. |
| 2. Potassium bromide | 20 grains. |
| Water | 1 ounce. |
| 3. Ammonia (880) | 1 part. |
| Water | 9 parts. |
| 4. Sulphite of soda | a saturated solution. |

To No. 1 add two drachms of No. 2, thirty minims of No. 3, and two drachms of No. 4. Add water to make up to two ounces.

Reducing this developer to its simplest terms, we find it to consist of—

- | | |
|-------------------------|------------------------|
| Pyro | 1 grain, |
| Ammonia | $1\frac{1}{2}$ minims, |
| Potassium bromide | $1\frac{1}{4}$ grains, |
| Water | 1 ounce, |

with enough sulphite of soda to prevent discolouration. It is evidently a developer well calculated to bring out contrast, and that was doubtless the work for which it was designed, the object being to differentiate between the light of the extreme parts of the corona and the almost equally intense light of the

surrounding sky. We would suggest that the mixture given above be known as the "Eclipse Developer."

The observers had some practice with their instruments before leaving England, and with the twenty-inch mirror Mr. Taylor secured a photograph of the "earth-shine" on the crescent moon, giving an exposure of three minutes. The nebulae in the Pleiades required an exposure of thirty minutes.

As expeditions from the United States have also been sent to observe this eclipse, we feel confident that, granted a clear sky, much additional knowledge as to the nature of the corona and other solar envelopes will be obtained.

PHOTOGRAPHING INTERIORS.

CONCLUSION.

THE expedients narrated will usually minimise the evil effect of strong illuminated skies causing halation effects, but window lights must be considered as affording other troubles. Important among these is the illumination of the atmosphere of the interior of a spacious building, as, for example, a church. When a long vista with interesting details at every point, a sun-light atmosphere is ruinous to good work, excepting only when the visible path of the sunbeams or the object they strike upon aid in the pictorial effect the whole scene produces. Then, if the slanting rays be not very wide, very pretty effects may be secured; but this is comparatively rare, and the consequence is that when public buildings and places of worship are the objects of the camera, the best effects are far more easily obtained in late spring, summer, and early autumn, where the haze to be illuminated and produce fog is generally almost entirely absent. This haze is a very serious question as much indoors as out, for in the winter months, with fogs and extra smoke, the days out-door or in that fine negatives can be taken are wont to be exceedingly few and far between. In this connexion let the photographer remember that by choosing the time of day he takes the view he may frequently eliminate any injurious effect the sun's rays might produce by waiting for the luminary to "go round," and so send his rays at such an angle that they are scarcely seen. It should suffice here to remind the reader that he can easily ascertain this by remembering that the communion table is almost universally placed at the east end. Again, too, if the sun cannot be thus evaded, the least degree of foginess is produced the more it lies in the direction of the photographer's back. Facing the rays end on, as it were, we get fog; looking along them, their source being behind, the fog is reduced to a minimum.

Then, again, as to windows it is very far from always being the right thing to use all the illumination possible. For interiors a very considerable range of effect is obtained by entirely or partially cutting off the light from one or more, and, sometimes, great improvements in the general effect, the chiaroscuro of the picture. We have, as we write, two views of the same apartment taken by two different photographers: in one the foreground is brilliantly illuminated by what is evidently a large window, in the other the window has been curtained over. The difference in effect of the two pictures must be seen to be appreciated.

The subject of windows or other illuminating orifices would take long to exhaust, but we will leave them in pointing out a most important effect for consideration. It very frequently happens that the camera itself is placed in the full light of the window, while the apartment to be photographed is but dimly lighted, and long exposures will be required. The best con-

tion will then be present for fogging the plate: the lens must be screened. If the camera possesses no screen of its own, some extemporised arrangement must be made. The dark cloth may be brought forward, or some object, such as a step ladder with cloth thrown over placed between camera and light. Light must not be permitted to fall upon the lens, for if it be, crisp negatives will not be obtained. A very awkward position sometimes occurs when the object to be photographed, say the high altar in a cathedral, is just below a window. We repeat the lens must be screened, and in this case the screen may have to project a considerable distance forward; and it is most strongly to be impressed upon all who are unfamiliar with this work that our remarks on this head are of the greatest importance.

It may not here be inopportune to point out that the arrangement of the furniture of a dwelling room plays a most important part in the pictorial effect. The removal of a piece of furniture—a chair, a table, or even an ornament on a table—an inch or two in one direction or another may make all the difference between a pretty picture and an awkward-looking map of a room. Foreground is most important; this, of course, is always the case, and is of prime importance in the photograph of an apartment full of furniture and knick-knacks. And here, no matter how experienced a hand the operator may be, it will generally be found necessary to refer to the ground glass to observe the effect; indeed, it would be well to have some one to shift the furniture to the dictation of the artist at the ground glass. Those who have not done much work of the kind will be astonished how important is the attention to these matters. But a word of caution: though pictorial effect is an important consideration, the propriety of things must be borne in mind. If a room be of the nature of an ante-room, for example, it would never answer to block up the obvious path for the sake of making the object balance or fill up bare spots. And, once more, some ladies have most particular notions as to the exact spot for each particular piece of furniture, and if her views be ignored the result might be for the picture to be returned upon the hands of its producer.

Finally, we have to consider the plates themselves that are fittest for the purpose. We have already spoken of backing them; now we have to say that the general consensus of opinion is that slow plates are far the best for indoor work. With quick plates it is often considered that with such contrasting depths of shade and varieties of colour from white to black, greyiness is apt to be produced with the quicker plates. Whether this be the case or no, we do not offer an opinion.

We have now treated the subject from standpoints sufficiently numerous to give the tyro many useful hints, and perhaps the older hand may be benefited by some of our remarks on this interesting kind of work—the photographing of interiors.

FREQUENTERS of the leading London thoroughfares do not require reminding that, since the recent legislation on the subject of electric lighting, the different Companies have not been idle. Indeed, their activity has, in many instances, been a source of considerable inconvenience to pedestrian and vehicular traffic. It is certainly a wise precaution that the leads are underground, as there they will be less dangerous, also less liable to injury, than if they were overhead. In some instances insulated leads are laid in metal tubes, in others bare metal conductors—bundles of stout copper bands are simply laid in tubes of an insulating material. In America, according to the newspapers, there have recently been several fatal accidents through overhead leads which were but imperfectly protected; also some serious

conflagrations through faulty internal appliances. Such accidents may be avoided with underground mains, and more attention to the fittings. As a rule, the current is supplied in a dangerously light state of tension, and is then reduced by a transformer to suit the necessary conditions. The extension of the electric supply will be a great convenience to photographers, as there are, or shortly will be, few localities in London, or other large towns, where the electric light will not be as available as gas. Then, there is little doubt, the light will be still more extensively utilised for photographic purposes.

THERE are photographers in London, who a few years ago went to the cost of dynamos and engines for generating the current and have since discarded them, now taking their supply from the mains. From this source the current is always at command, and is available at a moment's notice. Unfortunately there is not, at the present time, an electric meter which is thoroughly satisfactory in practice. However, most of the Companies have a contract system with regard to incandescent lights—so much per light per year. With the arc light, which is only used by photographers at uncertain intervals, the charge is based by some Companies upon the consumption of the carbon rods, these, of course, being supplied by the Companies. Till the adoption of a satisfactory meter, this is a very equitable arrangement.

THE enforcement of the Merchandise Marks Act reveals the not altogether pleasant fact that by far the larger proportion of the Christmas and New Year's cards sold in this country are printed abroad, as the imprint upon them testifies. A large number of collotypes used to be printed in Germany and passed off here as being of home production; but a considerable check has been put upon this trade by the vigilance of the Customs officials, who, now, will not permit them to pass unless they bear an imprint showing the place of their production. Still, however, the Act is being evaded in photo-mechanical work.

It may not be generally known that a considerable number of the "process blocks" and photographically engraved *intaglio* plates used here for book and periodical illustrations are made on the Continent, though printed from here. These blocks and plates, or the prints made from them, bear no indication whatever that they were made abroad; hence they are supposed, by the uninitiated, to be of English production. Although foreign work may be as good as, or better than English, it does not appear of so high a value in the eyes of the British public. If all foreign-made plates had to bear an intimation as to the place of their origin, they would not be so largely employed by many first-class publishers as they are at the present time. Many fancy cards and books bear the imprint "designed in England, printed in Germany." Why should not photographic engravings be marked "engraved abroad, printed in England?" There can be no valid reason why the Merchandise Marks Act should be put in force with regard to prints, while it is not enforced in the case of the plates or the blocks themselves.

It will be remembered that some time ago considerable indignation was aroused in this country by reports stating that an execution was suspended, after the unfortunate culprit had been pinioned and everything was in readiness, in order to give a photographer time to arrange his apparatus to secure an instantaneous photograph of the event. Several highly sensational articles appeared in some of the daily and weekly papers on the barbarity of the proceedings. It now appears, from a letter from Mr. Stanley, dated from Lake Victoria, that the report had no foundation whatever; in fact, that at the time of the execution there was no photographic apparatus within five hundred miles of the scene. Photography is here exonerated from the charge of having been put to a most inhuman purpose, and the whole affair proved to be a "much ado about nothing."

THE shortest day is now past, and from this time the duration of daylight will gradually extend. As a matter of fact, however, it is noticed by photographers that the light is usually not so good in January as it is in December or November. A London portrait

photographer recently remarked to us that, as a rule, we have more "November fogs" in January than we do in the month to which they are credited. Anyhow, in London this year November fogs were conspicuous by their absence. Whether they will make their appearance later on remains to be seen.

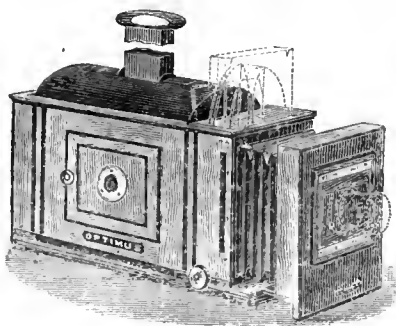
ARTIFICIAL light—so far as the flash light is concerned—is not being so much adopted by professional photographers as it was at one time predicted it would be. However, amongst amateurs during the festive season it will not be overlooked, and many and interesting, as well as amusing, pictures will no doubt be produced. In taking instantaneous pictures by the flash light considerable discretion should be used. An instantaneous photograph taken while a little harmless fun is proceeding may be, and we regret to say has been, turned to a very unpleasant account.

THE present is about the time when photographers collect their year's residues and turn them to account. Many will do well to refer to the articles on *Economy in the Printing Room* which recently appeared in these columns before commencing operations. The desirability of reducing all the residues to the smallest possible bulk by complete burning in the case of paper, and by thorough drying in the case of the chlorides and sulphides, should always be borne in mind. Also, that as much extraneous matter as possible, which contains no silver, should be removed before sending to the refiner. When this is done, trouble and expense is saved in the reducing.

LANTERN IMPROVEMENTS.

APPROPOS of some lantern literature we have received from Messrs. Perken, Son, & Rayment, we perceive that this firm has introduced a novelty which is one of great value, namely, that of interchangeable condensers in their enlarging lanterns. In order to utilise a half-plate or a whole-plate negative in the production of a picture of larger dimensions, it is imperative that the diameter of the condensers in the enlarging lantern shall exceed in a slight degree the diagonal of the negative, or its measurement from corner to corner; and the condenser for the larger size is, from its longer focus, far from being so well adapted for the smaller negative as one specially constructed for that size. The difficulty may in some measure be met by having the negative carrier fixed to a travelling base, so as to permit of a negative of relatively small size being moved forward in a large cone of light, so as just to be covered by the light and no more; but this is only an expedient, and one for which no provision has ever been made in enlarging lanterns, at least in none which we have seen.

But by having the condensers set in a wooden frame capable of being inserted in a properly grooved recess in the body of the enlarging lantern all trouble is at an end, and this is the idea that finds practical expression in the new Optimus enlarging lantern, of which we here give a drawing. By having only one enlarging lantern, and



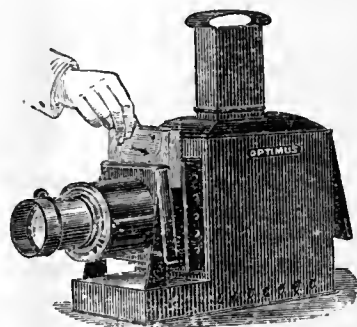
two or more condensers of different diameters, it is evident that the enlarger is placed on a footing similar to the possessor of a camera that has facilities for holding plates of different sizes with lenses to suit each. Nay, more, for by discarding entirely the use of this lantern as a photographic enlarging apparatus, and inserting in the adapting frame a condenser of small size, by which we here mean one

of four inches diameter, it is evident that we now possess a projected optical lantern pure and simple, and not a mere makeshift at all, but one which fulfils every optical and mechanical requirement. For this reason we are much pleased to be able to record what is a decided improvement upon a useful piece of apparatus.

In the construction of the ordinary optical lantern we may direct attention to what we consider is also an improvement upon the time-honoured instrument of this class—it is found in the inserting of slides from above rather than in the pushing of them in from the side. This latter method is, doubtless, indispensable in the case of a succession of slides being "passed through the lantern," as the common phrase runs, but it interposes a serious difficulty when manipulating the chemical or life tank, of which we give a view in the adjoining cut.



This may contain small fish, large aquatic beetles, or any of the innumerable objects known as photographic life, or it may contain chemicals or crystallisable compounds acted upon by other chemical reagents, or by the electric current. It may contain an exposed plate, the development of which is to be shown upon the screen to a large number of spectators. The lantern shown in the cut, in which the objects are inserted from



above, indicates the best way in which the tank is to be inserted.

We are much pleased to find that Messrs. Perken, Son, & Rayment have provided the photographer with so much that conduces to success and enjoyment and the real instruction and amusement of the public in their enlarging and projecting lanterns.

SENSITOMETRY IN TWO CHAPTERS.

CHAPTER II.

BEFORE alluding more directly to the mechanical department of sensitometry, I may perhaps be allowed to revert shortly to the mention in the preliminary report of the Congress of the method of gauging the results obtained and the means proposed for obtaining them.

It is not perfectly clear what the report really means in speaking of the renunciation of methods of measurement "by means of special apparatus" on the ground that these "measure only the functions of the sensitive substance and of the apparatus employed." We are compelled to employ some form of apparatus, preferably such as will measure the "functions of the sensitive substance" rather than our own. After alluding to the complications introduced by the variations in development, the report goes on to recommend a system of comparison of the tints obtained by development with a series of artificial or mechanical tints formed by black hatchings on a white ground. Surely no method of comparison could well be much less satisfactory than this, yet it is difficult to fix on a really satisfactory one; and as undoubtedly the matter received due consideration before the report was issued, we are brought face to face once again with the difficulties of the subject on the mechanical side.

From the purely mechanical point of view we have specially to deal with the sensitometer proper, that is, the apparatus employed for the purpose of actually measuring or graduating the light allowed to fall upon the standard sensitive surface. As I have already pointed out, existing instruments fail in the requirements, inasmuch as they present no definite series of gradations or tints; for though the

may be useful enough for special purposes and in the hands of those who are thoroughly conversant with them, it is not possible to state in accurate terms the relative values of their different tints. Thus the various forms of photometer or actinometer in daily use in connexion with carbon printing and similar processes, consisting of a scale of tints or steps of gradually increasing opacity, behind which a strip of sensitive silver paper is exposed, though practically useful and thoroughly intelligible to those who constantly employ them for the purposes named, are of little or no use in other hands or when otherwise applied.

By actual experiment it is ascertained how many thicknesses of paper or other translucent material forming the screen are penetrated by the light necessary to properly impress the tissue when printing from a certain negative, and this once found proves approximately correct with the same negative in all variations of light. But it is impossible to say that the readings carry any meaning to one unacquainted with the instrument, or that the absolute value of the exposure given can in any way be calculated.

In the Woodbury photometer, which is much used for similar purposes, as well as for roughly estimating the value of the light when making camera exposures, the system is different, but still subject to the same objection. In this a central aperture of clear glass is surrounded by a series of tints painted to imitate silvered paper in various stages of darkening, and a strip of sensitive paper being exposed through the clear aperture for a given time is compared with the surrounding tints, and that one selected which most closely resembles it. Here, again, the reading is purely arbitrary, and possesses no value except to those who have had experience with the instrument; while the accuracy of the estimation is still further lessened by the possible variation in colour between the sensitive paper and the painted tints. The actual colour taken by albumenised paper under the action of light is modified, as is well known, by many circumstances: by the salting of the paper, the length of time it is floated on the silver bath, and the strength of the latter, as well as by the character of the light employed, so that here again it would be folly to say that any definite measurement is obtained of the light used.

In Warnerke's sensitometer the different tints of the graduated screen have been arranged with the utmost care in order that they may, as far as possible, bear a definite relation one to another, and it is usual to consider them as having such proportionate values that each alternate tint represents a double exposure. The screens or scales are made by the Woodbury type process, and consist of a cast in coloured gelatinous ink from a plate presenting hollows of gradually increasing depth. It is of course possible, working with one standard, with the same batch of ink and with an absolutely uniform pressure, to produce a series of screens which shall be identical, but it is, to say the least, extremely difficult, even in the hands of the same operator, to secure these conditions. In the first place, the slightest variation in pressure produces a corresponding difference in the quantity of ink left in the mould, consequently an entire modification of the whole scale, and in order to avoid this result we are met with the additional necessity for the employment of glass of absolutely uniform thickness as well as mathematical accuracy of surface. Further, the temperature of the ink must remain constant, or a similar variation in the quantity remaining in the mould will be the result, from which it may be gathered that, even adopting the most stringent precautions, the same individual will find it no easy matter to produce uniform scales.

When, however, the work is executed by different operators from different plates and with different ink, it is impossible to imagine that anything like uniformity can be attained, and this alone prevents the Warnerke or any other screen consisting of varying thicknesses of semi-transparent matter of whatsoever nature from being accepted as a universal standard. Such may be useful for individual purposes, but no more; and it is no doubt such contrivances that the promoters of the Congress had in view when in their report they deprecate the use of special apparatus.

To Mr. Alexander Cowan, so far as I am aware, belongs the credit of having first pointed out the conditions necessary in a universal method of measuring sensitiveness. His proposition, made nine or ten years ago, was to employ a falling shutter immediately in front of the sensitive surface, the shutter to be pierced with a series of open-

ings varying in length but bearing a definite relation to one another. Mr. Cowan pointed out the importance of being able to measure *by time* the actual exposure given to some standard light without the intervention of any translucent or semi-opaque material between the light and the plate. These two conditions I hold to be absolutely essential, and though Mr. Cowan's apparatus would be but limited in its utility, still I repeat the credit is his of having shown the direction in which to work.

Ignoring *vis inertia* and friction, the speed of a falling body is readily calculated by known rules; but taking them into consideration, the difficulty of accurately timing such a shutter as that proposed would be very great, while the range of exposures possible without very cumbersome apparatus would be comparatively small. Still, for some purposes such an apparatus presents advantages over any of the artificial screens.

Somethirteen or fourteen years ago Captain Abney described a method of producing an evenly graduated tint on a photographic plate for photometric purposes, dispensing with the use of different thicknesses of superimposed paper or other translucent material. This consisted in causing a star, cut out in blackened tin or cardboard, to revolve rapidly in front of a white background and photographing it while in motion. Clearly the central portion of the "star" would be rendered black, the tint gradually and imperceptibly becoming lighter until the pure white of the background was reached, and by cutting out a strip from this vignette a delicately graded tint would be obtained which might be varied to any extent by modifying the outlines of the star.

On this principle was based the proposal for a sensitometer which Mr. Bedford and myself, independently of one another, communicated to the Photographic Club some years ago on the same evening, and which has since been elaborated for experimental purposes. Roughly, this consists of a disc of thin metal or other material mounted upon an axis and capable of being set in rapid revolution. It is plain that if apertures of varying angular measurement be cut in this disc at different distances from the centre the disc when revolving will cut off varying proportions of light from a sensitive plate placed behind it and in close proximity; and these apertures may be so proportioned as to be definitely related to one another, while at the same time giving accurately timed exposures or subdivisions of a more or less protracted exposure.

Thus, if the disc be divided into a series of concentric zones, and commencing with the outer one a portion representing six degrees of arc be cut away, and with each succeeding zone the excised portion be increased by six degrees, when set in rapid motion a series of exposures will be given to a plate placed behind it and uncovered for one minute, varying from one second upwards by seconds, since the smallest opening of six degrees represents one-sixtieth of the total period, the plate is allowed to remain uncovered. The result on development is a series of concentric bands of correspondingly varying intensity, more or less sharply defined according to the distance between the sensitive surface and the revolving disc. Or a series of points may be marked at regular distances from the centre, and representing gradually increasing angular measurements from a radial line. If these be joined in a rough curve, and the portion of the disc between the curve and the radius be cut away, an evenly graduated tint will result instead of a series of abrupt ones. Still another alternative consists in drilling a series of holes of uniform size at regular and calculated distances from the centre, when the image on development will consist of a number of concentric lines of varying density separated by bands of clear glass. In each case it is easy to calculate the exact period of actual exposure that has been given to any portion of the plate.

Such a piece of apparatus, while admirably adapted as a basis to work upon, giving as it does the absolute power of subdivision of a comparatively long exposure, is better adapted for use with a feeble or artificial light than with daylight or magnesium, which appears to offer the most advantages as a standard. Still, it is open to modification and improvement, while there are methods possible by which the light itself may be curtailed before reaching the sensitometer without the intervention of screens.

It is impossible to say how *small* an exposure to magnesium, or even to gaslight, would suffice to impress a rapid gelatine plate, and

herein lies the weak point of the apparatus described. Some of Muybridge's earlier exposures on *wet collodion* plates were calculated, he informed me, to have been no longer than the *two-thousandth part of a second*—in the camera, be it observed. What, then, can we imagine would be the duration of *direct* daylight or magnesium that would just impress a rapid gelatine plate?

To give some idea of the difficulty of reducing the exposure to the necessary point, I have made the following calculations:—If a disc revolving at a very high speed were pierced at a distance of about three and one-fifth inches from its centre, with a *pinhole* one-one-hundredth of an inch in diameter, a plate exposed behind it for *one second* would receive the two-thousandth part of a second's exposure where the pinhole traversed it. That being the camera exposure required to impress a wet plate, I think I shall be well within the mark in curtailing the exposure to the ten-thousandth of a second for even an ordinary gelatine plate, and to give that with the revolving apparatus would require the pinhole to be removed to a distance of sixteen inches from the centre. Moreover, the disc would have to revolve at a very high speed indeed, for even at the rate of 600 revolutions a-minute, successive exposures might vary as much as ten per cent.

The same objection—at least, with light rich in active rays—applies to the ingenious and elaborate "time" sensitometer of Mr. J. W. Newall, described in the JOURNAL some months ago. The difficulty of accurately measuring and mechanically subdividing extremely short periods of time is what we then have to cope with, and we must, therefore, see if we cannot adopt other auxiliary measures.

It is of no use suggesting the employment of feebler artificial lights. I have already pointed out what I consider the importance of adopting as a standard a light similar in character to daylight, such as magnesium. With that source of illumination it is possible by reducing the area of the aperture through which it passes to the actinometer, and by increasing the distance at which it is used to very greatly reduce its power without altering its character, and, if necessary, we may use a "standard lamp" with a pinhole aperture and place it at any reasonable distance in order to gain the needful degree of attenuation. I must say, however, that in my own experiments I have not got uniformly satisfactory results in that manner.

I had intended touching on other points, but find it impossible within my present limits. However, I am not unhopful that on the lines I have indicated we may some day be able to compare accurately, and in a rational manner, the sensitiveness of gelatine, collodion, or any other plates, and to state in mathematical terms the value in "standard candles of both sun and moon." When that "good time" arrives, it will be interesting to know how many "sixty times" plates come up to their description.

W. B. BOLTON.

THE IMPROVEMENT OF FAULTY NEGATIVES.

IV.

In my previous articles, when dealing with this subject, I referred somewhat in detail to what I considered was the best method of removing large opaque markings from negatives. We have, however, frequently to contend with faults or opaque marks in negatives of small dimensions, yet still sufficiently pronounced to cause eyesores or troubles in the finished print. I am not now referring to such flaws as come within the scope of being removed by the simple means of spotting out in the print, but those annoying marks which just get beyond being so treated.

To make a transparency and fill up such flaws, and from the same pull off a new negative, would by most people doubtless be considered a most troublesome and roundabout way of setting to work for the removal of such faults, and doubtless this would be so. Recourse must be had to other means of overcoming same. Therefore, in such cases a different treatment is advisable. Should the negative in which such are found be varnished, then the first thing to do is to proceed to remove the same, an operation by no means difficult, and which is rapidly done by flowing over the surface of the negative some *absolute alcohol*. Methylated spirit is not nearly so good for this purpose. Absolute alcohol acts much quicker, and in a few minutes will have so softened the varnish as to permit of its being easily wiped off with a soft cloth or clean handkerchief, leaving the film beautifully clean; and should there have been any defects in the varnishing, such as grit

or dirt, they will be found to be removed. Any small opaque flaws, such as I have referred to, and which are now found incorporated in the film, can be taken out with a scalpel. I know it is not many workers who have courage enough to take up and use a scalpel on their negatives, but once any one knows the proper way of setting to work, such timidity soon vanishes. Of course, there are those who are so clumsy with any tool as to be quite outside this work; it is certainly a delicate operation, but still not so much so as to deter any one gifted with a little neat-handedness easily overcoming it.

Were any one to take up a common penknife, and with its aid try to peck away at such spots, it is just about certain they would do more harm than good. Between a fine scalpel and a penknife, however, there is a wide difference in the operation we are considering, for let it be borne in mind it is not like setting to work at one's writing desk, and with a penknife scrape out some ink blots, an operation which every schoolboy knows a trifle about. It is not a *scratching* out operation we have to do with at all, but what I may term a *cutting up* or *breaking up* of the flaw we are wishful of removing. Therefore, my advice to those who are sufficiently bold to try their prentice hand at such work is, first, look out for some film that has such a case apparent as a small spot or mark—say about an eighth or a sixteenth of an inch in size—and having removed the varnish, place the same on a good retouching desk. Now with a very finely pointed scalpel, and the aid of a strong pair of spectacles, let him proceed not to scrape or scratch out the flaw, but make *fine cuts* or incisions right into the film. This will break up, as it were, the flaw, and after a very few of such it is wonderful how they will appear to have vanished. Should there be any clear glass showing through the film just where one or two incisions of the knife has penetrated down to the bottom of the film, such are quite easily spotted out with a pencil or brush after the negative has again been varnished.

Just let those who attempt this work for the first time bear in mind that it is not a digging out of the flaw, but a cutting into the same of very fine, transparent lines or snags. A good pair of strong spectacles, as I have said, are very useful to magnify matters, far better than a single glass, because they permit of entire freedom of the hands and help towards steadiness. A healthy eye with a strong pair of spectacles will get a good magnification at about ten inches off the negative.

Another prolific source of faults found in nearly all classes of negatives are those showing minute pinholes or transparent specks. Who is there that has not lost his temper at times on looking through his negatives after development and finding quite a crop of these annoying little visitors turning up, marring, as they frequently do, an otherwise almost perfect result? We are told dust is the cause of these troubles. Somehow I fancy the blame does not always lie at the door of the users of the plates, for I can well remember when, having something to do with a dry plate manufactory, we could always tell the day beforehand when a batch would have a few of these faulty platea. However, be the cause what it may, it is the removal of them we have now to deal with. Prevention is better than cure certainly, but when it is too late, and the best has to be done with just what one has got, then a power of patience will come in handy. Just lately I met with a provoking case of this sort. A young beginner had got a nice negative, but it had quite a colony of these pinholes. He thought the best way to get rid of them was to peck away with a finely pointed pencil and so spot them out. At it he went, but he was not long in finding out that he had not an easy job, for he was piling on the lead outside the holes. Now I know this sort of thing is by no means uncommon with novices; they never imagine that exceedingly small touches on the face of a negative can better be done with a very finely pointed sable brush and a suitable spotting material than can be accomplished with a pencil, yet such is the case. The brush must be a really good one, however, and the medium so applied as just to give the desired opacity. When undertaking this work a beginner is sure to err in laying the colour on too dense. In most cases only a slight modicum is required. A little practice, however, will soon teach a patient worker how to spot out pinholes with a brush. It needs unlimited patience.

Another case which recently came under my notice was that where a negative was marred by a hole somewhat larger than could be classed under pinholes. The picture in question was a seascape, and my friend had been trying hard to spot it out until he quite gave it up. I at once saw the similarity of the shape of the flaw to that of a duck, so taking a finely pointed needle a few touches soon had the desired effect, and that picture has been admired for its duck over and over again, and sells well at the present moment. When such flaws can be utilised in the manner described, by all means take advantage of them.

Another very common means resorted to for improving certain

classes of negatives is blocking out, skies that are faulty being a very common example of this kind. In many landscape negatives the mere blocking out of a sky is by no means a matter of difficulty, for where there are not many projections beyond the sky line, it is quite easy to run round the outline with a brush and black varnish, or some other suitable medium; but in cases where, say, vessels' masts with their rigging, form out prominently into the sky, it is next to impossible to block out such satisfactorily. When such happens, it is better to remove the faults from the sky and then proceed to gain density by means of a transparency, and from that again a new negative. It is not only in landscape negatives and such-like where faulty skies have to be dealt with that blocking out is of service; very frequently in such as architectural, engineering, and the copying of black-and-white subjects. In this category also may be included the removal of faulty backgrounds and the blocking out of statuary. Such work requires a good steady hand, and close application to do it properly. As a rule, black varnish comes in very handy, especially for the broad parts of such work, but where very fine outlines have to be followed I prefer to use a mixture which I have found very useful, and which I make up myself as follows:—Into a little flat penny ink bottle place a small quantity of red ink, then break up a tablet of Indian ink and put the same into the bottle. Now add a little gum. When this is well mixed we have a mixture that will work well with either brush or pen. Perhaps, all considered, as good results can be obtained by working with a finely pointed sable brush, but I have also found for very minute outlining that a lithographic pen works very well. Of course, fine work of this kind requires to be done on a retouching desk, and it is as well to have a little front light on the negative as well as that transmitted through; this enables the worker to see better not to overlap the lines. When doing this work the use of a strong pair of spectacles will improve matters considerably. Blocking out is not really hard to overcome; it only needs patience and neat-handedness.

I now come to the consideration of such flaws as are caused by accidents or carelessness, such as scratches, cracks, &c., and perhaps there is hardly any more troublesome fault to remove from the face of a negative than that of a scratch, when such happens to be in such a position as to make its presence felt. The filling up of same is not unfrequently attended with opaque markings all along their line, and this to some will appear as bad as the scratches themselves. When such is the case, perhaps there is no better way of proceeding than to go ahead and get rid of the scratches with as little overlap as possible; this done, pull off a transparency, work in the new transparent defects, and finally pull off a negative. In this manner much may be done to remove a serious scratch from the face of a valuable picture.

Cracked negatives may also be treated in a similar way, and when a duplicate negative has been secured (provided the crack has not injured the film), an operator may proceed to strip the film from the glass and lay it down upon a new plate which has been prepared with a coating of collodion and gelatine, or, what is perhaps simpler still, an Eastman stripping skin may be brought into requisition. It is not every one, however, who is expert at stripping an ordinary gelatine negative. Those, however, who have never tried it should practice on some negative of no value. The operation is performed as follows:—The negative, if cracked, must first be attached to another sheet of glass of the same size. This can be done in several ways, by glue or binding round the edges. When firmly fixed and bound together, the face of the negative is coated with a good thick coating of enamel collodion. When set, this is washed under the tap till all greasiness has disappeared.

The negative is then placed into a very weak solution of hydrofluoric acid (of not greater strength than four drachms to ten ounces of water). This solution must be contained in a leaden or rubber tray. After a short time it will be observed that the edge or corners of the negative will begin to leave the glass. Now a clean, stout piece of white writing or other suitable paper must be laid flat, and the negative, removed face down from the hydrofluoric acid, is brought and laid upon the white paper, and the surfaces squeezed into contact slightly. The edges of the glass are then sized, and with one or two vigorous shakes—if all has gone well—it will be found that the film leaves its original glass support and attaches itself temporarily to the white paper support. A prepared sheet of glass having been provided beforehand to receive the film upon, by first rubbing the surface with French chalk, and then collodionising and giving a final coating of a thick solution of gelatine, is now taken and immersed in a dish of clean water until the surface becomes somewhat tacky; this is then laid flat on the table, and the surface flooded with quite a pool of water. The film and paper are then grasped, and by a dexterous movement are turned up and drawn on to the gelatine surface and squeezed into contact, the paper afterwards being removed and, if

desired, when dry, the whole can be stripped off the glass and the negative recovered in the shape of a film alone. Hydrofluoric acid is not the most comfortable agent to work with, and due care must be taken when using it. After several trials, however, but very few failures will result, and the operation reduced to one of certainty.

Some workers use Eastman films in this operation, but the clean white paper does first-rate to keep the film on until it is brought into contact with its final support.

Such are a few of the methods which in my hands I have, and do, from time to time, bring into play when dealing with negatives that require doctoring. In nearly every case there will be much that will occur to the mind of an operator that is almost impossible to record in a paper of this kind. In concluding these articles, I think I cannot do better than say, that before proceeding to any of the methods of doctoring study the case well; and having done so, and made up your mind what is best to be done, set about it with confidence, for without doubt much better work will result than would be the case when a worker approaches the thing timidly.

T. N. ARMSTRONG.

COLOURED PHOTOGRAPHS.

CONCLUSION.

In our last paper we concluded our *second painting*, and I think, with certain *rational* modifications, there is nothing laid down for the legitimate production of a water-colour portrait that cannot be applied, with equal advantage, to the painting of a similar portrait upon a photographic base. I see no very strong reason, therefore, if we treat both pictures virtually the same, why both should not possess sufficient merit to be classed as works of art. To my thinking, if there be any argument at all upon this point, it would be more likely to reflect unfavourably upon the *artist* than upon the *work* he produces. In other words, it is more likely that a man who *only* paints upon a photographic base may be somewhat less entitled to the distinction of being called an *artist* than that his works should possess so little merit as to be unworthy to be classed as a *work of art*. This would appear more evident if we were called upon to pronounce a verdict upon the merits of a work without knowing whether or not photography had lent a helping hand. We will now push along with our *third painting* and the general finishing of our work.

Having before us now a picture with a generally harmonious tone all over it, we will at once see there is a lack of vigour and force, which we must try to alter. This we can do by *taking out* the high lights and putting in the strong "darks," without which no picture possesses finish or solidity. It will, however, be well, before attacking these points, to generally look over our entire face, starting from the forehead and proceeding downwards, thoroughly *finishing* as we go along. In doing this the directions laid down for the second painting will carry us through, only in *fining* up the face we must place our work *between* the hatching already on or we may deepen the colour, and this would result in heaviness. It will be worth noting that if our shadow-tint above the eye should be too purple we must correct it with a greenish tint; if too green we should use *flesh colour* instead. If we wish to *lower* the blue of the iris use sepia and cobalt in judicious proportions. This applies equally to the *white* of the eye: We must paint the eyelashes with sepia, not trying to put in each hair, but, broadly, as if we were painting a shadow.

Assuming that we have given due attention to these points we come to the *high lights*, which we must *take out* before we go any further. A good method of doing this is as follows:—Take a clean brush, dip it in water; with this mark out accurately the form of the light to be taken out. This done, rub quickly (but in a horizontal direction) with a soft clean rag. This will have the desired effect; if more light be required it can be repeated. If the *outline* of this light should be too hard we must soften it by working upon the edges with the adjacent colours. Bear in mind, too, that in nature there is no such thing as outline, so we should try to make all our tints blend softly one into the other.

This done, we proceed to soften and round every part that seems to require it. Keep before us the fact, too, that *shadows* also indicate form, therefore we must paint them full in colour, exact in form, and warm in tone. If our shadows be too *purple* we must neutralise them with green, if the reverse, that is, too *green*, work upon them with purple, and if they are too blue hatch them with orange. A tint for the latter purpose may be made from Venetian red and yellow.

For all retiring points of our portrait grey must be largely used, as such we will find in nature. The corners of the mouth will require, no doubt, a few touches of shadow colour, and the edges of same softened by a delicate blue or grey. The ear is always semi-trans-

parent, and should be painted with a view to preserving this quality. The shadows of the ear should always be *warm* if not red.

If any of our work should appear coarse or wiry, we can soften this by applying plain water with a clean brush and wiping off *quickly* with a clean rag and then replacing as much of the colour as we may think necessary. This mostly refers to a more or less *fair* head, but judiciously thought over can be modified to suit all complexions. The light in the eye should be put in with the point of the brush charged with Chinese white. As water colours dry without a gloss, a little gum may be used in the strong shadows to give depth and transparency, but should be used sparingly and *never* until the picture is finished as regards the painting.

With this we will conclude, and I trust what I have laid down and we have figuratively done together will have appeared sufficiently clear to all who have been good enough to follow these papers. I have always had a strong opinion regarding coloured photographs, and know artists perfectly capable to paint from the life who turn out portraits on a photographic base with all the freedom and vigour of their so-called *genuine* portraits. Works by such artists as I have in my eye while I write are more deserving to be classed as works of art than under the contemptuous title of coloured photographs.

REDMOND BARRETT.

PARIS EXHIBITION, 1889.—PROCESS BLOCK MAKING.

ARTISAN'S REPORT TO THE MANSION HOUSE COMMITTEE.

EXHIBITION—Goupil & Co.—Commencing with the Exhibition. I may dismiss it in a few words, as there were not any firms, either English or foreign, exhibiting the process or method of producing process blocks; and only one French firm—that of Boussod, Valadon, et Cie., successors to Goupil et Cie.—that had an exhibit of specimens of process block work. These certainly were very fine specimens of photogravure. I might mention those that struck my attention; they were all produced from wash-drawings by the artist named: *An Oriental Scene*, by E. L. Weeks; *Horses and Foals*, by R. Goubie; *Two Children Asleep*, by L. Perrault; *The Sailor's Wife*, and *Pushing off the Boat*, by G. Haguette. There was but little in them to show the method of production; but they were most probably obtained by the ordinary grain-screen method in the camera. They were printed on fine thin paper and then mounted on cardboard. There were also other results produced by the half-tint process in colours of an artistic nature. This exhibit was in the Liberal Arts Gallery.

Illustrated London News and Artists' Drawings.—There were some very good specimens of wash-drawings, suitable for the half-tint process, in the *Illustrated London News* exhibit, by Forester & Woodall, the shadows not being too heavy and the high lights being toned down. This may be of some use to artists who wish to draw for the half-tint process. It may not be out of place to mention the conditions necessary to obtain the best results for line work, as frequently drawings are made not at all suitable. White cardboard should be used, and a black ink that dries a dead colour, not glossy. It is well to have a little gamboge or sepia in the ink. If the drawing has to be much reduced the lines should be thick and wide apart, that is, the work should not be too fine. These hints, if acted on, would prevent both the artist and the process being brought into disrepute.

Obtaining Information.—It is very difficult to obtain detailed information of the process as worked by different firms in Paris; for although there are no secrets in the methods used in the trade, the details on which so much depends, so as to obtain the best results, are kept to themselves by the various firms. On the whole, the methods used by firms in Paris and London are the same in principle and general application.

Information Obtained.—For much of the following information I am indebted to the firm of Messrs. Krakow & Michel, Rue de Fleurus, and to M. F. Perriot, Secretary of the Photogravure Society of Paris; and, for confirmatory knowledge, to the book published by the Labour Bureau, containing the answers to questions addressed to various trade societies.

Visiting Workshops.—Application was made to the following firms for information and permission to visit their workshops, with the result that a favourable reply was received from Messrs. Krakow; and an answer from Messrs. Boussod, Valadon, et Cie., that it was not their custom to give information, or to allow visits to their *ateliers*, although they answered a few of the questions addressed to them; also from Messrs. Dutheil, stating that it was impossible for me to visit their place. From the others no reply was received.

The firms written to were:—

Firms applied to.—1. Messrs. Krakow; 2. Boussod, Valadon, et Cie.; 3. Dutheil; 4. P. Dumont fils; 5. Garnier; 6. Lefman; 7. Minot; 8. L. Rolla; 9. Rose Victor; 10. Clicherie Générale; 11. Michelet.

Quality of Work—Materials Employed.—The work turned out by Parisian firms is certainly as good, and sometimes better, than by London ones; but the materials employed and the methods are, generally speaking, the same. No process depending on any new principle is employed; the improvement being more in the manipulation, depending on the individual workman and the time taken, which is a little longer than is usual in England.

Prices—Cost.—This is a difficult subject to report on, although it is a very important one, prices varying as they do in London, depending on the kind of work, the quality, and the trouble and time taken in obtaining a result. There are, I am informed, firms in Paris that take in any kind of work, cutting down the prices and obtaining inferior results. Still, as a criterion, it might be mentioned that work is frequently sent to Paris from England, but seldom or never to London from France, which shows that the prices are less, and the quality as good in Paris.

Wages—Mode of Payment.—Wages are paid on the Saturday, with the exception of the photographers, who are paid monthly. Photographers are paid 14*l.* 10*s.* per month by one firm. The amount varies in Paris from 10*l.* 10*s.* to 18*l.* 15*s.* per month. Printers are paid about the same as operators. Transferrers can earn from 2*l.* 10*s.* to 3*l.* 10*s.* per week, and the lithographic artists from 2*l.* to 3*l.* 10*s.* per week. Engravers receive from 2*l.* to 3*l.* 10*s.* weekly. There are about ten engravers in Paris who earn 3*l.* 18*s.* weekly. They are all paid in hard cash. In two firms the men, I understand, share in the profits of the employer, and the employers insure the lives of their *employés*. There are no fines in the trade. It is not the custom in France to give any notice on either side, and the engagement may be broken at a moment's notice.

Hours of Work.—The hours of work throughout the trade are ten; this is the usual time for most trades in Paris. In one house they commence at seven and leave off at six in the summer, and in winter they work from eight to seven. They have an hour, from twelve till one, for dinner. There is no Saturday half-holiday, and although Sunday is usually a rest day, in one firm they work on that day if necessary. They have about seven days' holiday per year. Overtime is worked and paid for at 2½*d.* extra per hour over the ordinary time rate. There is work all the year; but for about two months trade is somewhat slack.

Piecework.—There is no piecework; it has been tried by the employers, but has not proved a success. There are no sweaters or jobbers, but there is the usual division of work—photographers, etchers, mounters, &c.

Female and Juvenile Labour—Apprentices.—There is no female or very young juvenile labour. There are a few apprentices who are paid from 4*s.* to 12*s.* 6*d.* per week. They earn about 4*s.* 2*d.* per week for the first year, 10*s.* second year, and 12*s.* 6*d.* the third year, besides which they have a Christmas-box, and also encouragement money if they become useful. There is no premium paid, and the agreement is usually for three years, commencing generally at about fourteen; but it must be understood that apprenticeship as in England does not exist in France; there is only a mutual arrangement, but it cannot be legally enforced by either side, and can therefore be broken at any moment. Improvers are paid about 25*s.* per week. The head of one firm said that he did not think it paid to employ much juvenile labour; and this is no doubt correct if the best work is desired.

Power.—Steam power is largely used for driving the dynamos for lighting purposes, lithographic machines, etching boxes, and saws.

Manner of Life—Living—House Rent.—They have only two meals a day in Paris; one from twelve to one, and the other after half-past six. Their meals are principally obtained at the restaurant, or from the cookshop, very little cooking being done at home. In the early morning they have a cup of coffee or wine, and a very little to eat; and in the afternoon the same while they are working. There is no tea-meal or supper, as we have in England. As to cost of living and house rent, it is a somewhat difficult subject, varying as it does with the ideas of the individual; but while living is about the same as in England, house rent is higher and clothing dearer—living costs about 7*s.* per week, and rent is from 1*s.* to 4*s.* per week higher than in London for the same accommodation, workmen live principally in flats, there being very few small houses as in London. Their families are not so large as is frequently the case in England. Travelling is cheap by tram, bus, or boat.

Photography.—Steinhil's lenses are chiefly used in copying. Negatives are taken up to about 24 × 22. The wet collodion process is principally used as in England. Bitumen is largely used for printing

on zinc. In one firm, besides printing on zinc, the following well-known method is largely used:—Take an ordinary negative and print on photo-transfer paper, transfer to stone, touch up and make perfect, pull transfer, and transfer to zinc, and etch in. This has advantages if the original is imperfect; but printing direct on the zinc is better if the original is good, as in the transferrings one is liable to lose some of the work, as well as thicken the lines. In one firm an ordinary camera is not employed; the dark room is used instead, the lens being fixed on the wall, the copying board consisting of an iron framework carrying the board, and running backwards and forwards on rails. Inside the room, the ordinary dark slide, carriers, and bellows are dispensed with, the focussing screen and the plates being inserted in a framework with moveable sides, so as to take any size glasses. This plan has advantages over the ordinary way. The negatives were taken on plate glass, nearly a quarter of an inch thick, were of a black colour and very good quality. In the same firm, for half-tint work, they printed on copper, affirming that, although it was more expensive than zinc, better results were produced. The Brush dynamo is principally used. In one firm the Dubosq electric lamps were used, but they are no better than the ordinary type employed in England.

Etching.—Two large plates are considered a fair day's work, and but little small work seems to be done. The boxes are driven by steam power; the method is very simple. A long iron rod is kept revolving by a strap from a pulley; on this, at intervals, are fixed eccentric pieces. These alternately push up and let down the boxes under which they are placed, imparting to them a rocking motion, which is more regular and less liable to stoppage than by using hand power. The boxes are stopped by a lever, which takes them off the rod. Guttapercha is used for lining the boxes; it is said to withstand the acid better than pitch, one box having been in use for eight years only having had a few repairs. The ordinary method of etching with nitric acid is used.

Mounting.—Mounting is done on mahogany as in England. A circular saw is used for cutting the wood, but a fret saw for the zinc. The fret saw seems to have advantages over the circular saw, as it is able to cut round corners more easily. These are driven by steam power. A hand drill is used for making the holes in the metal previous to mounting, and a plane, running in a groove, is used for planing the sides of the zinc.

Work in Paris for Englishmen—Trade Society.—I was informed that Englishmen who knew the process well, and were good workmen, could obtain employment in Paris; but it would be well to apply to the *Chambre Syndicale of Photgraveurs*, by whom a registry and hiring book is kept. The Secretary is M. F. Perriot, and the address is Bourse du Travail, 35, Jean Jacques Rousseau (Bureau 11).

American.—Although there is no American exhibit in the Exhibition, I should like to draw attention to the fine specimens of the half-tint process in American periodicals. I need only mention *Paper and Press*, *The American Art Printer*, *The Inland Printer*, *The American Annual of Photography*, and *Annual of Anthony's Photographic Bulletin*. These all contain numerous specimens of work by American engravers and printers.

The fine qualities of these specimens may be largely attributed to the good rolled paper, black ink, and careful printing, to all of which it will be necessary for English printers to pay more attention, so as to get equally good results. As specimens of English process work, might be mentioned the *Guide to the Paris Exhibition*, in English, printed by W. Clowes & Sons. This, although good, lacks the cleanliness and brilliancy of the American productions. At the same time, I understand the price for a process block is greater in America than in England; but as cheap and nasty usually go together, it would be better to pay more and have finer results.

Map work is largely done by one firm, zinc blocks for chromo work and music work by another. For music work the usual method is practised; lines are cut in a lead alloy plate, the notes, &c., being punched in by a special punch. A transfer is taken from the plate and transferred to zinc, which is etched in the usual way.

As the firms visited were, I understand, the best in Paris, there was not much opportunity of obtaining information in regard to the cheaper kind of work done.

On the whole, the conditions of work and the workmen are pretty nearly the same in London and Paris. Although the wages are slightly higher, the hours are longer, being at least sixty per week in Paris to forty-nine in London, and the entire expense of living would be found slightly higher in Paris than in London. It seems to me that more attention should be paid here to the artistic side, and to the printing of the finished block in the letter-press machine, and we should soon equal our French neighbours and American cousins.

H. G. WALSH.

NOTES UPON A PROPOSED PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.*

Roman Warwickshire.—As Julius Caesar (B.C. 55) did not advance north of the Thames, his famous "Commentaries" tell us nothing directly of Central England. But a later Roman leader, Ostorius Scapula, established a line of forts along the Severn in A.D. 50; and he and his successors during the next four centuries made those famous "Roman roads" which were indispensable to the conquest of the country. Three famous Roman roads run through Warwickshire. The most important is the Watling-street, which extended from Richborough, in Kent, to Chester. It enters Warwickshire near Rugby, and from thence to Atherstone it separates the county from Leicestershire. At High Cross, about half-way between the two towns, the Watling-street is crossed by another Roman road, called "The Fosse-Way," which extends thence to Stretton-under-Fosse, in the south-west of Warwickshire, a distance of forty miles. It runs in a nearly straight line, up hill and down dale, with deep cuttings and many picturesque views; a true "old-world" road, and but little frequented now. Who will walk its length with a camera and resuscitate the Roman? I knew this "old Fosse Road" well when I lived in Leicester, and antiquaries have traced it all the way from Cornwall to Lincoln.

But the Roman road best known to dwellers in Birmingham is the Icknield-street (or Ryknield-street, as it is sometimes called, to distinguish it from another road of the same name). It enters the county in the south at Bidford, and runs nearly due north through Birmingham (where one long street still bears the name), to meet the Watling-street at Wall (the Roman station of *Etoctetum*), near Lichfield. For three miles in Sutton Park, on the north of Birmingham, the line of this fine old road is quite distinct as to direction, width, and level, although it is, of course, grass-covered. Beyond Warwickshire this Ryknield-street extended to Gloucester and St. David's in the one direction, and to the Humber, and thence to the Tyne, in the other.

Besides the Roman roads, practically the only certain traces left of the Romans in Warwickshire are the Roman rectangular camps, or fortified stations, at Manduessedum (close to Mancetter), and at Oldbury, in the same district; with another at Chesterton, on the Fosse-Way, six miles south-east of Warwick. These camps are well-defined, grassy mounds or "walls" of earth, enclosing a large central area. They will not be easy to photograph, and the best time for securing their outlines will probably be either early or late in the day, when shadows will accentuate their outlines.

Other important Roman stations are believed to have existed at *Præsidium* (Warwick), *Tripointium* (Cave's Inn, near Rugby), *Alauna* (Alcester), *Bennones*, or *Vennones* (High Cross or Cloudeley Bush).

Roman remains, coins, pottery, &c., have also been dug up at Brinklow, Monk's Kirby, and Wiltot. These latter relics appear to have been dispersed, and are probably now lost to us. They could all have been preserved and collected for purposes of study by their reproduction by photography. In the Warwick Museum there is a Roman tomb, or sarcophagus, found near Alcester.

Saxon Warwickshire.—The Romans were little more than visitors to Warwickshire, and they probably seldom, if ever, penetrated the recesses of Arden. After their departure in 449 A.D., they were succeeded by the Saxons, who "came to stay." And yet the Saxons cannot be said, in the ordinary sense of the term, to have "conquered" the Midlands. The tribe of Angles (from North Germany), who landed on our eastern coasts, very slowly advanced inland, and only by slow degrees gained power over, and amalgamated with—rather than subdued—the Celtic inhabitants of Arden.

Warwickshire formed a part of the Saxon kingdom of Mercia, which flourished under Cridda, Ethelbald, and Offa, from the sixth to the ninth centuries; after which the eight Saxon sub-kingdoms (the Heptarchy) united to form the Anglo-Saxon kingdom (827–1066).

Many of the tumuli or mounds of earth (sometimes so large as to be actually small hills) which stud the surface of Warwickshire, contain the remains of Saxon chiefs; but without actual exploration we cannot distinguish the Saxon from the Celtic tumuli. At Walton, near Wellesbourne a Saxon grave, which was opened in 1774, contained "three skulls lying in a row, with two Saxon jewels set in gold, one with an opal and two rubies, and the other adorned on both sides with a cross, between two rude human figures, with a sword or lance at the outer hand of each." Iron swords and the iron bosses of shields are also commonly found in Saxon interments; while stone implements, &c., accompany the bones of the Celts.

It is probable that during the next few years many of the as yet undisturbed tumuli will be explored; and it is earnestly to be hoped that photographs will be taken, recording each stage of the operations, and especially as showing the positions of the interred skeletons, whether lying on the side or back, and with legs drawn up or extended, as each of these points appears to have characterised different times and different nations.

Of undoubted Saxon remains we can only point to two places in Warwickshire. The first of these is at Tamworth Castle, just within the north-eastern boundary of the county, where the "herring-bone work" in

* Concluded from page 830.

the base of the lower wall is very characteristic. The second example is at Wootton-Wawen, where the lower half of the church tower is certainly of Saxon masonry. In each of these cases we want photographs taken from a moderate distance, showing the entire building, &c., and also several near views in which each stone would be distinctly represented. The best evidence of the complete colonisation of Warwickshire by the Saxons consists in the numerous Saxon place-names which still remain. The names of the rivers and hills—as Arden, Avon, Rea, &c.—are certainly Celtic, but most of the towns and villages have the truly Saxon affixes of “ham,” “ton,” “ley,” “thorpe,” &c. It is now pretty well acknowledged that the name of our new city—Birmingham—represents the dwelling-place (*ham*) of the tribe or descendants (*ing*) of Beorm; the said Beorm or Biorn being a Saxon chieftain.

The Danes, who ravaged the east and south of England so unmercifully in the ninth and tenth centuries, are thought not to have advanced beyond Rugby, the termination by being distinctively Danish. The gigantic ruddy animal which (carved out in the turf) ornaments the “Vale of Red Horse,” near Kineton, in the south-east of the county, may be either of Saxon or of Celtic age, although there is a legend which assigns it to Neville, Earl of Warwick, in the fifteenth century. Neville may perhaps have “scoured” it.

In the same direction, and just on the county boundary, are the famous Rollright Stones, some of which are seven feet in height. They resemble somewhat the famous stone circles (Druidical) of Stonehenge and Avebury, and are more probably of Celtic rather than of Saxon times.

The famous legend of Lady Godiva belongs to the very close of the Saxon period. Godiva (properly Godgiva) was the wife of Leofric, a powerful Saxon noble who died in 1057. He and his wife richly endowed a monastery and church at Coventry; and Dugdale records that in a stained-glass window in Trinity Church, Coventry, the stout earl and his fair wife are depicted, the former bearing in his hand a scroll with the inscription:—

“I, Leofric, for the love of thee
Doe make Coventre Tol-free.”

As in Leofric's time the population of Coventry was only 350, while the houses were but one storey high, with a door and no windows, the legend of “Peeping Tom” is in the highest degree incredible. As a fact, the tale probably originated during the latter part of the seventeenth century. Possibly some future historian will find in “Peeping Tom” the prototype of the man who carries a detective camera.

Many Saxon laws and customs have survived down to our own times; and to the Saxon rulers, in fact, we owe the very outlining of our county, as indicated by the word “shire.” They divided the “shire” into large divisions called “Hundreds,” and in Warwickshire we have:—

- I.—Hundred of Hemlingford, including Birmingham, Solihull, Atherstone, Tamworth, &c.
- II.—Hundred of Barlichway, including Alcester, Stratford, Henley-in-Arden, &c.
- III.—Hundred of Kington (or Kineton), including Warwick and the south-east of the county.
- IV.—Hundred of Knightlow, including Kenilworth, Rugby, Southam, &c.
- V.—Coventry, with a district around it, known as the “County of Coventry.”

It is possible that these “Hundreds” may form convenient sub-divisions for the purposes of our photographic survey, in which case the Birmingham Photographic Society would naturally commence with the Hundred of Hemlingford, whose area is about one-fourth (say 220 square miles) of that of the entire county. It is somewhat unfortunate that our city of Birmingham should be situated on the extreme north-west margin of the county; but the “county,” as a unit, is so much superior to any other that it must, perforce, be adopted.

Medieval Warwickshire.—With the conquest of England by the Normans in 1066, the written history of Warwickshire may practically be said to commence. In the Domesday Book we have a survey of the county, which includes the names of all the possessors of land, with the area and value of their possessions. With the Normans, too, we get the first important building operations—they erected many churches and castles. The monuments of the mediæval age (which extended from the eighth to the fifteenth centuries) include the most striking buildings in Warwickshire. The great castles of Warwick and of Kenilworth were, until the invention of gunpowder, practically impregnable fortresses, while Maxtoke Castle, if smaller, is even more interesting, for its “moat and outer walls and its old iron-bound gate and gatehouse are scarcely changed during 600 years.” Astley Castle, near Nuneaton, dates from the thirteenth century, when a castle was a fortified house with a moat. Tamworth Castle we have already mentioned.

The close of the mediæval period saw also the destruction of the monasteries and other religious houses by Henry VIII. (1539); but Maxtoke Priory, Polesworth Nunnery (near Tamworth), Merevale Abbey (near Atherstone), the Whitefriars Monastery at Coventry, &c., still remain (in a more or less delightfully ruinous and picturesque condition) to testify to the religious zeal of our ancestors.

And the old churches, how delightful they are! Shall it not be our

See that capital book, *The Scouring of the White Horse*, by Tom Hughes, in which describes similar work in Berkshire.

pleasure to record their every detail and architectural feature, so that when the hand of the “restorer” is laid upon them there shall be evidence retained of their original structure and condition? To take but two cases. “As an example of a preceptory and church of the twelfth century, of which neither restoration nor neglect have changed any important feature, Temple Balsall is unrivalled in Warwickshire, and not surpassed in any part of England.” Let the Beauchamp Chapel (1465) in St. Mary's Church, Warwick, be our second example. It is, without doubt, as a sepulchral chamber “one of the most famous in the kingdom, containing among others the tomb of Richard Beauchamp, Earl of Warwick, the cost of which alone exceeded 40,000*l.* of our money.”

Of moated houses and picturesque old mansions Warwickshire has many. Compton Wynyates (1510) is described by Timmins as “a marvellous and harmonious combination of the best and most artistic work in brick, stone, and wood. Its variegated colours of bricks, its richly-moulded brick chimneys, its exquisitely carved gables and beams and wainscoting, its bold and vigorous and delicate stone carving, its noble rooms and great hall with minstrels' gallery, its ninety rooms, with a secret chapel in the roof, its long lines of dormitories for soldiers, its venerable, moss-covered, and picturesque quadrangle, combine a series of charming views which are unequalled in Warwickshire and unsurpassed elsewhere.”

Of slightly earlier date is the old fortified manor house of Baddesley Clinton—“charmingly picturesque, for it has a fine ancient moat surrounding its grey walls, and quaint gables and chimneys, and its pretty garden parterres surrounded on three sides by the rooms of the house.”

Guy's Cliffe, two miles north of Warwick, is pleasingly described in Camden's *Britannia*, written in 1586:—“Hard by the River Avon standeth Guy Cliffe, the very seat itself of pleasantness. There have ye a shady little wood, cleere and cristall springs, mossy bottomes and caves, meadows alwaies fresh and green, the river rumbling here and there among the stones with his streame making a milde noise and gentle whispering; and, besides all this, solitary and still quietnesse, things most grateful to the Muses. Heere, as the report goes, that valiant knight and noble worthy, Sir Guy of Warwicke—so much celebrated after he had born the brunt of sundry troubles and atchieved many painful exploits—built a chapel, led an eremit's life, and in the end was buried. Howbeit, wisemen doe think that the place took that name of later time by far from Guy Beauchamp, Earle of Warwicke; and certain it is, that Richard Beauchamp, Earle of Warwicke, built St. Margaret's Chapell heere, and erected a mighty and giant-like Statue of Stone, resembling the said Guy.”

Warwickshire in Later Times.—During the sixteenth century many most interesting buildings were erected in Warwickshire, including Pooley Hall, near Tamworth; Weston Park, Shipston-on-Stour; Wormleighton; the Leicester Hospital, at Warwick, &c. Aston Hall (1618) is a fine Elizabethan mansion standing in a northern suburb of Birmingham, and now the property of the Corporation.

At the opening of the seventeenth century we find a Warwickshire man—Robert Catesby—acting as the proposer of the “Gunpowder Plot;” and quite lately it has been shown that the famous—or infamous—Guy Fawkes himself hailed from our county. Catesby was born at Bushwood Hall, Lapworth, and it is believed that the details of the plot were arranged there and at Norbrook, Clopton (near Stratford), and Coughton (the seat of the old Roman Catholic family of the Throckmortons.) The Princess Elizabeth was then residing at Combe Abbey, near Coventry; and the local conspirators arranged a hunting match at Dunsmore, near Dunchurch, for the 5th of November, intending, as soon as they heard of the success of the plot, to carry off the Princess and proclaim her Queen of England. When the news of the arrest of Guido Fawkes arrived, the conspirators fled into Staffordshire, where they were pursued and captured at Holbeach, Catesby being shot dead in the attack.

The Civil War in Warwickshire.—The first battle between the Royal and the Parliamentary forces was fought in 1642, on the plain below Edgehill, near Kineton, in the south-east of Warwickshire. The scene remains almost unchanged; and with the assistance of a few lantern slides (especially if our friend Mr. Jaques would supply moveable bodies of troops for the occasion) the eventful struggle of that day could be pictorially reproduced in a most graphic manner. This would be a novel and interesting way of teaching history.

Warwickshire Worthies.—To illustrate the local incidents connected with the lives of famous men and women who have been born in Warwickshire will be a pleasant task for the camera carrier. The plain stone farmhouse at Griff, near Nuneaton, acquires a halo when we know it as the birthplace of “George Eliot;” and all the country round is described in her various novels as accurately as in a guide-book. We shall associate the great antiquary—Dugdale, Garter King-at-Arms—with his home at Coleshill; David Cox with the Birmingham suburb of Harborne; Bishop Vesey with Sutton Coldfield; Dr. Priestley (the discoverer of oxygen) with the Birmingham suburb of Sparkbrook; Dr. Arnold and Rugby School; Matthew Boulton (who sold “what all the world desired—power”) with Birmingham; Michael Drayton (the poet) with Hartshill; and many another famous name shall add interest to our work. But, far above all, we possess in Stratford-on-Avon and the neighbouring country such an illustration of the life and work of the immortal Shakespeare, that this alone would be sufficient to render Warwickshire one of the

most interesting spots of the whole world in the eyes of all civilised nations! When the first Shakespeare jubilee was held at Stratford in 1768, the most popular song was that written by Garrick, in which the main feature is the connexion of the bard with the county:—

"Ye Warwickshire lads, and ye lasses,
See what at our jubilee passes:
Come revel away, rejoice, and be glad,
For the lad of all lads was a Warwickshire lad,
Warwickshire lad,
All be glad,
For the lad of all lads was a Warwickshire lad."

The Warwickshire of To-day.—And, lastly, we come to our own times. It is clearly our duty to secure, so far as in us lies, a faithful representation of the state of things as it is to-day. For every year we are "making history," and such a record will be just as much prized by posterity as we should ourselves prize it did it exist for the past. Just think what would be the value of good photographs of Bacon and of Shakespeare; or of Queen Elizabeth and her minister Cecil! Looking forward into the centuries, we can discern a time when no less value will be assigned to Mrs. Cameron's grand photographs of such men as Herschel and Tennyson with those by other workers of our good Queen Victoria and her "men of mind"—Salisbury and Gladstone!

We must accumulate portraits, then, of all our local worthies. And to them we must add street scenes—secured with the hand camera—from all our towns; delineations of the avocations of the people must also be obtained—from the country labourer in his smock-frock (a garment now rapidly disappearing) to the skilled artisan of the city seated before his lathe. Nothing that illustrates contemporary life must be omitted—the policeman, the soldier, and the volunteer must adorn our albums; and we must go "slumming" to depict the shady side of life.

Most congenial will be the task of recording the cottage and village scenery of Warwickshire. I have travelled round the world, I have spent many holidays in various parts of the British Isles, and I can assert, without fear of contradiction, that for characteristic pictures of rural and home life our county is unequalled. Take the string of Shakespearian villages along the Avon, for example:—

"Piping Peabworth, dancing Marston,
Haunted Hillborough, hungry Grafton,
Dadging Exhall, Papist Wixford,
Beggary Broom, and drunken Belford."

Let any one who loves English scenery drive (with his camera under the box-seat) from Warwick, through Charleotte (the home of the Lucy), to Stratford; and thence on to Evesham and Tewkesbury, calling at the villages named in the above quatrain (said to have been penned by Shakespeare) en route. Let him not hurry—take a fine week in, say, June—and I will answer for it that he will ever afterwards mark that excursion with the whitest of white stones.

In writing this brief account of our county, I must acknowledge my indebtedness to Mr. Sam. Timmins's recently published *History of Warwickshire*; but I have also studied most of the original authorities from Dugdale to Halliwell. Our noble Free Reference Library contains practically everything that has been published on Warwickshire; and some useful county books are also to be found in the Old Library.

If we are to "survey" Warwickshire in earnest, we must become students as well as photographers (and to my mind this will be one great good resulting from the task); we shall have to think of something else besides the beautiful and the picturesque, and we must remember that its associations may dignify the meanest dwelling, and render of world-wide interest the most prosaic surroundings.

Scientific Studies for Warwickshire Photographers.—Archæology—the study of the past, and ethnology—the study of the inhabitants of the district at the present day—we have already touched upon. But there is much work also to be done in geology, botany, and zoology.

The Geology of Warwickshire.—The coloured maps issued by the Geological Survey show the different strata of which the surface of the county is composed, and in a book which I wrote in 1881* a general description of the rocks of the county will be found.

Every landscape depends for its main outlines upon the rocks which lie beneath the soil, and for those who can "read the rocks," the study of the scenery of any district has a double pleasure. The oldest rocks of Warwickshire are the Cambrian quartzites and shales which lie between Atherstone and Nuneaton. These had been wrongly assigned to the Carboniferous period by the Geological Survey, and the discovery of their true age was made by Professor Lapworth and myself in 1882. The quartzites (altered sandstones) are insignificantly exposed in a series of immense quarries, and they are traversed by great masses of dark igneous rocks. The shales are well seen in the Stockingford railway cutting.

In the Warwickshire coal field, photographs of the surface works, collieries, and colliers might be secured; while descending beneath the surface, the flash light would enable us to secure interesting records of the mines and miners.

Of the Triassic strata which succeed, there is a fine section of the red sandstone, sixty feet in vertical height, at Hockley Cemetery, in Birming-

ham. Elsewhere the Triassic rocks are but seldom exposed, and we must be content with noting the level plains and rolling hills produced by their marls and sandstone.

The Liassic strata—limestones and clays—which rest upon the Trias, are quarried at Wilmore, Binton, &c., in South Warwickshire. The fossils contained in these and in other local rocks, of which there is a grand series in the Warwick Museum and in the museum of the Mason College, Birmingham, will form interesting subjects for our cameras.

Lastly, we have the drift, including those confused beds of clay and sand often containing great blocks of rock (erratics) which have been conveyed from Wales or from Scotland by the agency of ice during the glacial epoch. The immense boulder which lies in Cannon Hill Park (Birmingham) is a fine example of such a travelled block; but there are hundreds of others, and they are continually being destroyed—the farmers blow them up with dynamite. So, too, with the sections, the quarries, railway cuttings, &c., where the solid rocks are finely exposed. They change from day to day, until at last they are grassed over and lost. Let it be our task, by the aid of photography, to record their features for ever for the students of geology.

The Botany of Warwickshire.—The flora of our county has been carefully studied and described by Messrs. William Mathews, M.A., J. E. Bagnall, A.L.S., W. B. Grove, B.A., and other specialists. Artists have long visited our parks—Packington Park especially—to portray the grand old trees which adorn them, remnants of the old forest of Arden. Photography can admirably record every twig and leaf. It is certain that good photographs of plants, especially if taken while growing in their native haunts, would help to vivify the dry leaves of herbaria, and they would be much valued by those who study and teach botany. I have seen some exquisite work in this direction done by one of our members, Mr. Charles Pomphrey. Let me advise those who make this branch a speciality, to photograph trees either early or late in the day, when the nearly horizontal rays illuminate their trunks. Let photographs of the same tree be taken at different seasons of the year; then shall you be able to prepare a series of "dissolving views," in which the tree shall be shown to bud and blossom, be covered with leaves, and anon be bare, yet beautiful with frost-rime.

Zoology of Warwickshire.—In the minute life which occupies our ponds and ditches there is a never ending field of work for the photographer who combines the camera with the microscope. Some of us know, too, that it is better fun to hunt with the camera than with the gun; and we hope to be able to photograph the local birds, &c., in their native haunts, and so to secure pictures which shall surpass the best efforts of the taxidermist.

METHODS OF CONDUCTING THE PHOTOGRAPHIC SURVEY OF A DISTRICT.

There are several ways in which the photographic survey of any district may be carried out.

I.—First we have what may be called the "no method." Each member of the Society or body by which the survey is to be carried out wanders at will over the district, photographing whatever pleases his eye, and sending in his negatives or prints to the Managing Committee. It is not necessary to point out the demerits of such a scheme.

II.—If there is any good, modern, and tolerably cheap county history in existence, it might well furnish the groundwork for a general photo-survey. Lists of all the places and objects named in its pages should be drawn up, and grouped according to locality; each division being then allotted to those workers who have volunteered their services. For Warwickshire the recent publication of an admirable County History, by Mr. Sam. Timmins, offers a capital opportunity, the more especially as the book itself contains no illustrations. Any member who wishes to form a very valuable and interesting volume can do so by pulling Mr. Timmins's book to pieces (which is just what its reviewers have not done), interleaving it with a series of illustrations such as I have suggested, and then having it rebound.

III.—But for an exhaustive photo-survey of Warwickshire, or of any other district, I believe the plan must be based upon a large-scale and accurate map; and we must go to nature herself for our illustrations. Fortunately we are now provided with a map or maps (the work of the Government Ordnance Survey) which are in every respect admirable.

(a) *The Old One-inch Ordnance Map.*—Warwickshire was mapped on the scale of one inch to one mile as long ago as 1830. This map is sold in "quarter sheets" at one shilling each, each quarter sheet including about 160 square miles. The entire county on this scale makes a map 59 by 42 inches, which is sold in sheets for 17s. 6d.

(b) *The New One-inch Ordnance Map.*—The map described in the last paragraph is now, in some respects, out of date. But a new one-inch map is being prepared (by reduction from the six-inch map) which will be a great improvement. It will be similar in size and price to the old one-inch map. We can hardly expect to have this map for Warwickshire for a period of several years.

(c) *The Six-inch Ordnance Map.*—This is the ideal map for the work of a photo-survey. Its large scale (six inches to every mile) allows every field, and even every tree, to be depicted. The orientation of buildings is clearly shown, so that the photographer can see beforehand when the light will fall suitably upon any building, ruin, &c., that he may have to travel a long distance to photograph. The issue of the Warwickshire map on this scale is very nearly complete. The county is contained in 200 quarter sheets, each measuring 18 by 12 inches, and including six

* *Geology of the Counties of England, and of North and South Wales.* Kelly & Co. Ss. (Now out of print.)

square miles. They are sold at one shilling each, and 195 have been published.

(d) *The Parish Maps* are on the still larger scale of twenty-five inches to a mile. Four of these parish maps contain an area equal to one quarter sheet of the six-inch map. Each parish map measures 38 by 25½ inches, and contains an area of a little more than 1½ square miles. These also are all but complete for Warwickshire; and in some cases, as in Stratford, the ruins of Kenilworth, &c., they will be very useful to the photo-surveyor.

(e) Lastly, there are the town plans, on a scale of 125 inches to a mile.

PLAN NOW PROPOSED FOR THE PHOTO-SURVEY OF WARWICKSHIRE.

1. A Committee must be appointed, by whom the details of the plan can be formulated.

2. The maps of the county on the six-inch scale must be purchased. For each sheet of the map there must also be a light cardboard box bearing the same number as the map. In this box, mounted prints of all the photographs taken from objects contained in that sheet of the map should be kept.

A similarly numbered set of negative boxes would be needed to contain the negatives belonging to each sheet of the map.

3. All photographers who would be willing to place their services at the disposal of the Society should send their names (in pairs, if preferred) to the Committee.

4. The Committee would decide on a certain patch of country to be surveyed, say that included on twelve sheets of the six-inch map, if twenty-four names were received. They would then allot the maps, by ballot or otherwise, among the workers, giving one map to each pair.

5. Let us suppose that two friends, A and B, are allotted a certain area, say that contained in one quarter sheet of the six-inch map, including an area of six square miles. They carefully study the map and draw up lists of the promising points. They read up the history of any churches, ruins, or other monuments of the past included within it. Then they visit it for the first time, *without their cameras*. They walk across and across the district, calling perhaps at the inns, the farmhouse, or the rectory, gaining information, and jotting down places and times when the light will be favourable. On their next visit they are accompanied by their cameras, and the negatives necessary to illustrate the area—perhaps only two or three, perhaps ten or twenty—are soon secured; or a second and third visit are paid if necessary. Prints are then taken and lantern slides made, and the results are handed over to the Committee.

6. If a sufficient number of subscribers could be obtained, it would be very desirable to publish, perhaps monthly or quarterly, a selection of the most interesting photographs obtained, accompanied by descriptive letterpress. There must be many people in the county who would prize such a local record.

7. The principal books and works of reference upon the county should be added to the library of the Society, and lists of the large collections of books, &c., on the same subjects contained in the local libraries should be posted on the walls of the Club rooms.

8. One night in each week might be considered a "rendezvous night," on which all who were interested in the work of the survey should meet at the Club rooms; and on, say, one evening in each session of the Society there might be a more public display of the results which were being obtained. The year's work in this direction would naturally form an important feature of the Society's annual exhibition.

Society Excursions Utilised.—Everybody knows the routine of an ordinary excursion of a photographic society. Some well-known spot is selected, the further away the better, as North Wales, Dove Dale, Haddon Hall, &c. If the day is fine twenty or thirty members attend, and they go round the place in a crowd, occupying themselves to a large extent in getting in, and out of, one another's way.

I would suggest that the excursions be made local, and that a routine of work be drawn up beforehand, in which each detachment of three or four members should be assigned some particular task to accomplish. Thus, in a half-day excursion to Warwick suppose twenty camera carriers present themselves; let this number be divided into five sets of four members each, the tasks being as follows:—(1) The Castle and grounds; (2) St. Mary's Church, including the Beauchamp Chapel; (3) the Leicester Hospital; (4) the town of Warwick generally, its two gates and old buildings; (5) Guy's Cliff. Given a fine June afternoon, and the work of the survey for that town might be accomplished very rapidly on this plan. But it supposes that a full programme, showing the work of each section of the party, be drawn up beforehand and distributed.

Utilisation of Work already done.—There are probably in existence some hundreds, or even thousands, of photographic negatives which would be of service in the history of Warwickshire. It must be part of our task to draw up a list of such negatives, showing their subjects, their owners, &c. Some of them may, perhaps, be acquired by gift, loan, or purchase. A separate record-book should be kept for those negatives which are already in existence; and a circular asking for information on this subject might be addressed to the professional photographers of the county.

Documents, &c., copied by Photography.—We must photograph not only places but things. Old documents, seals, plans, maps, various objects of antiquity, rare fossils, &c. All these will provide food for the

camera, and will add interesting pictures to our stock. One advantage of photography in this direction is that it enables us to *bring together*, for purposes of comparison, a series of objects which may be scattered in many collections. The facsimiles of documents, &c., obtained by photographic processes are far more valuable than copies by hand can be, since they must be literal and unbiassed; errors in copying are avoided, and the evidence of the photograph is practically as good (sometimes, indeed, it is better, because clearer), than that of the original.

Size of Photographs to be taken.—I fear it will be impossible to bind ourselves down to any definite size of negative. Perhaps it would be best to make the whole-plate size (8½ × 6½) our standard. By the recent substitution of celluloid film for glass plates, the weight of the photographer's equipment has been greatly diminished—that a whole-plate camera with film weighs no more than a half-plate camera with glass plates.

By the use of cases or boxes to hold separately mounted prints, the difficulty of a variety of sizes is largely avoided. If albums are made up, they could be of such a size as to hold one whole-plate print, or two half-plates, on each page.

For hand-camera work the usual size is the quarter-plate (4½ × 3½), and for pictures of this size separate albums might be provided, or they might be mounted four on a page of the larger albums. It must be remembered, however, that it is easy to enlarge or reduce negatives, so that they could all be brought to one uniform size if that were thought desirable. Or it is even easier to enlarge or reduce the prints as they are made from the negatives, if we use bromide paper, &c., for printing upon.

How other Societies (Literary, Artistic, and Scientific) can Aid in the Work of the County Photographic Survey.—I trust that it may be assumed, that the three photographic societies already in existence in Warwickshire (namely, the Birmingham Photographic Society—Hon. Secs., Mr. J. H. Pickard, 361, Moseley-road, Birmingham, and Mr. A. J. Leeson, 20, Cannon-street, Birmingham; Leamington Amateur Photographic Society—Hon. Sec., Mr. F. M. Gowan, 20, Beauchamp-square, Leamington; Coventry and Midland Photographic Society—Hon. Sec., Mr. F. W. Dew, The City Studio, Coventry) will do all they can for the work of a photographic survey; but very valuable assistance can be rendered by several other societies within the county whose aim is the furtherance of Literature, Science, and Art.

How Antiquarians, Scientists, &c., can Aid in the Work of a County Photographic Survey.—Now, although we photographers may know *how* to photograph, we do not always know *what* to photograph. We want the historian, and the antiquary, the literary man, the artist, and the scientist to aid us in this. We want these students of the past and the present to draw up lists of places and objects in each square of our map which they consider ought to be recorded; and we want them to tell us all about them, so that the pictures we secure may be of interest to us as well as to them.

Assistance from Landowners, Residents, &c.—The nature of our work ought to secure aid and assistance from occupiers in all parts of the county. Armed with an introduction, stating the object and plan of this survey, the photographer may hope to be afforded facilities for his work which he would otherwise scarcely venture to ask for. Those who occupy historically interesting or beautifully situated places, will certainly be willing to aid in such a task, which may really be called national; while to the guardians of our churches—the clergy—our scheme should appeal with special interest.

Required Funds to be Obtained by Subscriptions and Grants.—In the work here proposed it is thought that all the workers will be willing to help, not only by paying their own travelling expenses, purchase of dry plates on which to make negatives, use of apparatus, &c., but also by subscribing to raise the funds which will be necessary for the purchase of maps, albums, cases, &c., and the defraying of the cost of printing in platinotype, &c., and making lantern slides.

It does not seem unreasonable, however, to ask for subscriptions from all who are interested in such a survey. Our own Society will, it may be hoped, make a grant in aid; and, doubtless, if a portion of the work is done as a sample, and well done, assistance will not be wanting.

The End of a Photographic Survey.—In the way of work to be done there could be no end. Every day sees some change, something of the old order is blotted out, something new is introduced. A railway is made across our pet landscape, and we must photograph the trail of black smoke from the engine, if it be only to send the picture to Mr. Ruskin. How rapidly the features of our towns are changing must be obvious to the most careless observer; and any one who has been absent from the new city for but a few years has good cause to sing the old song, "I can't find Birmingham!"

But the term "end" may also be considered in the sense of "object." What shall be done with our photographs when we get them? Well, this Society should retain at least two complete sets, a working set and one for reference. Complete sets ought also to be prepared for our Municipal Reference Library, for the British Museum, and for any other public institutions who desired a set and were willing to pay for it.

Our schools would value highly a selection of large photographs; and enlargements might be made for this and other special objects, as for exhibition on the walls of our free libraries, for teaching, and for lecturing purposes, &c.

Further, it appears to me that the pursuance of a task such as I have

attempted to sketch out would unite the members of this Society as only men are united who have a definite object in view, and who work for a common end. It would attract, it may be hoped, new workers to join our ranks; and would add to the status of the Society in the eyes of the public. Much energy which is now frittered away would be diverted into a useful channel; and although it may be said that the main benefits of our work will be reaped by a posterity "which has never done anything for us," yet I feel confident that we shall derive as much pleasure from doing the work, as our descendants will from its study and examination.

W. JEROME HARRISON.

A NOVEL MEANS OF REMEDYING CERTAIN DEFECTS IN PORTRAITS.

A VERY clever definition of photography that we once met with in the course of our reading made our art "the art of delineating aspects scientifically." This covers the ground very well; in fact we have never seen anything better. If we take the word "scientifically" in a free and liberal sense here, we might make it refer not only to true and faithful reproductions of objects, but to such scientific delineations of those objects as would tend either to the exaggeration of their beautiful qualities, or to the suppression of their ugly ones.

It is not our purpose to repeat in this connexion any of the unctuous art-jargon concerning "truth in art," &c., which occupies by far too much space in the columns of our photographic literature, but rather to ask our readers to consider the merits of the following curious process, which at first might be regarded in the light of a caricature only.

Transformism, the process alluded to, is defined by M. Ducos du Hauron rather diffusely as follows: "An image, characterised by a change in the relative proportions of the objects represented, is formed if a ray of light be introduced into a dark chamber, not through a simple orifice, but through two slits cut in places which are differently directed, and separated by a proper distance." He then proceeds to give some examples which are startling, to say the least. It seems that when the first of the two slits is vertical and the second (the one nearest the image) horizontal, the image, when compared with the original, will be found to be amplified or stretched vertically. Again, if one of the two slits instead of being rectilinear be curved more or less, the image will show curves or undulations laterally or vertically according to the direction of the slit. The examples therewith given are at least as strange and uncanny as the former ones. All the examples given are portraits, and here is the point that is so surprising—the natural likeness is well preserved in spite of the extreme distortion. The distortion of countenance seen in a convex mirror in some measure approaches to it, but it is not the same.

The method of working adopted by M. du Hauron is quite simple, and we will here give a condensed account of it, premising that for certain unfortunate individuals possessing great facial deformities this process may prove valuable, the photographer having it in his power to greatly exaggerate certain features, and to suppress others. It is this point to which we desire to direct our readers' attention, that the process, called "transformism" for want of any better name, puts into their hands the possibility of altering the features of the sitter, and yet of preserving the likeness while doing so. A sitter with a head so flat and wide as to be unsightly would be a good subject for trial with the first slit vertical and the second horizontal, as we mentioned above. Other examples will suggest themselves. M. du Hauron gives the following directions: "The best means of experimenting with photographic transformism is to provide a dark box so fitted up that twelve or more proofs may be made at one operation. Two partitions or septa are set into a deep frame, opposite to each other and to the sensitive surface at the bottom of the frame, the model being at the other end of the box and well lighted. Each of these two septa is pierced with twelve or more slits, which are brought opposite to each other and disposed in symmetrical rows. Two slits of any given form are then so placed that the desired deformation or distortion may be produced. The model will then be represented by as many different 'transformisms' as there are pairs of slits. In the production of these images the slight distance separating the slits from the sensitive surface will greatly influence the action of the light, so that the exposure will remain within the limits absolutely practicable for portraiture. The proofs obtained will thus all differ the one from the other. A variety may be made by reversing the position of either one, or both, of the two septa above mentioned, turning them upside down, &c. If a camera furnished with a battery of lenses of any desirable number were at hand, a plate of instantaneous proof-types might be made, with the same distances between as between the slits in the septa. This plate could then be set in place before the slitted septa in the dark box, and thus a series of instantaneous portrait transformisms obtained."

It is evident from the above description that the transformism is made from a ready-made portrait or picture, not done direct from the sitter. There are certain points in the process analogous to the pin-hole or diffraction principle of making views. Fun and recreation can be had from the above in plenty; but it is rather as an important means by which defects may be remedied in portraiture that we recommend it to all of our readers who are willing to experiment out of the beaten track.

In concluding, let us add that the making of the slits requires care; they should not be broader than one-third of a millimetre. They should be drawn on white paper with India ink, rather large in size, and with clean edges and borders, then reduced to the desired measure by means of the camera. The negative, of course, must be on glass, and acts as the transforming screen.

ELLERSLIE WALLACE.

Foreign Notes and News.

At the last meeting of the Geneva Photographic Society Professor H. Fol entertained the members present with a dissertation on the resemblance observable between married people. Out of seventy-eight young couples photographed for the purposes of this edifying research, M. Fol found that in twenty-four cases the resemblance between the personal appearance of the spouses was greater than that between brother and sister, in thirty cases equally great, and in twenty-four a total want of any resemblance was perceptible. Note the conclusion arrived at by the learned professor: "In the greater number of instances people choose one another on account of mutual similarity." What would the author of *Wahlverwandtschaften* have said to this? "Tive la Fol-lie!"

PROFESSOR FOL is going to extend his experiments to aged couples, in order to ascertain if there be any tendency for married people to grow like one another. He at present seems inclined to think there is. He will doubtless preface his treatise by allusions to well-known and historical cases of married couples whose mutual resemblance increased with declining years. We shall probably encounter the familiar instances of Darby and Joan, both of whose hair became white after they reached the confines of old age; and John Anderson and his wife (this instance resting on the testimony of a Scotch writer of some celebrity), who both became bald towards the sunset of life. Then he will, perhaps, go on to show that the tendency for the parties to grow like one another is fostered by the intensity of mutual affection, and in confirmation of this view he may point out how the daughters of Gaul manifest a disposition to develop hirsute adornments in their riper years, thus becoming like the opposite sex, for *les belles Françaises* are notoriously affectionate.

DR. MIETHE, in the *Deutsche Photographer Zeitung*, devotes a good deal of space to the ever-interesting question of flash lights. He points out that magnesium powder is often burned in such a way as not to evolve more than an eighth or tenth part of the light which may be obtained when its combustion is effected in a suitably constructed lamp. The reason of this is, according to Dr. Miethe, that the magnesium flame, like so many other brilliant flames, is almost completely opaque, and only gives off light from its surface. If, say, one burns a gramme of magnesium powder in a bunch, so to speak, one will only obtain at best half the illuminating power which the same amount of powder would produce if burned so as to produce a flat flame. The principal object is, therefore, to widen out the flame as much as possible, and so increase the ratio of surface to content. In blowing pure magnesium powder through a flame, care ought also to be taken to prevent any of the magnesium from passing through unburnt, as it is likely to come in contact with plates, albumenised paper, &c., and cause spots.

This explanation, though accounting for a good deal of the observed differences in magnesium lights of the same kind, does not, as Dr. Stolze points out, explain such a difference as 1:10. In flash light compounds the chloride of potash absorbs heat in decomposing, which heat has to be supplied from the combustion of the magnesium powder, thus lowering the temperature of the whole, and as a consequence producing a less intense light. The chloride of potash formed also surrounds the light with a kind of *chromosphere*, which absorbs a good many of the luminous radiations. In the case of lights, such as Dr. Miethe's, where the pure magnesium powder is blown through a Bunsen flame, these causes are not active, and the light is consequently brighter.

THE *Journal de l'Industrie Photographique* recently published two very interesting photographs of the clouds caused by the explosion of the Cartridge Factory at Antwerp, accidentally taken from a distance of 1700 metres. These clouds present a remarkable resemblance to gigantic sponges placed at the top of a column of smoke, and correspond therefore to the phenomena witnessed at volcanic eruptions.

THE Munich Photographic Club is about to publish a free-and-easy sort of periodical under the title *Notiz Blätter des Photo. Clubs*, in

München, to give the members a short account of all the novelties and discoveries in connexion with photography. The above Society has only just recently adopted the *Photographische Correspondenz* as its official organ.

M. KASSELBAUM, in the *Photographische Rundschau*, recommends the following as an intensifier, which is said to act well. The plate is first dipped in a solution of citric acid and then introduced into a bath of the following composition:—

Hydroquinone	6 grammes.
Water	700 "
Nitric acid	10 drops.
Silver nitrate, eight per cent.....	18 c.cm.

It would appear that now even, as in the days of the Revolution, the French still regard everything on the other side of the Rhine as appertaining to Cimmerica and the realm of barbaric darkness and confusion generally! How else can we explain the bland determination with which a French contemporary persists in alluding to the Berlin *Photographische Mittheilungen* as an Austrian journal?

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 31.....	Great Britain (Technical).....	5A, Pall Mall East.
January 1.....	Coventry and Midland	The Dispensary, Coventry.
" 1.....	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 1.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 2.....	Bolton Photographic Society	The Baths, Bridgman-street.
" 2.....	Leeds	Leeds Mechanics' Institute.
" 2.....	Dundee and East of Scotland	Lamb's Hotel, Dundee.
" 2.....	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
" 2.....	London and Provincial	Masons Hall Tavern, Basinghall-st.
" 2.....	Sheffield Camera Club	Whiteley's Institute, New Surrey-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 19.—Mr. A. L. Henderson in the chair.

Prints from a stereoscopic negative taken by Mr. F. York were shown to illustrate the effect of substituting liquor magnesia carbonate for ammonia and bromide in pyro development. The negative had been divided and one half developed with each mixture, the magnesia half being considered to show the more density and detail.

Mr. J. Traill Taylor showed a covering glass that had been removed from a transparency, and that exhibited an erosion over the whole of the inner surface not in contact with the paper mat. The transparency was one of a set of French production that had been sent to India, the covering glasses of which all exhibited the same defect. Other transparencies of English make that had accompanied them did not suffer from the erosion in question.

Mr. P. EVERETT inquired whether the transparencies had been intensified with mercury, and it being replied that probably they had been so treated, continued, that the mercury had, doubtless, been liberated, and, being condensed upon the glass, had attacked the lead in the glass.

This explanation was generally considered to be the correct one, and the CHAIRMAN mentioned, as lending it additional probability, that he had often noticed the same erosion of the covering glasses of Daguerreotypes where mercury was also employed in the preparation of the photograph.

The CHAIRMAN then brought to the notice of the meeting a stereoscopic slide representing a steamer in middle distance and a shore beyond. The peculiarity about the picture was that, although the negative had been taken with a twin-lens camera exposed with drop shutter, the stereoscopic effect was only properly shown where the print was mounted without the usual transposition.

Mr. TAYLOR, on examining the print, said that the two sides of the picture had been taken not quite simultaneously, and the vessel on which the camera stood having moved forward, the steamer in the picture appeared to cover over a different part of the distance from that in which it was when the first half had been exposed.

Mr. A. COWAN inquired as to the arrangement for exposing the plate, and, finding that there were two separate shutters connected by a loop of string, considered that unless the hand was perfectly central and moved truly one of the shutters would be sure to act slightly before the other.

The Chairman then showed some large instantaneous pictures of animals taken by Mr. F. Radford, of Adelaide, and a number of stereoscopic views by Mr. W. F. Hall, of Sydney. Amongst the latter were some views of the Jerolan Caves, which had been illuminated for the purpose by magnesium lamps.

Mr. TAYLOR thought it a great pity that the latter set of pictures had been spoiled by the name of the subject being printed near the centre of the scene.

The CHAIRMAN thought so too, and hoped that these observations would be reported and reach the producer of the pictures, and that he would be induced to forego the practice.

Mr. J. B. B. Wellington showed a negative which in the sky exhibited traces of an image belonging to another negative. The plate exhibited had been lying for some time undeveloped, with a piece of tissue paper separating it from a plate that had been developed, and fixed, and slightly washed before drying. It was the image of this negative that had been impressed upon the plate now shown.

Mr. W. E. DEBENHAM suggested, as a possible explanation, that the plates

had been exposed for some time to the light in the dark room or elsewhere with the developed negative uppermost.

The CHAIRMAN thought it more probable that there was some relief in the developed negative, and that this relief had acted through the tissue paper, producing the effect known as shearing stress.

Mr. Cowan showed the "Norsen" vignetting arrangement, a contrivance which admitted of great variation of effect and of constancy when the particular effect desired had been decided upon.

CAMERA CLUB.

ON Thursday, December 19, Mr. LYONEL CLARK read a paper upon *Salting and Exciting Ordinary Drawing Paper for Silver Printing*. The paper was accompanied by a demonstration. Mr. W. Clarke occupied the chair.

Previous to the lecture the Secretary handed round some excellent paper negatives made in 1853 by Mr. Registrar Jackson, of the Law Courts, and lent by Mr. Gambier Bolton, also some enlargements on celluloid ivory films lent by Messrs. Fry & Co. for exhibition.

Mr. CLARK described the qualities and characteristics of the different rough papers employed, and specified the particular treatment required for each. After giving details of the salting and exciting, he proceeded to show the processes, floating the paper upon the salting and sizing solution (a thick gelatine sizing being required for the rough, stout papers). After drying, he sensitised the sheets, employing a brush which was a modification of the Blanchard brush, swansdown calico being folded over a ten-inch sheet of celluloid bent till the two edges met, and the whole held by wooden clip handle after the manner of a squeegee. This brush was pliant and yet firm. In sensitising, Mr. Clark stated that Mr. Burton suggested twice sensitising; he himself found once sufficient. The difference in opinion was due, no doubt, to the fact that Mr. Burton soaked his paper in salting, whereas he (Mr. Clark) only floated it and used a strong sizing. Mr. Burton's method would appear to require more silver salt in exciting. Mr. Clark also exhibited a large number of examples and demonstrated several methods of toning and intensifying prints, the silver intensifier serving to bring up to full strength prints very faintly printed.

In the discussion, Messrs. Anstn, Shipton, Davison, Maskell, Dr. Patterson, and the Chairman took part.

Thursday, January 2, will be a lantern evening.

NORTH LONDON PHOTOGRAPHIC SOCIETY

DECEMBER 17.—The President (Mr. J. Traill Taylor) in the chair

Mr. H. Hudson was elected to membership.

Mr. W. H. SMITH, of the Platinotype Company, showed and explained the working of a new hand camera now being placed on the market by that Company. It could not in any sense be called a detective camera, as its appearance would at once betray its purpose, but the ingenuity of its construction was allowed by all, and the perfection of the workmanship was much admired.

Mr. SMITH then proceeded to explain and demonstrate *The Hot Bath Process of Platinotype Printing*. He said the process of preparing the paper was attended with too many difficulties to make it worth while to attempt it in small quantities; it was, therefore, recommended that it be purchased ready prepared. The only condition with regard to the sensitised paper which it was necessary to observe was that it should be kept perfectly dry, otherwise the prints would suffer in quality, and, instead of being brilliant, would be flat and without vigour. The paper should, therefore, be stored in a calcium tube, which consisted of a tin case having a receptacle for chloride of calcium, and, when placed in the printing frame, it should be backed up with a sheet of thin indiarubber or mackintosh cloth. In the printing, although the paper did not print out, a faint image was formed, which was sufficient to indicate, after a little practice, when the exposure had been sufficiently prolonged. The demonstrator then passed round a number of exposed prints and replied to several questions from members relating to the exposure they had received, &c. He then proceeded to develop these prints in the following manner, explaining each step as he proceeded:—A quantity of the developing solution, consisting of one pound of oxalate of potash dissolved in fifty-four ounces of water, was placed in an enamelled iron dish and heated, by means of a Bunsen gas burner, to a temperature of 160°. A print was then floated on the surface of the solution for a few seconds, until the developing action was complete; when this occurred the print was removed directly into a bath of hydrochloric acid solution—about one part acid to sixty of water—and there left immersed for about ten minutes, after which time it was removed to a second similar bath, and then to a third, in each of which it remained the same time; a thorough washing in water completed the operations. Mr. Smith explained that some degree of modification was admissible in the temperature of the developing bath, which could be used cooler, but he thought it advisable not to use it at a lower temperature than 130°. It was certainly easier to use at the higher temperature. The function of the acid baths was to remove the iron salts from the paper, and if the third bath was in the least degree discoloured another bath should be given to the prints. A large number of prints from negatives which had been supplied for the purpose by various members were developed.

Mr. N. P. FOX said he had used the bath at a much lower temperature than that recommended with success.

Mr. A. MACKIE said the platinotype process was one of the many processes based upon that discovery by Sir John Herschel, that some of the per-salts were reduced by the action of light to proto-salts, which proto-salts have the power of reducing some of the metals from certain of their salts. In the present instance the per-salt employed is ferric oxalate, a solution of which mixed with a solution of potassic platinous chloride is spread on paper and dried. The action of printing is to convert that part of the ferric oxalate which has been exposed to light to ferrous oxalate. The ferrous oxalate is capable of reducing the platinum from the platinous salt if brought into intimate contact with it, but is incapable of acting to any extent in the dry state. The required contact is attained by the action of the potassium oxalate solution, in which the ferrous oxalate dissolves and at the moment of solution reduces the platinum.

A vote of thanks having been passed to Mr. Smith, the CHAIRMAN announced that Mr. N. P. Fox had found it necessary to resign his office as Secretary, and that the duties of that office had been kindly undertaken for the present by Mr. G. J. Clark, of 52, Queen's-road, Brownwood Park, N., to whom all communications for the Society should be addressed.

The next meeting will be held on Tuesday, January 7, and will be a lantern night.

BATH PHOTOGRAPHIC SOCIETY.

DECEMBER 18.—Ordinary meeting at the Royal Literary and Scientific Institute, Terrace Walks.

Communications received were dealt with and forthcoming meetings announced:—January 8, Special evening devoted to Flash-light Apparatus and Photography. Open to all interested, at Messrs. Powell's Rooms, 10, Quiet-street. Visitors invited to bring cameras and lamps. January 29, Lantern night at the Institution, when Mr. Dugdale will illustrate scenes visited by the Society during the past season.—February 26, Annual meeting, when Mr. Friese Greene will exhibit his new camera and pictures taken by it.

Mr. Dugdale showed examples of silver printing of an effective character.

The PRESIDENT then gave an extremely interesting lecture upon *The Chief Subjects for the Camera to be found in the Cities of Italy*. The lecture was illustrated with eighty-six wet collodion transparencies from film negatives made by the President in Milan, Venice, Genoa, Rome, Florence, &c. The lecture also teemed with historical information and many amusing anecdotes.

Mr. AUSTIN J. KING moved the vote of thanks, after which several questions were asked and answered concerning lens, camera, and film used, and the method of toning the transparencies.

BRIGHTON PHOTOGRAPHIC SOCIETY.

DECEMBER 10.—Messrs. WEBLING and CORDER gave an account of their holiday in North Wales, illustrated by about ninety pictures shown by means of the oxyhydrogen lantern, the accompanying description being given by Mr. Webbling.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

DECEMBER 12.—Dr. J. K. Tulloch (President) in the chair.

Mr. W. D. VALENTINE, Judge in the lantern slide competition, awarded the prizes as follows:—1, Mr. H. S. Wybrants; 2, Mr. W. Salmon; and 3, Mr. J. Mathewson. His report stated that nearly all the slides were of very superior quality, and much above the average of such work. This competition was principally for technical excellence. Three negatives were selected by the Council, from which slides had to be made by each competitor.

A number of slides by members of the Society and of the Paisley Society were exhibited by the limelight.

Messrs. Mawson & Swan exhibited one of their transparency frames.

PACIFIC COAST AMATEUR PHOTOGRAPHIC ASSOCIATION.

At a special meeting, called for the purpose, on November 21, Mr. H. S. BELLSMITH, of the Eastman Company, appeared before the Association to describe the manufacture of the new film and the subsequent manipulations necessary to produce a negative. As this was the third appearance of Mr. Bellsmith before the members, he was given a right cordial greeting by a meeting fully as large as has ever assembled in the rooms of the Association.

With his direct style, good voice, and easy manner, he closely held their attention while he described the events which led to the gradual development from the first film produced by the Company, which was on paper, and had to be oiled, to the transparent film of to-day, which is ready for printing as soon as dry after development. The difficulties and objections to the disagreeable work of oiling were humorously spoken of, and now that they are upon the verge of the past, Mr. Bellsmith confessed that there was an awful lot of work connected with stripping. As the process of manufacture of the films used in the stripping process is known to readers of magazines, the description given, though interesting, will not be here repeated. Some facts regarding the new film, however, are interesting. At first it was thought impossible to make a celluloid support long enough for use in the roll holder. After the difficulties to the way had been overcome, there was trouble in getting the celluloid thin enough, for when too thick it would not lay flat on the table of the roll holder. After this question had been solved it was found that the emulsion separated from its support, sometimes even before reaching the developer—what is known as dry frill. This was caused by the celluloid not being sufficiently seasoned, the presence of camphor, which is largely used in all forms of celluloid, preventing the necessary adherence. Finally this serious difficulty was overcome, and its removal allows the production of the most satisfactory substitute for glass yet discovered.

Having finished his description, Mr. Bellsmith had the lights turned down, and, with the aid of proper illumination, proceeded to develop some exposures. Six pieces of transparent film were soaked in water to make them lay flat, and afterwards transferred, one at a time, to a diluted developing solution of elikonogen. They were kept in motion, examined frequently, and, in a remarkably short time—about twenty minutes—so dry longer than the time required to develop a plate, six good negatives were produced. To guard against their frilling, made possible by the heat of the hand tending to dissolve the substratum, they were passed through an alum bath before fixing. After the hypo they were washed in the usual manner and then soaked in a solution of glycerine and water to ensure their laying quite flat. Before the final washing they were handled around among the members for examination, and found to equal products on glass. Judging by sample negatives and prints, the results are much finer than those obtained by the stripping process, aside from the fact that negatives are easier to make. The skies are perfectly even, without the slightest trace of grain or mottle.

After this successful demonstration, Mr. Bellsmith exhibited a number of

new cameras, also the first Kodak ever made. Upon this subject the older members, as seasoned veterans of the tripod, could not resist the temptation to "josh" him upon the subject of "You push the button, we do the rest;" but he ably retorted, and, by the production of the most compact and complete detective or hand camera yet seen here, changed their criticisms to admiration. First came the enlarged Kodak. "No longer a Kodak," said the critics, for it contained a finder and a changeable focus. The size of the image, still circular in form, is about double that of the first Kodak. The size of the box is about that of the ordinary detective. Good as this camera is, it cannot hold a candle to its companion, the folding hand or detective camera. The front of this box drops down and is held in place by two braces. A bellows with lens and shutter attached is drawn out to a registered mark and fastened by the turn of a lever; the shutter is set, the exposure made, and the box closed up all in a moment. Equipped with a roll holder carrying transparent films sufficient for forty-eight exposures, this camera is complete, and must become a favourite, particularly if it is furnished with a ground glass, as some of the members suggested. Upon the 5x7 an ingenious arrangement of the rising front permits more sky to be obtained when used either horizontally or vertically, and the finder also changes to suit the shape to be made.

Correspondence.

Correspondents should never write on both sides of the paper.

AMATEUR VERSUS PROFESSIONAL.

To the Editor.

SIR,—Having read several of the letters on the above subject which have appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY, may I humbly suggest that in continuing the discussion the "versus" be henceforth omitted, for I see no earthly reason why each should not pursue his own course as he pleases without interfering with the other. As a professional photographer I am always pleased to meet an amateur. I do not mean a Shamateur—this latter class I do not think anybody, be he amateur or professional, has the slightest respect for, but even what he does cuts two ways; he produces photographic atrocities of his friends and charges cost of material, plus a little for time, &c. Now, although this tends to bring photography into disrepute as being cheap and easy (Mr. Shamateur has only had a camera so many weeks, they quote), yet when they see these atrocities side by side with the work done in a properly constructed studio by skillful men, they feel somewhat ashamed of the badly finished caricature (although it was cheap), and go to the nearest professional and obtain a good portrait, with the result that the cheap and nasty ones get burnt or hidden away, and photography goes up in their estimation as not being so easy after all.

As to the suggestion of a Trade Union, personally I look upon that as somewhat degrading, whilst a tax on every one who carries a camera would be very hard indeed, and almost as unjust as would be an attempt to tax every one who takes a trip into the country to enjoy the fresh air and change of scene in order that the doctors might have more business. The idea that amateur competition has reduced prices is only true to a very small degree. The cutting down of prices has emanated from within the profession, and not from without, as many seem to think. It is the rivalry amongst ourselves and the general badness of the times that is to blame for most of the trouble, and not the amateur, for, as most of us know who look at the question dispassionately, more than nine-tenths of the work he does would remain undone unless he did it, whilst a great deal of his work is a source of profit to the local photographer in after-manipulations, such as printing, &c.

It would be impossible to touch on the many causes that have helped to lower prices, but there is one that many photographers in provincial towns have suffered from, namely, that they engage a man as assistant operator, he remains a year or two, gains experience, and saves or has enough to buy a camera, lens, and a few accessories; then sets up in opposition to his late employer, whose clients and methods of doing business being well known to him make him at once a dangerous rival, particularly as, in order to attract business, he usually starts by fixing prices somewhat lower than his late employer's, this frequently ending in alternate reductions of prices until there is no margin of profit left. As a remedy for this evil I should suggest a clause in agreements, that an employé should not start in business for himself within a given radius, unless under a heavy fine. This may sound harsh, but it is the usual custom in several other businesses.

If a tax must be levied on photography, I would suggest that it should be applied only to work actually sold; it might take the form of a Government adhesive stamp to be affixed to each photographic print making it illegal under heavy penalties to buy or sell photographs without so stamped. This would at any rate cut against the pseudo-amateur, whilst it would not in any way interfere with the true amateur who photographs for the pure love of the thing.—I am, yours, &c.,

RED PINE.

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—Should any of your readers care to judge for themselves whether my letter (which appeared in your issue of the 8th of November) was

written in an offensive spirit or manner, I ask them to do me the justice to refer to it.

I decline to enter into any correspondence with a man who writes in such an intemperate manner as Mr. Robinson has done of one who never said an unkind word to or of him.—I am, yours, &c., BART ROUS.

The Arts Club.

[Here this matter terminates.—Ed.]

CELLULOID FILMS FOR LANTERN SLIDES.

To the Editor.

SIR,—The two gentlemen who write with reference to my article on the above subject which appeared in your issue of December 13th, appear to me to contradict one another. Mr. England says that celluloid is of no use for lantern slides; while Mr. Adams tells us that he has patented its use for that purpose!

If Mr. England will kindly read my article again, he will see that I show how the greater part of the heat-rays can—if necessary—be filtered out. But Mr. England must remember that in my experiments I have used only the thick, yet very rigid and transparent films, so beautifully made and coated by Mr. Fitch. I believe that celluloid films were prepared by Mr. Fitch even before the American workers, who are generally credited with its first application—in a transparent form—to photography.

It is probable that few exhibitors of lantern slides will require to keep their celluloid films for more than one or two minutes in the lantern. Any "buckling" can be prevented by putting the film between a couple of pieces of thin glass before inserting it in its holder. A tank of alum-water just in front of the condenser will filter out most of the heat-rays without practically impairing the light.—I am, yours, &c.,

W. JEROME HARRISON.

Science Laboratory, Icknield Street, Birmingham.

Exchange Column.

I will exchange *Cassell's Illustrated Shakespeare*, complete, unbound, and quantity of lantern plates and lantern slides of Irish scenery, for a pair of condensers and porcelain developing dishes.—Address, W., 30, Vicarage-road, Willesden.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

PHOTOGRAPHY.—REGISTERED:—

R. G. M., Market Drayton.—Two photographs of J. Taylor, Esq., High Sheriff of Shropshire.

E. M.—No such Directory is published.

J. L., referring to a lamp mentioned in the ALMANAC, the "Vulcan Safety," asks where this can be obtained, as he should like to try one.

H. M. W.—We do not know anything concerning the Chicago "Turn Over" detective camera, but will look up our American exchanges for information.

COPY.—Messrs. Mawson & Swan still continue to supply collodion for the wet process. Apply to them direct. Many dealers do not keep it in stock now.

A. F. TYLER.—Considerable advantage may accrue from the use of orthochromatised plates in the studio when the light is yellow from foginess of the weather. The formula named gives excellent results.

S. GOODR.—The best and cheapest process by which to illustrate the book is the colotype. For so small an edition no other process will prove so cheap. The prints can be produced with a clean margin, so that no mounting is required.

F. N. F.—There being no statement as to diameter and focus of your lens, we cannot say whether it would enlarge a half-plate negative. It seems to us that it would answer well enough for a quarter-plate, but why not ascertain this by actual trial?

W. C. B.—Enamelling collodion may be made by dissolving four grains of pyroxyline and four drops of castor oil in half an ounce of ether and half an ounce of strong methylated spirit. For directions to use it see page 477 of our ALMANAC for 1888.

C. BOLING.—Gum is a very good mountant for photographs, provided it contains nothing that will act injuriously on the picture. This, however, is the case with the glues of commerce, as they are generally acid, and contain other impurities.

A. B.—The class of portrait lenses usually designated "B" possess a much larger aperture than the rapid rectilinear, and therefore work more rapidly. This is a general statement only, as some "B's" may be slower than some rectilinears may be abnormally rapid.

W. B. WOOD.—The cabinet lens does not answer in its entirety because of the focus of the nine-inch diameter double convex being too long. This would be rectified by the addition of a nine-inch plano-convex, flat side placed next the lights, but the best way would be to get proper condensers the correct size.

F. GUTENST (Philadelphia).—The paper in question is what is known as *papier minéral*. It may doubtless be obtained from Messrs. Anthony & Co., of New York. They used to be the agents for Lambertype materials. It may also be had from Messrs. Marion & Co., London, and other stock dealers.

W. A. J.—For photographing such objects as those mentioned an objective of three inches focus should be used. No success must be expected if a deeper power be employed. A long exposure will be necessary, on account of the non-actinic character of the objects, if the source of light is an ordinary paraffin lamp. The limelight will be far better if it be available.

SIGMA inquires how to obtain good black-and-white negatives of engravings.

He says he wants the lines perfectly clear and the other parts very dense.—The best process for this class of work is wet collodion, but very good results may be obtained on ordinary slow plates with careful development. Perhaps the best commercial plates for the work are those specially prepared for the purpose, and sold by Mawson & Swan under the name of "photo-mechanical" plates. They are slow and yield results very similar to those obtained on wet collodion.

SYDNEY TELBUTT writes: "Your issue of August 3, 1888, gives an account of a discussion on stereoscopic matters at the Photographic Convention of the United Kingdom. It is there twice mentioned about 'Wheatstone's' stereoscope and once about an instrument for this same purpose invented by Sir Howard Grubb. I would be much obliged to you if you could put me in the way of obtaining either or both such instruments."—With respect to the former we cannot say where a Wheatstone stereoscope can now be obtained; but a letter addressed to Sir Howard Grubb, Dublin, would ensure information as to the latter.

H. A. HUTCHINSON asks: "1. Is a coating of varnish sufficient to resist hypo on wood? I am making a fixing tank for negatives as I have seen suggested in your columns, the ends and bottom of wood, the sides of glass, but I don't know whether the varnish would stand.—2. Do you think the extra price (about fifty per cent.) of thickly coated landscape plates over, say, Ilford or Fry's ordinary, is good value? I have asked several of my friends who are old hands at photography, but their opinions vary so.—3. My negatives (half-plates) are taken half for enlarging on bromide paper and half for matt-surface silver prints or platinotypes, so I am in doubt which of the two classes of negatives would be best for both kinds of work."—In reply: 1. Yes, if the varnish be impervious. Several coats of shellac will answer, but better still is a good coating of paraffin wax.—2. Yes, for some purposes. Why not compare results for yourself?—3. For printing in platinum, negatives of a more vigorous character are required than for enlarging on bromide paper.

ARTIST writes: "Will you kindly answer the following question in correspondence? Having been engaged by a country firm on a salary of 2l. 2s. per week for under three months was compelled to sign an agreement not to work for any other photographer in same town or within twenty miles radius for two years after leaving, under a penalty of 20l., or to take any kind of photograph on his own account in the same town. The agreement stated a week's notice on either side in writing; only a verbal notice was given, no writing whatever. Does the agreement stand good? There was no money given as a bonus to bind the agreement."—This is purely a legal question, and one we cannot answer with any degree of confidence. We fully imagine that in a court of law the prohibition to follow one's business a radius twenty miles would be ruled as an "undue restriction of trade." Furthermore, that the agreement was not an equitable one, inasmuch as no consideration was given which would make it binding. Also it was ignored by the employer in terminating the service of the employee. This is our opinion; and we give it for what it is worth. Perhaps some of our legal friends will supplement it with their opinions.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday December 31, at 5a, Pall Mall East, at eight p.m.

PHOTOGRAPHIC CLUB.—Wednesday, January 1, monthly lantern meeting (instead of December 25). Subject for discussion, *Lantern Matters*.

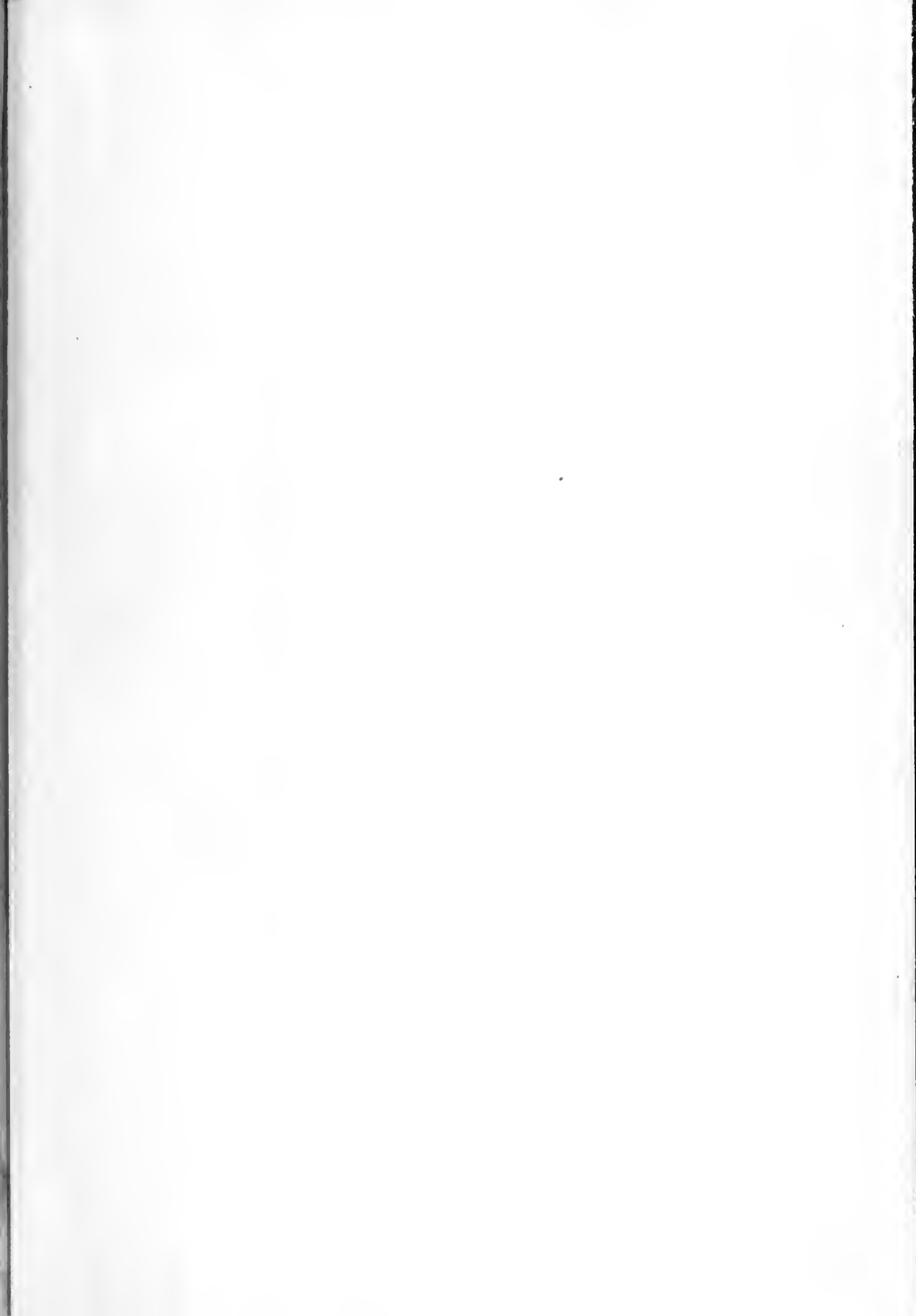
BIRMINGHAM PHOTOGRAPHIC SOCIETY EXHIBITION.—Our readers are reminded that all pictures intended for this Exhibition must be forwarded so as to be received not later than January 7, 1889, addressed to Mr. J. H. Pickard, 39 and 40, Woodcock-street, Birmingham.

ROYTON EXHIBITION.—The time for receiving pictures for this Exhibition has been extended to January 15.

THE PHOTOGRAPHIC CLUB.—Presentation.—The annual dinner took place at Anderton's Hotel, on Wednesday, December 18. Mr. W. Ackland presided and Mr. T. Charters White occupied the vice-chair. During the evening a testimonial was presented to Mr. Edward Dunmore, the late Hon. Secretary and Treasurer. It consisted of a gold watch, and the "Life Membership" of the Club, illuminated on vellum and handsomely framed. There was a large attendance of Members, and a most enjoyable evening was spent. Songs, pianoforte solos, and recitations being contributed by Messrs. A. Cowan, J. W. Kippis, W. Holt, Tagliaferro, Charters White, Scrivener, F. A. Bridge, &c.

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